STUDY HABIT AND GENDER AS DETERMINANTS OF CHEMISTRY PERFORMANCE AMONG SENIOR SECONDARY SCHOOL CHEMISTRY STUDENTS IN MINNA METROPOLIS, NIGER STATE

JAMILU, U., CHADO, A., PhD., & PROF. SHITTU, K. O.
Science Education Department,
Federal University of Technology Minna, Nigeria
Email: jamiluusman262@gmail.com.
Phone No: +234-805-527-3202

Abstract

This study examined study habit as determinant of performance among the senior secondary school II chemistry students. Two research questions, and two hypotheses formulated and were tested at 0.05 level of significance. The population for the study comprised of 3365 senior secondary school chemistry student 2019/2020 session within Minna metropolis, Niger State. A multi-stage sampling technique was employed, which were clustered into A & B with a sample size of 337. Four schools were randomly sampled for the study. Study Habit Inventory (SHI) was used for data collection in the study. A five-point Likert scale inventory of a Strongly Agreed (SA), Agreed (A), Undecided (UD), Disagreed and Strongly Disagreed (SD). The instrument was validated by expert in Guidance and Counseling from College of Education Minna, Niger State. The reliability was determine using Cronbach Alpha and reliability coefficient of 0.87 index was established. Data collected from the study were analyzed using descriptive (mean and standard deviation) to answer research questions and inferential statistics (Regression analysis and ANOVA) to test the formulated hypotheses. Findings from the study shows that study habit impacted positively on student academic performance in chemistry. And it was recommended that chemistry teachers should adopt measures to strengthen students good study habit by organizing reading session for each topic to boost their academic performance in chemistry.

Keywords: Study habit, Performance, Gender

Introduction

The importance of chemistry as a requirement for the technological development of a nation like Nigeria cannot be overemphasized. Chemistry is needed to find solution to some specific problems of the nation. For example, the scarcity of some basic building materials such as cement, processed wood, aluminium and so on can be reduced by inculcating knowledge of chemistry. Furthermore, the knowledge of utilizing the available raw materials in the country to manufacturing industries can be improved by the teeming population of Nigerian youths most of whom are jobless. They can be gainfully employed in small-scale industries such as salt processing industries and pharmaceutical industries using local herbs. These and many other tasks are what chemistry in conjunction with other science subjects such as physics and biology will help Nigeria to accomplish (Onyido, 2016). For chemistry to adequately play these desired roles, the chemistry courses at the secondary school level in particular must be properly taught to prepare the students who take chemistry at this level and improved students' tasks in biology and physics as outlined by (Onyido, 2016).

Despite the importance of chemistry to mankind and efforts of researchers to improve on its teaching and learning, the performance of students in the subject remains low in West Africa Examination Council in Nigeria (WAEC Chief Examiner report, 2017; Odebunmi, Oluwasogo, & Folahan, 2016). Among the factors that have been identified to be responsible for student achievement in chemistry are, poor methods of instruction (Osuafor & Ijenwa, 2017) poor attitude and laboratory in-adequacy (Raimi, 2015) and poor science background

(Adesoji, 2016) other studies psychosocial factors such as motivation, attitude, interaction, academic self-efficacy and study habit, (Li, 2012).

Students' study habit toward the learning of chemistry is a factor that has long attracted attention of researchers. Azikwe (2017) describes study habit as the adopted way and manner a student plans his private readings after classroom learning so as to attain mastery of the subject. Study habits have been observed to affect the academic achievement of students to a great extent and students can have good or bad study habits (Odebunmi, *et al*, 2016).

Students with poor study habits are more exposed to failure compare to students with good study habit. Good study habits act as a strong indicator for the students to excel in life because if students do not possess good study habits they cannot excels in life (Amandeep & Raj, 2015). Singh (2011) revealed that there is positive correlation between study habit and academic achievement of elementary, secondary and college students. Amandeep and Raj (2015) noted that there is significant relationship between study habits and students' academic achievement. However, Lawrence (2014) observed no significant relationship between study habits and academic achievement of higher secondary school students. Also, Ebele and Olofu (2017) who investigated the impact of study habits on secondary school students' academic performance. The finding of the study revealed that there is significant relationship between study habits and students' academic performance.

Adesokan (2013) asserted that in spite of realization of the recognition given to chemistry among the science subjects, it is evident that students still show negative study habit towards the subject, thereby leading to poor achievement and low enrolment which in turn deny students study chemistry related subjects in higher institutions of learning.

The issue of gender on students' academic performance in chemistry has become the global debate. Gender refers to the social meanings associated with being a male or a female, including the construction of identities, expectations, behaviours and power relationships that derive from social interactions. Ambe-Uva *et al.*, (2014) investigated the impact of gender and science-orientation on the motivation to learn. Study on the correlational analysis showed that there was no significant difference in motivation to learn sciences for gender and for science-orientation subject even if the analysis was restricted to the science students (Zeyer, 2010). Therefore, researcher aim at investigating study habit as determinant of performance among the senior secondary school chemistry students' in Minna Metropolis, Niger State.

Statement of the Problem

The challenges of chemistry education in senior secondary schools in Nigeria is poor performance in chemistry as a subject. (WAEC, 2016; 2017 & 2018). Despite the central position it played, its importance in sustaining economic growth and development. Several factors has been identified to be responsible for poor performance and gender gap of students in chemistry, many researchers worked on teachers, environmental, poor service background and poor method of teaching, yet the problem still persist as such, the researcher narrowed his research to students centre, to see whether if the problem of students' performance and gender inequality will be reduce. The poor performance in chemistry have been one of the factors responsible for the slow pace of scientific and technological development in Nigeria (Titilayo *et al*, 2016). The poor performance has been linked to so many factors including, poor study habit, poor motivation and low self-efficacy of students towards chemistry (Kolawole, 2002). Nevertheless, study habit played important role in the learning of chemistry. In spite of that limited research have been conducted with

little or no attention given to poor study habit in Nigeria. To tackle the above issues, this study examined study habit as a determinant of performance among senior secondary school chemistry students in Minna metropolis, Niger state.

Research Questions
To guide this study, the following research questions were raised:
(i)   What is the relationship between student study habit and senior secondary school II performance in Chemistry?
(ii)   What is the relationship between study habit, gender and senior secondary school II performance in chemistry?

Hypotheses
The following null hypotheses were tested at 0.05 level of significance:
 Ho_1:   There is no significant relationship between student study habit and senior secondary school II performance in Chemistry.
 Ho_2:   There is no significant the relationship between study habit, gender and senior secondary school II performance in chemistry.

Methodology
This study adopted correlational survey design. Is a type of non-experimental research method, in which a researcher measures two variables, understands and assess the statistical relationship between them with no influence from any extraneous variable. The population for this study comprised of 3365 Senior Secondary School's Chemistry Students (2019/2020) within Minna metropolis of Niger State. The target population was SSS II students that were selected within the study area. A multi-stage sampling technique was employed to sampled 337 senior secondary school's chemistry students in Minna metropolis. Multi-stage sampling technique was employed, which was involved four stages. Firstly, was to cluster the 27 secondary school into three A and B, Three secondary schools were randomly sampled from cluster A and two secondary school were randomly sampled from Cluster B, to make it five secondary schools for the whole study. One secondary school was used for pilot study and four secondary schools were used for the main study in Minna, Niger State. The randomly selected four secondary school for the main study were selected using simple random sampling technique. Secondly, SS II chemistry class were randomly selected using simple random sampling technique. Thirdly, non-proportionate stratified sampling technique was used in categorising the sample, based on gender (male & female) of the students.

The instrument used for data collection on the study was Study Habit Inventory (SHI). A five-point Likert scale of Strongly Agree (SA) was awarded 5 points, agree (A) was awarded 4 points, Undecided (U) was awarded 3 points, disagree (D) was awarded 2 points and Strongly Disagree (SD) was awarded 1 point. The construct and criterion validity of the instruments was carried out by expert from College of Education in the department of Guidance and Counseling Minna Niger State. Vital inputs that were made like construct and phase by all experts, their suggestions and corrections were affected by the researcher and found to be valid for the study. The reliability of the research instrument was determine using Cronbach Alpha and coefficient index of 0.87 was established for study habit and existing chemistry promotion examination results of SS II was used as performance data. Data collected from the study were analysed using descriptive (mean and standard deviation) and inferential statistics. The significant difference was ascertained at 0.05 alpha level. The Statistical Package for Social Science (SPSS) version 23.0 was used for the analysis.

Results

Research Question One: What is the relationship between study habit and performance of senior secondary school II performance in chemistry? This research question is answered using descriptive statistic of Mean and Standard Deviation the summary of the result is presented in Table 1

Table 1: Mean, Standard Deviation and mean difference of student's performance and study habit

Variable	N	Mean	SD	Mean difference
Performance	337	49.73	12.02	
				1.36
Study Habit	337	48.37	12.55	

Table 1 shows that mean and standard deviation of student's performance and study habit. The findings show he computed mean score of 49.73 with Standard Deviation of 12.02 for student's performance and Mean score of 48.37 with standard Deviation of 12.55 for study habit. This gives Mean difference of 1.36 between their performance and study habit. The finding is highlighted using a scattered plot.
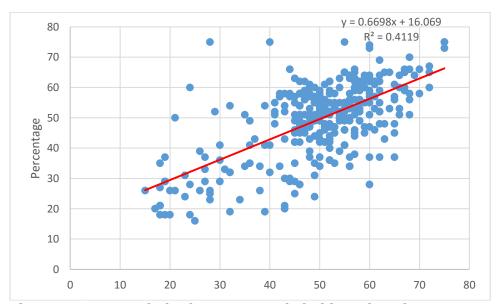

Figure 1: Scattered Plot between study habit and performance

Figure1 is a scattered plot of the relationship between student's performance and study habit. The scattered plot indicates that there seem to be a positive relationship between the two construct. Therefore, linear regression will be used to determine the strength of the relationship.

Research Questions Two: Examine the relationship between gender and senior secondary school II performance in chemistry.

This research question is answered using descriptive statistic of Mean and Standard Deviation the summary of the result is presented in Table 2

Table 2: Mean, Standard Deviation and mean difference of gender and senior secondary school II performance in chemistry

Variable	N	Mean	SD	Mean difference
Performance	337	49.73	12.03	
				48.23
Gender	337	1.50	.5007	

Table 2 shows that mean and standard deviation gender and senior secondary school II performance in chemistry? The findings show the computed Mean score of 49.73 with Standard Deviation of 12.03 for senior secondary school II performance in chemistry and Mean score of 1.50 with standard Deviation of 0.50 for gender, this gives mean difference of 48.23. The relationship between performance and gender is illustrated in Figure 2.
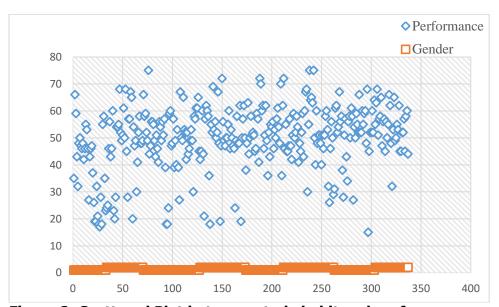

Figure 2: Scattered Plot between study habit and performance

Figure 2 is a scattered plot of the relationship between student's performance and gender. The scattered plot indicates that there seems to be a negative relationship between the two construct. Therefore, linear regression will be used to determine the strength of the relationship.

Hypothesis One: There is no significant relationship between student study habit and senior secondary school II performance in chemistry.

This formulated hypothesis was tested using linear regression and the summary of the results is presented in Table 3.

Table 3: Linear Regression Model Summary on the Influence of student's Study Habit on senior secondary school II performance in chemistry

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.642[a]	.412	.410	9.23592

a. Predictors: (Constant), Study Habit

Table 3 shows the regression coefficient regression for the independent variable; Study habit. The result shows r (1,355) = .642, r^2 = .412. Indicating that 41% of the total

variation in senior secondary school students' performance in chemistry. To determine whether the model was a good predictor, ANOVA result was presented Table 4.

Table 4: Regression ANOVA on student Study habit and senior secondary school II performance in chemistry

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20012.154	1	20012.154	234.603	.000[b]
	Residual	28576.274	335	85.302		
	Total	48588.427	336			

Dependent Variable: Performance, b. Predictors: (Constant), Study-Habit

Table 3.1 display ANOVA results. The findings shows that there is a significant difference between the predictor (student's habit) and the criterion variables (senior secondary school II performance in chemistry) $F_{(1,335)} = 234.60$, p (0.00) < 0.05. Indicating that the model is a good predictor of the relationship between students' study habit and performance. The result is further highlight using regression coefficient.

Table 3.2: Linear Regression Coefficient between student Study habit and senior secondary school II performance in chemistry

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	19.366	2.045		9.469	.000
	Study_Habit	.615	.040	.642	15.317	.000

a. Dependent Variable: Performance

Table 3.2 shows the regression coefficient between student habit and senior secondary school II performance in chemistry. The result shows that that student habit is a significant predictor of students' performance in chemistry (B = .642, t = 15.32, p (0.00) < 0.05). The regression coefficient indicates that for any increase in one unit of student's habit will cause an increase in .615units of senior secondary school students' performance in chemistry. Hence study habit is a strong predictor of students' performance in chemistry.

Hypothesis Two: There is no significant relationship between gender and senior secondary school II performance in chemistry. This formulated hypothesis was tested using linear regression and the summary of the results is presented in Table 4

Table 4: Linear Regression Model Summary Showing the Influence of Gender on Students' Performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.071[a]	.005	.002	12.01256

a. Predictors: (Constant), Gender

Table 4 shows the regression coefficient regression for the independent variable gender on performance. The result shows r (1,335) = .071, r^2 = 0.005. Indicating that 0.05% of the total variation of senior secondary school II performance in chemistry is accounted by the students' gender. To determine whether the model was a good predictor, ANOVA result was presented Table 4.

Table 4.1: Regression ANOVA of gender and senior secondary school II performance in chemistry

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	247.376	1	247.376	1.714	.191[b]
1	Residual	48341.051	335	144.302		
	Total	48588.427	336			

a. Dependent Variable: Performance
b. Predictors: (Constant), Gender

Table 4.1 display ANOVA results. The findings shows that there is no significant difference between the predictor (gender) and the criterion variables (senior secondary school II performance in chemistry) $F_{(1,335)} = 1.71$, p (0.19) >0.05. Indicating that the model is not a good predictor of the relationship between gender and performance than the mean.

Table 4.2: Linear Regression Coefficient between Gender and Performance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	47.162	2.067		22.812	.000
	Gender	1.714	1.309	.071	1.309	.191

a. Dependent Variable: Performance

Table 4.2 shows the regression coefficient between gender and senior secondary school II performance in chemistry. The result shows that that gender is not a significant predictor of their performance senior secondary school II chemistry (B = .071, t = 1.31, p (0.19) > 0.05).

Discussion
There was significant relationship between student study habit and senior secondary school II performance in chemistry. This is in support of the findings of Ebele and Olofu (2017) who investigated the impact of study habits on secondary school students' academic performance. The finding of the study revealed that there is significant relationship between study habits and students' academic performance. Also, in support of Minoo (2017) who carried out the relationship between the study habits and the academic performance of medical sciences students. The results show that correlation between study habits and academic performance was significant. This is in contrary to the findings of Younis and Hemant (2016) who investigated the academic performance and study habits of college students. The results highlight that there is no significant difference in their study habits

There was no significant relationship between gender and senior secondary school II performance in chemistry. This agrees with the findings of Omiko (2014) who carried out a study on "the construction and validation on a formative achievement test on chemical formulae for senior secondary class three chemistry students. The researcher administered the validated instrument to the students. After data analysis of the study, he found out that sex has no significant effect on students' performance. Also disagree with the finding of Ajai and Imoko (2015) who sampled gender differences in senior secondary school chemistry performance. The result revealed a significant gender difference in favor of males. This trend may be attributed to the fact that females regard science subject as intellectually complex and task oriented.

Empirical evidence shows in the research of Joseph, Kweku and Robert (2018) who carried out investigation on study habits of students, keys to good academic performance in public junior high schools. The findings of the study revealed that study habits significantly accounted for 44% variance in students' academic performance.

Conclusion

The study disclosed that study habits impacted positively on academic performance on students accordingly. Students should be reoriented to improve study habits in relation to time allocation for personal reading and assignment, since these are crucial aspects of schooling. Curriculum planner should incorporate contents related to students' study habits into their curriculum, in order to improved academic performance of students in chemistry.

Recommendations

(i)   It was recommended that chemistry teachers should adopt measures to strengthen students' study habit to boost their academic performance in chemistry.

(ii)   Stakeholder as matter of urgent should organize orientation to new chemistry students on how to develop good study habit in order to enhance their performance in chemistry.

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