Self-Concept as Determinant of Biology Performance among Senior Secondary School Students in Minna, Niger State

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Abstract: *This paper aimed at investigating the relationship between self-concept and performance in Biology among secondary school students in Minna, Niger State with an objectives to determining the academic self-concept' perception of secondary school students, examine the influence of academic self-concept on biology performance among secondary school students and examine the influence of gender difference on biology performance among secondary school students. The study adopted a correlational research design. The total population for the study comprises 2,425 Male Students and 2,227 Female Students making a total sum of 4,698 students. Sample sizes of 234 students were selected randomly from 10 Selected Schools making 20% of the population. Validity of the instruments was carried out by science education and psychology expert at Federal University of Technology, three biology experts from secondary schools in Minna. Data obtained were analyzed using Cronbach Alpha. A reliability computation on Academic self-concept showed 0.719 alpha level.The data collected from the sampled students were analyzed using descriptive and inferential statistics of mean and standard deviation with a significance level of 0.05. The result show that there is a positive perception with mean value of 3.03 – 3.60; that academic self-concept is a determinant of students' academic performance and gender does not influence students academic self-concept. The study recommends that school teachers should encourage students to develop high positive self-concept of themselves, Parents and teachers to also encourage awarding of students' performance and get the students to be more expose to strong love and counseling that will build their self-esteem.*

Keywords: Self-concept; Biology performance; Gender.

Introduction

It has been a general notion over the years that there is low level of academic performance of students among secondary schools across West African countries (West African Examination Council [WAEC], 2012). This trend could be attributed to factors such as social, economic, religion and psychological, under which self-concept finds expression (Villarroel, 2001). There are many factors contributing to enhancement of academic performance of students. Individual students would be able to set for him or her, a future goal and objectives. Radhika, (2018) is of the opinion that academic performance would determine what subject they will specialize in colleges and universities, which educational institutions they will get enrolled into, what career opportunities they would take up and so forth. Thus, academic performances are influenced by class participation, class exercise, assignments, tests, examination, and other academic exercise.

Previous research findings have shown a significant correlation between self-concept and academic achievement, and suggest that individuals with positive views of themselves strive for success to keep that positive outlook. On the other hand, individuals with weak or negative self-appraisals are more likely to view themselves as incapable of success in attaining desired goals (Tabone, 2011). Steinke (2010) also noted that pupils who posses a good self-concept are actively engaged in school, which leads them to be more successful than those who do not feel capable.

According to Gillan (2008), there is a clear relationship between self-concept and academic p e r f ormances, and this relationship affects how students deal with the demands of their academic environment, which means a positive self-concept should result in positive educational outcomes and vice versa. There has been diverse opinion on the definition of self-concept. While some authors refer to it as a construct closely related to personality, that is, a relatively stable and distinctive patterns of

behavior that characterize an individual and his or her reactions to the environment, some others view it as domain-specific evaluations of the self (Ayodele, 2011; Santrock,2005; Whiston, 2005). However, for this study self-concept will be defined in this context, as the way an individual thinks, feels, acts, values and evaluates himself or herself in relation to performance in Biology. Self-concept is one of the most popular ideas in psychological and educational literature which is considered as a key to success. It shapes how the individual views his relations with the world and reflects his overall quality of being. The self-concept is basically a set of ideas about oneself: ones' personality and his/her place in the world, society, and the lives of people around (Ayesha and Shah, 2015).Self-concept is the sum of a person's perceptions about his/her physical, social, temperamental and academic competence. It covers beliefs, convictions and values the person holds (Sood, 2006).

Several studies have examined the relationship between self-concept and academic achievement or performance. Most of these studies support the belief that self-concept is a strong facilitator of academic achievement and that a positive or negative change in self-concept tends to produce a commensurate change in academic achievement or performance (Yara, 2010; Valentine, Dubois &Cooper, 2004; Hamachek, 1995). For example, in a meta-analysis of 128 studies, Hanford &Hattie (1982) found the overall correlation between general self-concept and achievement to range from -0.77 to 0.96 with a mean correlation co-efficient of 0.21. However, the 95 percent confidence interval also spanned 0, indicating a positive relationship. In another large scale study of 4,500 college students, Pascarella, Terenzine &Wolfe (1986) concluded that pre-college academic self-concept generally has a unique, positive and direct influence on collegiate academic achievement even when other factors suc has high school achievement and degree aspiration were taken into consideration (Ayodele, 2011). Similarly, recent studies in this area also support the existence of relationship between self-concept and academic achievement. For example, in a study involving 500 pupils randomly selected from primary schools in Kebbi State of Nigeria, Kamba (2009) found a correlation co-efficient of 0.695 (0.70) between self-concept and academic performance, indicating a positive moderately significant relationship.

Yara (2010), conducted research on senior secondary school II students in South-West Nigeria, and found that found that students with high and positive self-concept perform satisfactorily in Mathematics. On this premise, it could be conjectured that students who think positively about their mathematics abilities feel highly delighted in solving mathematical problems, act promptly in learning mathematics, place high value on the benefits accruable to them in having good grades in mathematics and evaluate themselves as being capable of performing favorably in mathematics, are likely to perform creditably in the subject. Therefore, same can applies to all students in Biology class that when students can develop high positive self-concept of themselves, they could as well perform greatly in Biology.

However, the relationship between self-concept and performance in Biology has not been established nor research as most of the review work is diverse and contradictory. Again the issue of gender difference in self-concept and performance in biology has not been resolved and therefore subject to further investigation. Consequently, three important questions are relevant in the present study: One, "Does self-concept relate to performance in Biology?" Second, "Does gender difference influence self-concept towards Biology?" Third, "Does gender difference influence performance in Biology?" Therefore, this study seeks to provide concise answers to the questions raised.

Aim and Objectives

This paper aimed at investigating the relationship between self-concept and performance in Biology among secondary school students in Minna, Niger State with focus on the following objectives;

1. Determining the academic self-concept' perception of secondary school students in Minna.
2. Examine the influence of academic self-concept on Biology performance among secondary school students in Minna.
3. Examine the Influence of gender difference on biology performance among secondary school students in Minna.

Research Questions

1. What is the perception of secondary school students' academic self-concept in Minna?
2. What is the influence of academic self-concept on Biology performance among secondary school students in Minna?
3. What is the Influence of gender difference on biology performance among secondary school students in Minna?

Research Hypotheses

Ho$_1$: Academic Students self-concept has no significant influence on their academic performance directly.

Ho$_2$: Gender has no significant influence on secondary school students' academic self-concept

Review of Related Literature

Clark and Seevers (2003) investigated the relationship between student self- concept, both in a global sense and more specific areas, with achievement scores in reading and mathematics. Student self-concept was assessed with the Piers- Harris Children's Self-Concept Scale and academic achievement was measured by the Texas Assessment of Academic Skills annual test battery. A significant positive correlation was found between global self- concept and reading achievement and a weaker positive correlation for mathematics achievement.

Awanetal (2011) made a study on relationship between achievement motivation, self-concept and achievement in English and mathematics at secondary level and found that self-concept has a significant relationship with achievement motivation.

Khirade, Santosh (2012) measured self-concept among the adolescent comprising 80 girls and 80 boys. Self-concept questionnaire was adopted from Dr. Raj Kumarassess their self-concept. The result shows that there was no significant difference between the self-concept of boys and girls & there was no significant difference between the physical, social, temperamental, educational, moral and Intellectual self-concept among the boys and girls adolescent students.

Methods

Research Design

This study adopted a correlational research design which seeks to investigate the relationship between self-concept performances of students in Biology among secondary school students in Minna, Niger State. This design seeks to clarify phenomena through careful data collection and analysis (Creswell, 2015 & Fraenkel & Wallen, 2006).

Population

The population for the study will consist of all SS II Biology students in senior secondary schools across Bosso local government in Niger State. The total population for the study comprises 2,425 Male Students and 2,227 Female Students making a total sum of 4,698 students. a sample size of 234 students will be selected randomly from these 10 Selected Schools

Sample and Sampling Technique

There are twenty secondary schools in Bosso local government that comprises of the population of students offering biology. 10 of the schools will be randomly selected from each stratum and a sample size of 234 students will be selected randomly from these 10 Selected Schools. This is exactly 20% of the target population under the study.

Research Instrument

A researcher instrument named 'Questionnaire on Self-Concepts' was adapted from previous researchers and modified to suit the purpose of this research study. The questionnaire QSC is divided into sections (A and B); section A sought demographic information from the respondents' gender, age and school location. Section B sought participants' opinions on their academic self-concept and gender differences. The instrument for data collection will be a structured 4-point Likert type questionnaire; Strongly Agree (SA), Agree (A) Disagree (D) and Strongly Disagree (SD) with the scale of 4,3,2 and 1 respectively.

Validity of the Research instrument

To determine whether the research instruments was actually relevant to the constructs to be measured and how related they are to the set criteria, the construct and criterion validity of the instruments was carried out by science education and psychology expert at Federal University of Technology, three biology expert from secondary schools in Minna. To examine how presentable the research instruments was, and its appropriateness, suitability for target population in term of clarity, depth of coverage and language. Vital inputs that were made by all the experts, their suggestions and corrections were effected by the researcher and the research instruments was finally found out fit for the research.

Reliability of the Research instruments

There liability of the research instruments was determined after conducting a pilot study on 249 students at Day Secondary schools Limawa Minna and Day Secondary school Gidan Magoro Minna who were among the population, but no part of the sample for the main study was used. The researcher carefully administered the instruments once on the respondents and data obtained were analyzed using Cronbach Alpha. A reliability computation on Academic self-concept showed 0.719 alpha level, Social self-concept showed 0.712 and Physical self-concept showed 0.815 Cronbach alpha level respectively (See Appendix). Reliability coefficients equal or above 0.70 are considered acceptable (George & Mallery, 2003)

Method of Data Analyses

The data collected from the sampled students were analyzed using descriptive and inferential statistics. All the research questions were answered using descriptive statistics of mean and standard deviation. In section B, C and D decision mean of 3.0 was used. The significant difference was ascertained at 0.05 alpha levels. The Statistical Package for Social Science (SPSS) version 23.0 was used for the analysis.

Results

The results are presented based on the stated research question and formulated hypotheses. Note research question 2 and 3 are translated into hypotheses 1 and 2 and are tested at 0.05 significant differences. The results are presented below:

Research Question 1: What is the perception of secondary school students on academic self-concept in Minna? To answer this research question, mean and standard deviation was employed and the result is presented in Table 1

Tabe1: Mean and Standard Deviation of the Perception of Secondary School Students' on Academic Self-Concept

S/No	Statement	N	Mean	Std. Deviation	Decision
1	I always have good grades in Biology	249	3.50	.61	Positive perception
2	I have no issues with spelling biological /botanical words	249	3.03	.75	Positive perception
3	I enjoy studying Biology	249	3.63	.58	Positive perception
4	I am good in drawing and labeling Biology diagrams	249	3.27	.78	Positive perception
5	I have no problems pronouncing biological words	249	3.13	.75	Positive perception
6	Learning Biology enhances my understanding of other science subjects	249	3.34	.79	Positive perception
7	I do better in Biology than other subjects	249	3.03	.82	Positive perception
8	Biology is relevant to my daily life activities	249	3.42	.69	Positive perception
9	Biology is not boring to me at all	249	3.46	.72	Positive perception
10	I have interest in Biology	249	3.52	.67	Positive perception
	Grand Mean	249	3.33	0.72	Positive perception

Table 1 shows the results of the Perception of Secondary School Students' on their Academic Self-Concept. The average mean of 2.50 was the benchmark for agreeing and less than 2.50 for disagree on each item. Consequently, all the items 1-10 show the mean of between 3.03 – 3.60, and the grand mean is 3.33, indicating that secondary school students in this population have positive perception of their academic self-concept. The standard deviation of the respondents' perception was between 0.58 - 0.82, while the standard deviation grand mean is 0.72. Indicating that the standard deviation means in the data set are close to the group mean of the data set. This implies that there is no a large variation or deviation in the responses of secondary school students on academic self-concept.

Testing of Hypotheses

Hypothesis 1: Students academic self-concept has no significant influence on their academic performance directly. To test this formulated hypothesis, linear regression was used, and the result presented below:

Table 2: **Table 1; Linear Regression Model Summary on Students Academic Self-concept as a Predictor of Students Performance in Biology**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.567[a]	.321	.317	17.665

a. Predictors: (Constant), Academic self-concept

Table 1 shows the regression coefficient for the predictor variable academic self-concept and the criterion variable academic performance. The result shows r (1,249) = 0.567, r^2 = 0.321, which shows that academic self-concept is a determinant of students' academic performance. Therefore, hypothesis one is rejected. The r^2 of 0.321, indicates that 32.1% of the total variation in students' academic performance is accounted for by the predictor. To determine whether the model was a good predictor, ANOVA result was presented Table 2

Table 3 Table 4: Regression ANOVA on Entrepreneurship Education and Entrepreneurship Intention

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2205.853	1	2205.853	7.069	.008[b]
	Residual	77077.167	247	312.053		
	Total	79283.020	248			

a. Dependent Variable: Perf
b. Predictors: (Constant), ASTOT

Table 2 display ANOVA results. The findings shows that there is a significant difference between the predictor (student academic self-concept) and the criterion variables (academic performance) $F(1,248) = 312.05$, $p(0.01) < 0.05$. Indicating that the model is a good predictor of the influence of students' academic self-concept and academic performance. The result of the regression coefficient is presented in Table 4

Table 4: **Table4.xx: Linear Regression Coefficient between Content Mastery and Pedagogical Content Knowledge**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	33.430	9.843		3.396	.001
	ASTOT	.390	.147	.167	2.659	.008

a. Dependent Variable: Perf

Table 4 shows the regression coefficient between students' academic self-concept and academic performance. The result shows that that academic self-concept is a significant predictor of academic performance (B = 0.39, t = 2.66, p (0.01) < 0.05). The regression coefficient indicates that for any increase in one unit of students' academic self-concept will cause an increase in 33.43 in students' academic performance.

Hypothesis 2: Gender has no significant influence on secondary school students' academic self-concept. To test this formulated hypothesis, Kendall's Tau B was used, and the result presented below:

Table 5 Relationship between Students' Gender and academic self-concept

		ASCTOT	Gender
ASCTOT	Pearson Correlation	1	.115
	Sig. (2-tailed)		.071
	N	249	249
Gender	Pearson Correlation	.115	1
	Sig. (2-tailed)	.071	
	N	249	249

Table 5 revealed that there is no significant relationship between gender and students' self-concept, r = 0.115, p-valuSe = 0.71, which means p> 0.05, the null hypothesis three is rejected. The correlation coefficient (r = 0.115) further shows that there is a positive relationship between gender and student academic self-concept. Nevertheless, gender does not significant influence the respondents' perception of their academic self-concept

Discussion of Results

The study seeks to find out what is the perception of students on their academic self-concept. With this the result have shown that there is a positive perception with mean value of 3.03 – 3.60. This implies that there is tendency of the students' academic performance in biology to be influence by their self-concept. However, a positive perception alone is not criterion or determinant of the correlation between the students' self concept and academic achievement.

Thus the first hypothesis, which says there is no significant influence of self concept on academic performance, was rejected. The linear regression of 0.321 in an indication that academic self-concept is a determinant of students academic performance. This finding is in agreement with the result of Laryea et'al (2014) who are of the opinion that students self-concept is a significant factor responsible for students' academic performance; that if students are expected to do better in tests, a positive self-concept is sin quo non. This is also established through the regression coefficient in table 4 that academic self-concept is a significant predictor of academic performance. That is, a little increase in students' self-concept will cause an increase in students' performance.

The hypothesis 2 stated that gender has no significant influence on secondary school students' academic self concept. From the result shown in table 5, a correlation coefficient of (r = 0.115) is an indication that there is positive correlation between gender and students' academic self-concept. Nevertheless, gender does not significantly influence the students' perception of their academic self-concept.

Conclusion

With the outcome of the study, we can conclusively agree that self-concept is related to academic performance particularly in senior secondary schools in Bosso Local Government area of Niger state. And that gender has no direct influence on students' academic self-concept towards performance in biology.

Recommendation

The study recommends that school teachers should encourage students to develop high positive self-concept of them, which could as well enhance their performance in Biology. Parents and teachers can as well encourage the award of students' performance and get the students to be more expose to strong love and counseling that will build their self-esteem.

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