CULTURAL BELIEFS AS A CORRELATE OF PERFOMANCE IN BIOLOGY AMONG SENIOR SECONDARY SCHOOL STUDENTS IN NIGER STATE, NIGERIA

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Abstract

The study examined the cultural beliefs as a correlates of student's performance in Biology among Senior Secondary Schools in Niger State, Nigeria. The study adopted multi method research designs which comprises of Expo-facto design, co- relational design descriptive survey research design. The population for the study was made up of the entire SS II Biology Student's in Niger State therefore, the target population is 49,031. The purposive and simple random sampling techniques were adopted on 381 Biology student's in Niger State, Nigeria. Two research questions and their corresponding hypotheses were formulated and tested at 0.05 alpha level to guide the study. The questionnaire was administered to the sampled student's, and the researcher collected the student's performance result in Biology to correlate with. The reliability of the instrument was determined using the result from the pilot study and Cronbach alpha formula yielded a reliability coefficient of 0.92. The data collected were analyzed using the linear regression, standard deviation, Pearson Product Moment Correlation and regression analysis . The finding of the study revealed that there is a significant difference between the achievement scores of male and female students in favour of the female students, also it showed that school location had a significant main effect on students' cognitive attainment performance in practical skills. Based on these findings, the study recommended among others that the Science Educator should endeavor to relate science more closely to the learner's societ al., or cultural environment so as to minimize the conflicts that might arise from the student views of the world and that of biology. Government and other organizations should support any association in its efforts to eradicate negative cultural beliefs and discrimination against gender and school location.

Key word: Cultural Beliefs, Performance, Biology, School location

Introduction

Education is the systematic development or training of the mind, capabilities or character of an individual through instruction. Education varies in its forms, philosophy, contents and methods as there are different societies in the world. Secondary education is the education children receive after primary education and before the tertiary education. The broad goals of secondary education shall be to prepare the individual for useful living within the society and higher education (FGN, 2014). It is an investment as well as an instrument that can be used to achieve a more rapid economic, social, political, technological, scientific and cultural development in the country.

It is in this wise that there seems to be a lot of controversies and concern all over the world as to the view that, the standard of education is falling. One of the most amenable tools for measuring such standard has been students' performance in external examinations such as West African Examination Council (WAEC), National Examination Council (NECO),and National Board for Technical Education (NBTEB) among others in Nigeria.

The vital role of the study of this discipline in the economic, industrial and public life of the learners and the general humanity cannot be overstressed (Ibe & Ukpai, 2013; Akanbi & Kolawole, 2014). In recent times, observations on student's academic performance in science and Biology in particular, indicated that results of Senior Secondary Certificate Examination (SSCE) conducted by West African Examination Council (WAEC) revealed that 29% of students performed better in Biology examination compared with other subjects (Skaalvik, 2005).

Parents and government are in total agreement that their huge investment on education is not yielding the desired dividend and that despite their huge investment on education, students' performances still remain poor. Teachers also complain of students' low performance at both internal and external examinations.

Result of WASCE examinations revealed that in 2010/2011, 2011/2012 and 2012/2013 respectively only 49%, 38.5% and 35.66% of the candidates that sat for the examinations scored A1- C6 in Biology for the years mentioned. The situation was worse in 2009/2010 where only 28.59% of the total population recorded A1-C6 in Biology (Ministry of Education, Niger State).

The characters in current teaching appear to be discipline-centered, teacher-centered teaching, and the student learning is just passive, i.e. surface learning. A wealth of evidence has been reported to support the concept that under the discipline-centered teaching, the needs, concerns, and requirements of teachers and students are not

considered because the subject content is driven by, and depends mainly on the disciplinary content that must be presented.

Science teaching requires attention to both the content of the course and the process of moving students from their initial state of knowledge and understanding to the desired level. In fact, teaching is part of a whole that comprises the teacher, the learner, the disciplinary content, the teaching/learning process, and the evaluation of both the teacher and the learner. A shift from the traditional teacher-centered to a progressive mode of teaching-learning process had led to an increased interest in learners' individual differences. The new paradigm is student-centered, based on inclusiveness, cooperative learning and encouraged diversity. In spite of the new approach to the teaching-learning process, students' performance in examinations appears to be discouraging; prompting researchers to investigate the causes of the poor performance and how to improve on the teaching-learning process (Benjamin & Emmanuel, 2017). According to Lee (2015) who state that, secondary schools are elaborate, complex mini-societies whose internal organizational structures have a direct impact on the lives of the individuals, and groups of individuals who inhabit them. In addition, to their formal organizational structures, secondary schools are equally inherent cultural entities replete with amazing arrays of artifacts, rituals, and rites of passage all of which impact directly on the manner in which their inhabitants negotiate the terms of their existence within those institutions (Hemmings, 2016 & Hoffman, 2013). The degree of success with which these negotiations are concluded has a significant effect on participants' long-term success, or lack thereof, within those walls (Hemmings, 2010). Moreover, Culture can be defined as the historically transmitted patterns of meaning that include the norms, values, beliefs, ceremonies, rituals, traditions and myths understood by members of the school community (Slocum & Hellriegel, 2017).

Cultural belief influence has significant effect on students' academic performance in science and science related careers such as medicine, forensic science, agriculture and so forth among different countries. Cultural beliefs context has several components that determine and shape young people's attitudes towards science and even their performance in sciences. Cultural belief influence has significant effect on students' academic performance in science and science related careers such as medicine, forensic science, agriculture and so forth among different countries. Cultural beliefs context has several components that determine and shape young people's attitudes towards science and even their performance in sciences.

Ajikobi and Bello (2001), observed that some Nigerians have inherent cultural beliefs that have built in them a form of mindset, which repulses explanation of scientific concepts in ways that difers from their norms. These attitudes are invariably transmitted to learners such that any attempt to provide an alternative modern scientific explanation to such beliefs held to evoke unwilling and non-co-operative attitude. It is at this level that science education seeks to awaken in the learners desire to become a professional scientist a change in the inherited mindset in order to experience joy or excitement in the intellectual power of science (Uche & Umoren, 2018).

Biology as a subject is known to occupy a very sensitive position in medical science and related discipline. This informs several efforts geared toward studying Biology at a secondary level of education. Hence, it is one of the science subjects one must pass so as to qualify to offer some science courses at tertiary level of education. It is however, very disheartening and heartbreaking that despite the key role and much emphasis, being laid on Biology, students at secondary school level of education are still performing woefully in this subject which has being an issue of great concern to stake holders in education, most especially those in the field of science.

This has been attributed to myriad of factors such as poor parenting, poor attitude of students towards their studies (Akinfe, Olofiniyi & Fashiku, 2012). According to Adegbite (2000) who views on the causes of poor performance differs. He posited very strongly that wrong location of market place, highway, airport, industrial areas constitute an academic unfriendly environment for learners.

Ochima (2015) investigated the influence of cultural practice-related misconceptions on achievement among Biology students of senior secondary schools in Zone C of Benue State in central Nigeria using the survey design. There is a significant difference between the mean achievement scores of male and female students in favour of the female students. Faith, Nazim, Karadag and Yusuf (2015) examined the school culture and academic achievement of students. It was confirmed that school culture had a statistically significant effect on students' academic achievement.

In another study by Undie (2015) who investigated superstitious beliefs and academic performance of pupils in early childhood science in Ogoja Educational Zone, South Eastern Nigeria opined that academic performance of early childhood pupils was significantly decreased by Cultural beliefs in the four basic categories of "Good Luck", "Bad Luck", "impending danger" and "perceived effect". Ellah and Ita (2017) who studied correlational relationship between school location and students' academic performance in English language in Nigerian secondary schools. The results revealed that there is a significant difference in students' academic performance in English language on the basis of school location.

Osokoya, Modupe, Akuche and Ukamaka (2012) investigated the effect of school location on students' learning outcomes in practical physics. Results showed that school location had a significant main effect on students' cognitive attainment performance in practical skills.

Statement of the Research Problem

There are persistent low achievement in Biology which has elicited a lot of concern among researchers to establish the cause of such failures. Several attempts have been made by stakeholders in education to find ways to curb such drawback and find ways of improving student's academic achievement in Biology. Some of which have focussed on identifying appropriate teaching methodology. Unavailability of suitable practical equipment, indequate funding and proliferation of out-of-field teachers are some of the draw-backs. (Theodora, 2015). Despite all these efforts, the academic achievement of students in Biology is stil below expectation. It is therefore pertinent to consider other factors that could be responsible for low achievement in the subject, Biology.

The influence of Biological Concepts Misconceptions which students bring to Biology class. Recent investigations have shown that students understanding of scientific phenomena are controlled and influenced by what they percieved from their cultural beliefs. Ododo,(2014) noted that, scientific knowledge and explanation have not been an integral part of Nigerian life, rather mystical power and evil spirits are means of providing explanations and reasons to natural phenomena..

Aim and Objectives of the Study

The aim of this research is to investigate Cultural Beliefs as a Correlate of Performance in Biology among Senior Secondary School Students in Niger State, Nigeria. The specific objectives are to:

1. Determine the relationship between male and female Biology students' cultural belief and performance.
2. Determine the relationship between cultural beliefs and the performance of SS2 Biology students based on School location
3.

Research Questions

The following research questions were raised to guide the study:

1. Is there any relationship between male and female SS2 Biology student's cultural belief and performance?
2. Is there any relationship between cultural beliefs and the performance of SS2 Biology students based on School locations
3.

Research Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance:

Ho$_1$: There is no significant relationship between male and female SS2 Biology student's cultural beliefs and their performances in Niger State, Nigeria.

Ho$_2$: There is no significant relationship between cultural beliefs and the performance of SS2 Biology students based on school locations.

Research Methodology

This study adopted multi method research designs which comprises of expo-factor design, Co relational design and descriptive survey research design to investigate the cultural beliefs as a correlate of students' performance in Biology among senior secondary school students in Niger State Nigeria. The population for the study is made up of the entire SS II students from public secondary schools in Niger State, Nigeria, totaling forty-nine thousand and thirty-one (49,031) students. The breakdown of the population by gender showed (27,757) while female students (21,274). Therefore the target population is 49,031. Sample size of three hundred and eighty-three (381) using SS II from eight (8) public co-educational, single secondary schools drawn from the three geo-political zones of Niger State. Purposive sampling and simple random sampling techniques were adopted for this study. In order to take care of location and gender, stratified random sampling techniques was used to select the schools. Niger State has three geo-political zones, three public schools were selected from zone A and B while two were selected from zone C. However, the selection of coeducational schools was to take care of gender. This is to ensure that both the male and female are duly represented in the sample.

Based on the population male and female students in each of the selected schools, a simple ratio was used to obtain the sample per sex. The next step was to use simple random sampling technique. This was done by placing two hats on the ground containing numbered, folder pieces of papers, one for male and other for female biology students. The Instrument designed for data collection was researcher developed questionnaire cultural beliefs on biological concepts entitled "Cultural Beliefs in Biology Instrument" (CUBIBI). The CUBIBI was divided into two sections. Section A was meant for information on the demographic data of the student's; section B contained 30 items on some cultural beliefs misconception in Biology. The section B of the

questionnaire was developed on modified 4-point Likert Scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). In order to ensure validity of the instrument, the draft of the researcher developed instrument (CUBIBI) was subjected to face and content validity. Copies of the draft instrument were presented to the research supervisor, two senior lecturers in Science Education Department and one senior lecturer in Biological Science Department, Federal University of Technology Minna and one Test and Measurement expert in the Niger State Ministry of Education, Minna for their observations, corrections contributions and suggestions.

Their observations, corrections, contributions and suggestions were taken seriously and effected the research instrument before subjected to reliability test. In order to carry out reliability test, a sample of thirty (30) SS II were selected from Police Secondary School, Minna, a secondary not included among the selected school for the actual research work, Cronbach's alpha reliability coefficient (r) was used for reliability coefficient of 0.91 which is within range of high reliability coefficient. With this result the instrument was found reliable and suitable for the actual research., The researcher visited the 8 selected secondary schools in 3 geo-political zones in the State and administer the questionnaire named (CUBIBI) and their performance result in Biology. Data collected were analyzed using descriptive and inferential statistics. Descriptive statistics and inferential statistics of Linear Regression (LR) and ANOVA were used to test null hypotheses

Data Analysis

Research Question One: Is there any relationship between male and female SS2 Biology student's cultural belief and performance? To answer this question, mean and standard deviation was employed and the result is presented in Table 2

Table 1: Mean and Standard Deviation of Male and Female SS2 Biology Students' Cultural Belief and Performance

Gender	No. of Sample	Cultural Belief		Academic Performance	
		Mean	SD	Mean	SD
Male	223	75.52	18.34	55.08	17.48
Female	158	75.57	13.79	54.55	17.3

Table 1 showed the mean and standard deviation of the responses of the male and female respondents on cultural belief and students' performance. The mean and standard deviation of the responses of male respondents on cultural belief were $\bar{X}$ = 75.52 and SD = 18.34 respectively, while the mean and standard deviation of academic performance of male respondents were $\bar{X}$ = 55.08 and 17.48. Similarly the mean and standard deviation of the female responses on cultural belief were $\bar{X}$= 75.57 and 13.79 while the mean and standard deviation of the male respondents academic performance were $\bar{X}$ = 54.55 and SD = 17.3 respectively. This implies that there could be a relationship between gender and academic performance; therefore multiple regressions was used to examine the strength of relationship.

Research Question Two: Is there any relationship between the age group of SS2 Biology students and cultural belief as well as performance? To answer this question, mean and standard deviation was used and the analysis is presented in Table 2

Table 2: Mean and Standard Deviation of SS2 Biology Students' Cultural Belief and Performance based on School Location

School Location	No. of Sample	Cultural Belief		Academic Performance	
		Mean	SD	Mean	SD
Urban	255	73.08	15.88	55.25	15.92
Rural	126	80.52	16.93	54.07	20.07

Table 4.9 showed the mean and standard deviation of the responses of respondents from urban and rural schools on cultural belief and academic performance. The mean and standard deviation of the responses of respondents from urban schools on cultural belief were $\bar{X}$ = 73.08 and SD = 15.88 respectively, while the mean and standard deviation of their academic performance were $\bar{X}$ = 55.25 and 15.92. Similarly the mean and standard deviation of the responses of respondents from rural schools on cultural belief were $\bar{X}$ = 80.52 and 16.93 while the mean and standard deviation of their academic performance were $\bar{X}$ = 54.07 and SD = 20.07 respectively.

Ho_1: There is no significant relationship between male and female SS2 Biology students' cultural beliefs and performance in Niger State. To test this hypothesis, Multiple Regression was used and the analysis is presented in table 5.

Table 3: Regression analysis of Male and Female SS2 Biology Students' Cultural Belief and Performance in Niger State.

3a: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.093[a]	.009	.003	17.35162

a. Predictors: (Constant), Gender, Cultural Belief in Biology

3. b Regression analysis between Male and Female (Gender) SS2 Biology Students' Cultural Belief and Performance in Niger State.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	991.933	2	495.966	1.647	0.194
	Residual	113807.695	378	301.079		
	Total	114799.627	380			

a. Dependent Variable: Students' Performance

b. Predictors: (Constant), Gender, Cultural Belief in Biology

The findings show that there is no significant difference between the predictor (gender and cultural belief) and the students performance $F (2,378) = 1.647$, $P = (0.194) > 0.5$. This indicate that the model is nor a good predictor of the relationship between gender, cultural belief and students performance in biology. The results of the Regression coefficient is presented in Table 5c

Multiple Regression Co-efficient between the Predictor Variable and Dependent Variable

3c Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	62.866	4.870		12.910	.000
	Cultural Belief in Biology	-.096	.054	-.092	-1.791	.074
	Gender	-.526	1.804	-.015	-.291	.771

a. Dependent Variable: Students' Performance

Tables 5a, b and c presented multiple regression result on the relationship between male and female SS2 Biology students' cultural belief and performance in Niger State. In the multiple regressions analysis students' performance was used as dependent variable, while cultural belief and gender were independent variables. The results indicated that cultural belief is not a significant predictor of students performance in Biology (B = -.096, t = -1.791, p (.074) > 0.05). Similarly, gender is not a significant predictor of students performance in Biology (B = -.526, t = -/291, p (.771) > 0.005). This implies that an increase in student's cultural belief will not impact student's academic performance when we control for gender. Table 5 Presented regression analysis results of Male and Female SS2 Biology Students' Cultural Belief and Performance in Niger State .The findings show that there is no significant relationship between the predictor (gender and cultural belief) and the students' performance $F (2,378) = 1.647$, $P = (0.194) > 0.5$. This indicate that the model is not a good predictor of the relationship between gender, cultural belief and students performance in biology.

Ho_2: There is no significant relationship between cultural beliefs and performance of SS2 Biology students based on school location in Niger State.

Table 4: Multiple Regression Result on relationship between Cultural Belief and Performance of SS2 Biology Students Based on School Location in Niger State.

4a Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.093[a]	.009	.003	17.35211

a. Predictors: (Constant), School Location, Cultural Belief in Biology

4b. ANOVA Analysis between school location, cultural beliefs and performance in Niger State.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	985.382	2	492.691	1.636	.196
	Residual	113814.245	378	301.096		
	Total	114799.627	380			

a. Dependent Variable: Students' Performance

b. Predictors: (Constant), School Location, Cultural Belief in Biology

4c Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	62.550	4.484		13.951	.000
	Cultural Belief in Biology	-.093	.055	-.089	-1.698	.090
	School Location	-.486	1.933	-.013	-.251	.802

a. Dependent Variable: Students' Performance

Tables4.15a, b and c presented multiple regression result on the relationship between cultural beliefs and performance of SS2 Biology students based on school location in Niger State. In the multiple regression analysis students' performance was used as dependent variable, while cultural belief and school location were independent variables. The results of the regression indicated that the model explained 0.009 (0.9%) of the variance and that the model was not a significant predictor of students' performance, (F $(2,378)$ = 1.639, p =0.196. Both cultural belief and school location did not contribute significantly to the model, cultural belief (B = -0.093, p> 0.05) and school location (B= -0.486, p > 0.05). These results indicate that there was no significant relationship between cultural beliefs and performance of SS2 Biology students based on school location in Niger State Therefore hypothesis 4 is accepted.

Discussion of Results

There is no significant relationship between male and female SS2 Biology student's cultural beliefs and performances. This is in contrary to the study Ochima (2015) who investigated the influence of cultural practice-related misconceptions on achievement among Biology students of senior secondary schools in Zone C of Benue State Central Nigeria using the survey design. The results revealed that there was significant difference between the mean achievement scores of male and female students in favour of the female students.

There was no significant relationship between the school location of SS 2 Biology students' cultural belief and performance in Niger State. This is in disagreement with the work of Ellah and Ita (2017) who studied correlational relationship between school location and students' academic performance in English language in Nigerian secondary schools. The study revealed that there is a significant difference in students' academic performance in English language on the basis of school location. Also oppose the study Osokoya, Modupe, Akuche and Ukamaka (2012) who investigated the effect of school location on students' learning outcomes in practical physics. Results showed that school location had a significant main effect on students' cognitive attainment performance in practical skills.

Conclusion

Based on the findings of this study, it can be concluded that Biology students hold cultural believes and ideas which they heard mainly from their grandparents and parents. It was further that they bring their cultural believes into Biology class which can lead to misconceptions in understanding Biology concepts. Also, the misconceptions held by students due to their cultural believe significantly influence their academic Achievement in Biology positively.

Recommendations

1. It was recommended that government should close the gap between the rural and urban location through the provision of social amenities to rural populace which will enhances better academic performance of students in their final examination like SSCE.

2 Provide a teaching/learning situation in science that makes it possible for students in traditional settings to have easier access to science through overt comparisons of their world view with that of science, so that they would be in a better position to evaluate the likely contribution of science to their lives. Success in science depends·on teachers helping pupils mediate or negotiate cultural borders and engage in some form of collateral learning. Thus, the teacher's role is to resolve the cultural conflicts that arise across-cultural education.

3 The government should find a way of standardizing the use of our natural herbs and give it an encouragement to be used for treatment of ailment alongside with the use of orthodox medicine.

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