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RESEARCH ARTICLE

ASSESSMENT OF STUDY HABITS OF SENIOR SECONDARY SCHOOL SCIENCE STUDENTS IN NORTH WEST ZONE OF NIGERIA

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ABSTRACT

The effect of student factors such as their intellectual capability, their attitude to learning, and their general study habit in academic performance are areas not fully investigated by myriad of efforts directed at unraveling causes of abysmal performance by Nigerian students in public examination in recent times. It is as a result that this study was undertaken to assess the study habits of secondary school science students in North West Nigeria, a zone that is considered educationally less advantaged. Consequently, 1,796 students who were offering the basic science subjects (Biology, Chemistry and Physics) in 22 secondary schools in four North West states (Kaduna, kano, Katsina and Zamfara) of Nigeria during the 2011/2012 school session were selected by means of stratified random sampling. The students' study habits were assessed by administering the Bakare's (1977) Study Habit Inventory on them and their science scores (academic performance) were obtained from their first term's school results. The independent t-test and one way Analysis of Variance (ANOVA) statistics were employed for data analyses that were used to test five null hypotheses stated for the study at alpha value of 0.05. All the null hypotheses were significant, indicating that difference exists between the study habits of male and female, older and younger, private and public schools', low and high academic performing, and among the students in the four states. It was therefore recommended that school counsellors, teachers, administrators, examination bodies and governments should, among other things, do the following so as to improve students' study habits - carry out routine study needs assessment of secondary school science students, teach students how to study, and how to prepare and use personal time-table in effective study.

INTRODUCTION

What makes a nation truly great is not the vastness of land or the quantity of natural, or even, the human resources it possesses. This is because, a nation could be endowed with vast arable land and abundant natural and human resources but still remain poor if its resources are not harnessed. Quality human resources are required to cultivate the land, explore, exploit and market the available natural resources for the ultimate benefit of the nation and its people. Any nation that genuinely seeks to develop therefore must make conscious and deliberate efforts to develop its human resources (Ehiozuwa, 2009). The development of human resources is seldom done elsewhere other than in the schools. Hence, Enoh (2010:6) avers that "the prosperity being enjoyed in Japan, India, China and other Asian countries has been linked more to their schools than any other factor". He reinforced his assertion by quoting Dore's (1996) Report of the Indian Education Commission thus:

The destiny of Indian is now being shaped in her classrooms. This, we believe, is no mere rhetoric… It is education that determines the level of prosperity, welfare and security of the people.

Similarly, Bloom, Canning and Chan (2005) posit that education plays a crucial role in preparing and providing leadership to meet challenges and stimulate sustainable development. It is this realization of the importance of school, and indeed education, in nation building that has propelled many nations of the world, Nigeria inclusive, to invest substantial portion of their gross national income in the education sector. For instance, education is allocated a whopping ₦249.08 billion in the 2010 annual budget of ₦4.079 trillion, thereby making it the second highest, only after the ₦249.4 billion given to Ministry of Works in the sectoral allocations for the year (Yar' Adua, 2009, Brain, 2009). Despite the commitment of enormous financial resources into education in Nigeria, there has been noticeable decrease in academic performance among the students as evident from public examination results. This is transparently apparent from the results of examinations conducted by West African Examination Council (WAEC) and National Examination Council (NECO). Akparanta (2010) reports that

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188,442 out of 1,369,142 representing 13% passed while 87% failed in the May/June result of 2008 West African Senior School Certificate Examination (WASSCE). In the 2008 November/December result of the same examination, 85,901 (23%) passed out of 372,600 (77%) who failed. In 2009 WASSCE, only 356,981 (25.99%) out of 1,373,009 candidates that sat for the examination got five credits and above passes including English and Mathematics (Abubakar, 2010; Ebije, 2010). Similarly, in 2010, only 337,071 out of 1,351,557 representing 24.94% passed; that is those who obtained credit in 5 papers including English and Mathematics (Akparanta, 2010). Probably, the most abysmal and embarrassing was the NECO's 2009 November/December examinations result in which only 4,223 (1.80%) out of 236,613 students that sat for the examination in 1,708 centres spread across the country passed with five credits including English and Mathematics.(Abubakar, 2010; Ebije, 2010). Analysis of 2009 WASSCE result showed that the students with science orientation performed poorer, 116,729 as against 133,656 students in the social science/arts class. The implication of this is that the nation's quest for science and technological advancement will not only be a mirage, but also her dream to become one of the world's twenty largest economies, as encapsulated in the present administration's *Eleven Point Agenda*, will be utopian.

The embarrassing results have not only elicited widespread angry reactions from Nigerians of all shades of opinion, many conferences, seminars, talkshops, workshops, and summits had been held to identify the remote and immediate causes of the woeful performance with a view to suggesting the way out of the doldrums. In one of such conferences, School of Education (2010) identified the reasons for Nigeria education's failure to serve as agent of global change. Its reasons that are most pertinent to this discussion include, inadequate funding of education, low value placed on teachers/poor teachers' condition of service, and narrow scope of curriculum that learners are exposed to. Abubakar (2010) put the cause of the problem differently as, insufficient resources, inadequate teachers, poor training and motivation of the available teachers. However, it is well known that student factors such as their intellectual capability, their attitude to learning, and their general study habit, do play a major role in academic performance. These are areas the myriad of conferences seem to have neglected. If we truly wish to unravel the mystery behind the continued poor academic performance of students in science subjects in Nigeria, assessment of their study habit is imperative. Good (1973) define the term study habits as a student's way of study whether systematic, efficient or inefficient etc. Azikiwe (1998) in Omotere (2011) 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. According to her, good study habits are good assets to learners because they (habits) assist students to attain mastery in areas of specialization and consequent excellent performance, while the opposite constitute constraints to learning and achievement and leads to failure. Omotere (2011) defines study habit as a behaviour style that is systematically formed by students towards learning and achievement. He differentiated study habits from study skills and defined the later as the peculiar strategies developed by the students in studying. Wikipedia (2012) says study skills or study strategies are approaches applied to learning. It posits that they are generally critical to success in school, are considered essential for acquiring good grades, and are useful for learning throughout one's life. Ramaswamy (1990) found that there is significant difference between high and low achievers in study habits among boys. Nagappa, *et al.* (1995) in Kalaivani and Babu (2011) found in their study that the females' percentage was more than the males' in the poor study habits group. Pupils studying in private schools were better than the pupils studying in government schools. Both male and female in private schools possessed better study habits than the males and females in government schools.

Blumner and Richards (1997) investigated the study habits of 69 college engineering students and found that women scored higher on the compulsiveness study habits scale than men. They therefore argue that special programs to help some students study more meaningfully would likely improve overall academic performance. Duruh (2001) also investigated 200 remedial students of Ahmadu Bello University Zaria, Nigeria and found significant relationship between their academic need achievement and study behavior problems. Ehiozuwa (2003) studied 246 low academic performing students of the Federal College of Education Zaria, Nigeria. He administered on them the Intelligence Scale of Odebunmi's (1991) Psychological Tests for Counselling and Health Management and Bakare's (1977) Study Habit Inventory (SHI), he found that all the students were of average intelligence level but have poor study skills. He concluded that the students' poor study habits may be the cause of their low academic performance. Arockiadoss (2005) found that the academic performance of the students in his study is influenced by study habits. Olayinka (2008) administered a study habit questionnaire on a control group and experimental group of JSS II students of Omuaran High School of Kwara State of Nigeria before and after study habit group counselling. T-test statistics' analysis of the data obtained showed that the experimental group subjects improved considerably in their study habits after counselling session, while the subjects in the control group did not improve. Kalaivani and Babu (2011) investigated 565 higher secondary school students' achievement in chemistry in relation to their study habits at various schools in Cuddalore District of India with the aid of Dr. Gopal Rao study habit scale and their final exam marks were considered for achievement score. Independent samples test for differences were performed across three distinct groups, that is, gender, locality and type of school. The results of the test conducted indicate that there is positive and significant correlation and between study habits and achievement in chemistry. There is no significant difference in the study habits of higher secondary students in respect of gender and type of school.

Ekanem, Apebende and Ekefre (2011) used the score of the primary six mock examinations of 100 pupils from Calabar South Local Government Area of Cross River State of Nigeria to find out their academic performance and a questionnaire called ERE inventory to find out the rate at which children were provided with materials for school as well as time allocated for study at home. Analysis of data obtained using t-test showed that there is a significant difference in academic performance between pupils who had time to study and those who did not; in favour of those who had time to study.

It is in realization of the role of study habit in students' learning and academic performance that this investigation was carried out to assess the study habit of secondary school science students in North West geopolitical zone of Nigeria.

Objectives of the Study

The major objective of this study is to assess the study habit of secondary school science students in North-West geopolitical zone of Nigeria. More specifically, the study seeks to:

1. Find out the performance of students from the various states on the different aspects of study habit inventory.
2. Compare the study habit of male and female secondary school science students in North-West zone of Nigeria,
3. Compare the study habit of older and younger secondary school science students in North-West zone of Nigeria,
4. Compare the study habit of private and public secondary school science students in North-West zone of Nigeria,
5. Compare the study habit of high and low academic performing secondary school science students in North-West zone of Nigeria,
6. Compare the study habit of secondary school science students in the different selected states of North West zone of Nigeria.

Research Questions

1. What is the performance of students from the various states on the different aspects of study habit inventory?
2. Is there any difference between Male and Female study habits of secondary school science students in North-West Nigeria?
3. Is there any difference between the study habits of Younger and Older secondary school science students in North-West Nigeria?
4. Is there any difference between the study habits of Private and Public secondary school science students in North-West Nigeria?
5. Is there any difference in the study habits of Low and High Academic Performing secondary school science students in North-West Nigeria?
6. Is there any difference among the study habits of secondary school science students in Kaduna, Kano, Katsina and Zamfara States of North-West Nigeria?

Hypotheses of the Study

The following null hypotheses were stated for testing in this study at 0.05 level of significance:

1. There is no significant difference between Male and Female study habits of secondary school science students in North West Nigeria
2. There is no significant difference between the study habits of Younger and Older secondary school science students in North West Nigeria
3. There is no significant difference between the study habits of Private and Public secondary school science students in North West Nigeria
4. There is no significant difference in the study habits of Low and High Academic Performing secondary school science students in North West Nigeria
5. There is no significant difference among the study habits of secondary school science students in Kaduna, Kano, Katsina and Zamfara States of North West Nigeria

Scope and Delimitation of the Study

This study is limited to secondary schools that has Senior Secondary class 2 (SS2) and is offering science subjects (Biology, Chemistry, and Physics) in four (4) states (Kaduna, Kano, Katsina and Zamfara) of North-West geo-political zone of Nigeria during the 2011/2012 school session.

METHODOLOGY

Research Design: This study is a quantitative descriptive survey design. Survey research design describes situations, as they exist in natural setting, and it is used to gather data at a particular point in time with the intention of describing the existing conditions as well as determine relationships that exist between specific events (Kajang, David and Jatau, 2004). The quantitative descriptive survey design is used here because the study collects, from the students, data that can be analyzed in terms of number (Holmes and Savang (1991) in Ajibola, 2008).

Research Area: The North-West geo-political zone of Nigeria comprises of seven (7) states namely: Jigawa, Kaduna, Kano, Katsina, Kebbi, Sokoto and Zamfara. The aborigines of these states are mostly Hausa-Fulanis who predominantly are Muslims that embraced western education lately, in comparison to people of some other geo-political zones. The North-West zone is chosen for this investigation because all its states are still branded as *educationally less developed* (JAMB, 2008).

Population: The population comprises all SS II students who offered the three basic secondary schools' science subjects of Biology, Chemistry, and Physics in both private and public schools in the research area during first term of 2011/2012 school session.

Study Sample: From the research area four states namely, Kaduna, Kano, Katsina, Zamfara were selected through purposive sampling method. Twenty-two (22) private and public secondary schools were selected by means of stratified random sampling from the research area. Also, one thousand eight hundred (1,800) students were selected from the sampled secondary schools and given the Study Habit Inventory (SHI) to respond to. Four copies were improperly completed and were excluded; thereby amounting to a total number of one thousand seven hundred and ninety six (1,796) students that were used for the study. They are drawn from the states/schools as follows:

i. Kaduna State Schools – (a) Barewa College, Zaria (74), (b) Alhuda-Huda College, Zaria (74), (c) Christ Ambassodors' College, Kaduna (84), (d) Government Secondary School, Ungwan Sarki, Kaduna (35), (e) Government Girls' Secondary School, Dogon Bauchi, Zaria (57), (f) Government Girls' Secondary School, Independence Way, Kaduna (82), (g) St Barth's School, Zaria (44) = 450

ii. Kano State Schools – (a) Mukhtar Adnan Day Science College, Kano (100), (b) Mairo Tijjani Girls' Science and Technical College, Kano (100), (c) Government Senior Secondary School, Panshekara (100), (d) Rumfa College, Kano (95), (e) First Grade Comprehensive College, Kano (55) = 450

iii. Katsina State Schools = (a) Government Girls' Science Secondary School, Mani (93), (b) Government College (Pilot), Katsina (97), (c) Government Girls' Science Secondary School, Sandamu (105), (d) Government College (Pilot), Katsina (63), (e) Ulul Albab Science Secondary School, Katsina (63) = 421

iv. Zamfara State Schools – (a) Government Girls' Arabic Science Secondary School, Gusau (93), (b) Government Girls' Unity Secondary School, Kotor Koshi (82), (c) Government Science Secondary School, Gusau (90), (d) Government Science Secondary School, Shinkafi (117), (e) Danturai Day Secondary School, Gusau (93) = 475. The total sample number of 1,796 is considered representative of the population in view of Ferguson's (1981) assertion that a sample size of thirty (30) or more is adequate, and could facilitate the use of Central Limit Theorem, if the population is unknown.

Instrumentation: Bakare's (1977) Study Habit Inventory (SHI) was used to obtain data on the student's study habit, while their academic performance was obtained from the schools record. The Bakare's (1977) Study Habit Inventory, which is made up 45 items that covers eight (8) areas of study (namely - "homework and assignment", time allocation", "reading and note-taking", "study period procedures", "concentration", "written work", "examinations", and "teacher consultation") is chosen for use in this study because of its high reliability estimate and it was also validated on Nigerian subjects. Internal school examination result is preferred to external one here because the process of obtaining it is less susceptible to malpractice.

Validity and Reliability of the Instrument

Bakare (1977) who developed the Study Habit Inventory (SHI) also standardized it. Describing the adopted standardization procedure, Duruh (2001) reports that Bakare tested students to establish the construct validity of SHI by finding out if there is discrimination between a group of passing and failing students, and the discriminating index was very glaring. Duruh (2001) also reports that the Study Habit Inventory's manual by Bakare has a test-retest reliability level of 0.83 for a group of 58 students (N = 30 boys, 28 girls) with a time interval of 3 weeks.

Administration of Instrument/Data Collection: The researchers and their research assistants administered copies of SHI to the sampled students in the class adhering strictly to instructions on the administration of the inventory. The completed copies SHI were collected immediately. Hence, data on the students' study habit were collected by means of Study Habit Inventory (SHI). The data on the students' academic performance were collected from the records in their schools' first term results.

Scoring: Copies of SHI that were completed by the students were scored using Bakare's (1977) Study Habit Inventory's scoring key. Indicating for any item "Almost never", "Less than half of the time", "About half of the time", "More than half of the time", and "Almost always" attracted a value of 5, 4, 3, 2, and 1 respectively, or the reverse depending on whether the item is a positive or negative one. At the end, the scores of each student were summed up. The highest score obtainable in the inventory is 225 while the lowest is 45. As for the science score, the mean of the marks obtained by each student in Biology, Chemistry and Physics were found. The resulting mark became the science score for each student.

Statistical Procedures: The data were analyzed using descriptive statistics of simple percentage, mean and standard deviation; and parametric statistics of independent t-test for hypotheses on difference with two groups, and one way Analysis of Variance (ANOVA) for the hypothesis on difference but have more than two groups. The results were determined at 0.05 level of significance.

RESULTS AND DISCUSSION

The demographic characteristics of the subjects of this study are presented in tables, pie chart and bar chart. The demographic data includes the sex, type of school attended, age and state of the subjects

Table 1. Sex Distribution of the Subjects

Sex	Number	Percentage (%)
Female	1,061	59.08
Male	735	40.92
Total	1,796	100.00

Table 1 above shows that 1,061, representing 59.08%, of the subjects are females while 735, representing 40.92%, are males. This is presented pictorially in Fig.1 below in a pie chart.

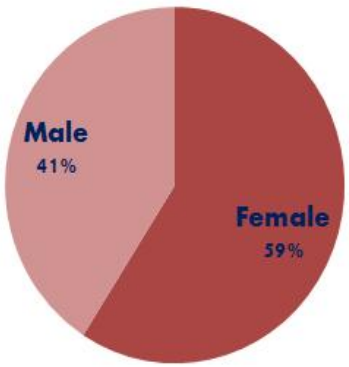

Fig 1. Sex Distribution of the Subjects

Table 2. Distribution of Subjects according to the Type of School they attend

School Type	Number	Percentage (%)
Private	246	13.70
Public	1,550	86.30
Total	1,796	100.00

Table 2 above reveals that only 246 (13.70%) of the subjects attend private secondary schools. The greater number, 1,550 (86.30%), of the subjects are from public secondary schools. Again, this is pictorially presented below in a pie chart (See Fig. 2).

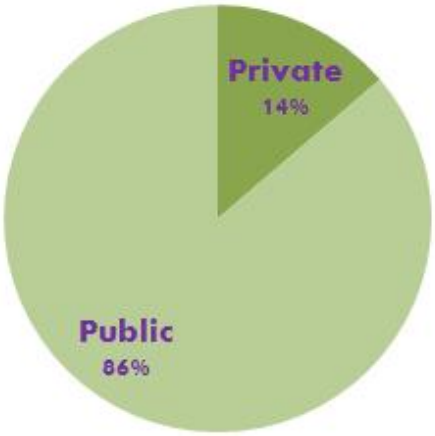

Fig 2. Distribution of Subjects According to the Type of School they Attend

Table 3. Age Distribution of the Subjects

Age	Number	Percentage (%)
Older (Subjects who are above 16 years of age)	633	35.24
Younger (Subjects who are 16 years and below of age)	1,163	64.76
Total	1,796	100.00

Table 3 above indicates that Older students (those above 16 years of age) and Younger students (those who are 16 years and below) constitute 633 (35.24%) and 1,163 (64.76%) respectively of the subjects of the study. This is more vividly shown in the pie chart (Fig. 3) below.

Table 4. The State in which Subject is Attending School

State	Number	Percentage (%)
Kaduna	450	25.06
Kano	450	25.06
Katsina	421	23.44
Zamfara	475	26.45
Total	1,7 96	100.01

It is clear from the Table above that Zamfara state is where the highest number of the subjects, 475 representing 26.45%, was drawn from. This is followed by Kaduna and Kano states with 450 subjects each representing 25.06% and then Katsina state with 421 (23.44%), where the lowest number of subjects was drawn from. A clearer picture of this is painted in the bar chart in Fig. 4 below.

Research Questions Answering/Hypotheses Testing

Six research questions and five null hypotheses are answered and tested respectively in this study. They are as follows:

Pattern of Performance in different Areas of SHI

1.What is the performance of students from the various states on the different aspects of study habit inventory?

The revelation on Table 5 above is startling and at the same time interesting. Katsina state science students have the highest mean SHS of 153.22 but have the third highest mean APS of 48.64, whereas Kaduna state science students have the third highest mean SHS of 149.53 but the overall highest mean

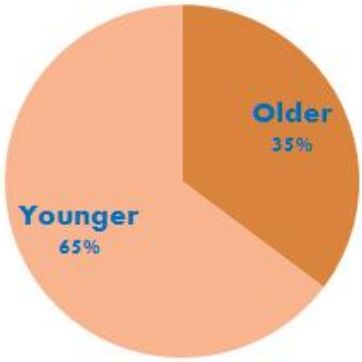

Fig 3. Age Distribution of the Subjects

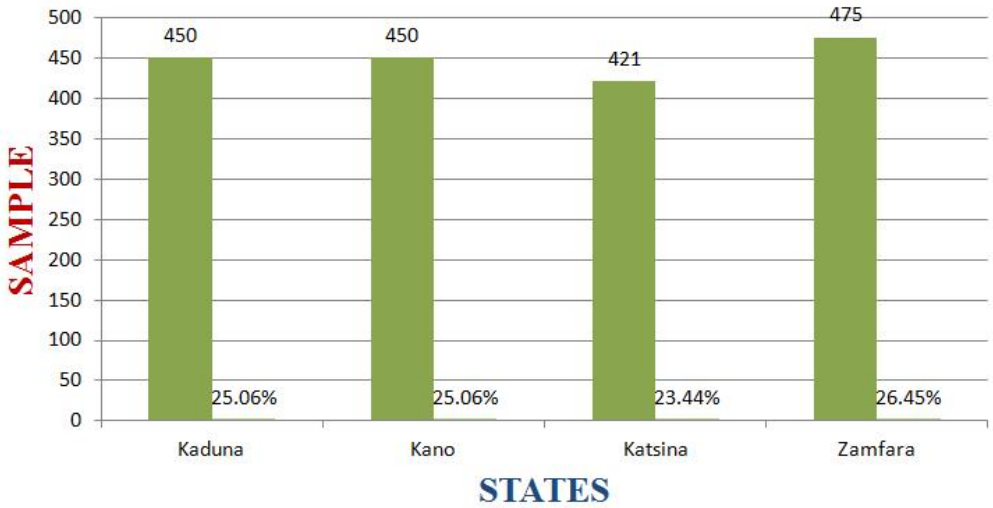

Fig 4. Distribution of Sample According to States

Table 5. Students' Performance in different Areas of SHI

Aspect of Study Habit	Min–Max Score on Each Aspect	Mean score of Kaduna (450)		Mean score of Kano (450)		Mean score of Katsina (421)		Mean score of Zamfara (475)	
		SHS	APS	SHS	APS	SHS	APS	SHS	APS
Homework & Assignment	6 – 30	10.21		11.43		10.13		11.44	
Time Allocation	6 – 30	16.30		11.33		17.01		10.31	
Reading & Note-taking	9 – 45	35.59		36.62		36.70		33.58	
Study Period Procedures	8 – 40	30.86		33.55		33.17		30.24	
Concentration	3 – 15	9.69		10.87		11.17		6.45	
Written Work	4 – 20	8.11		10.23		9.20		10.11	
Examinations	7 – 35	31.44		29.92		28.53		24.77	
Teacher Consultation	2 – 10	7.33		7.00		7.31		8.65	
TOTAL	45 – 225	149.53	51.06	150.95	49.83	153.22	48.64	135.55	45.73
Rank		*3rd*	*1st*	*2nd*	*2nd*	*1st*	*3rd*	*4th*	*4th*

Key: SHI – Study Habit ScoreAPS – Academic Performance Score

Table 6. Independent t-test Statistics between Male and Female Students in their Study habit

Variable	N	Mean	SD	SE	DF	T cal	T crit	P	Remark
Study Habit of Male	735	153.50	22.928	0.846					
Study Habit of Female					1,794	9.294	1.96	0.000	Significant at 0.05
	1,061	137.15	25.461	0.782					

APS of 51.06. Kano state science students have the second highest mean SHS of 150.95 and second highest mean APS of 49.83. Zamfara state science students have the lowest (4^{th}) mean SHS of 135.55 and the lowest (4^{th}) mean APS of 45.73.

A cursory interpretation of the Figures would suggest that higher study habit score would not necessarily translate into high academic performance. But a careful analysis of the data would support previous studies (Arockiadoss, 2005; Olayinka; 2008; Kalaivani and Babu, 2011; Ekanem, Apebende and Ekefre, 2011) that the better a learner study habit the better would be his/her academic performance. What gave Kaduna state students superior academic performance was their development of good examination writing skills. This suggests the need to teach students how to write examinations. What may have militated against Katsina state students' academic performance is their not too impressive handling of homework and assignment, written work and teacher consultation. Apart from in the sub-section of teacher consultation, homework and assignment, and written work, Zamfara state students which has the lowest mean SHI score also has the lowest mean APS score. The students have a very low mean of 6.45 in concentration, a very important sub-section of study habit.

Difference between Male and Female Students' Study Habit

Q2: Is there any difference between Male and Female study habits of secondary school science students in North-West Nigeria?

Ho1: There is no significant difference between Male and Female study habit of Secondary School Science Students in North West Nigeria

Outcome of the independent t-test statistics table revealed that significant difference exist between male and female study habits. This is because the calculated P value of 0.000 is less than the 0.05 alpha value while calculated t-value of 9.294 is greater than the t-critical value of 1.96. The male students had higher mean study habit of 153.50 than the female with mean study habits of 142.59. Therefore, the null hypothesis which states that there is no significant difference between male and female study habit of secondary school science students in North West Nigeria is hereby rejected. Consequently, our answer to research question number two is that there is difference (to the advantage of the males) between the study habits of male and female secondary school science students in North West Nigeria. This discovery that there is significant difference between the study habit of male and female secondary school science students in North-West Nigeria; where males are superior to the females is interesting. This may be attributed to females' involvement in domestic activities such as meal preparation, house cleaning, washing of clothes, to mention but a few. All these impinge on the female study habit. The result may also be explained by The Association of University Women's (1997) in Nura (2011:82) observation that "girls are less interested in success than boys and that this stereotypical feminine attitude could be detrimental to higher achievement". However, Blumner and Richards (1997) and Nagappa, *et al.* (1995) in Kalaivani and Babu (2011) found sex difference in study habits with female having higher study habit scores than male. This difference in result could be attributed to the ages of the subjects. While the earlier study used men and women, the present study used boys and girls as subjects.

Difference between the Study Habit of Younger and Older Students

Q3: Is there any difference between the study habits of Younger and Older secondary school science students in North-West Nigeria?

Ho2: There is no significant difference between the study habit of Younger and Older Secondary School Science Students in North West Nigeria

Independent t-test statistics revealed that significant difference exist between younger students (16 years and below) and older students' (17 years and above) study habits. This is so because

the calculated value of 0.000 is less than 0.05 level of significance, while the calculated t-value of 6.265 is greater than the t-critical value of 1.96. The younger students had a lower mean study habit of 144.35 than the older students who had higher mean study habit of 152.02. The null hypothesis is hereby rejected. Based on the evidence above, the answer to research question number three is that difference exist between younger students (16 years and below) and older students' (17 years and above) study habits; to the advantage of older students. This result can be explained on account of experience. In addition, the older students know why they have come to school and face their studies squarely.

schools therefore, to find out the way students of private schools study so that they can learn from them in order to improve the way they teach their students.

Difference in the Study Habits of Low and High Academic Performing Students

Q5: Is there any difference in the study habits of Low and High Academic Performing secondary school science students in North-West Nigeria?

Ho4: There is no significant difference in the study habits of Low and High Academic Performing Secondary School Science Students in North West Nigeria

Table 7. Independent t-test Statistics between Younger and Older Students Study habit

Variable	N	Mean	SD	SE	DF	T cal	T crit	P	Remark
Study Habit of Younger (10-16 yrs)	1,163	144.35	24.839	0.728					
Study Habit of Older (17 yrs & above)	633	152.02	24.639	0.979	1,794	6.265	1.96	0.000	Significant at 0.05

Table 8. Independent t-test Statistics between Private and Public School Students' Study habit

Variable	N	Mean	SD	SE	DF	T cal	T crit	P	Remark
Study Habit of Private Sch. Stds.	246	152.33	23.300	1.486					
Study Habit of Public Sch. Stds.	1,550	146.22	25.201	0.640	1,794	3.568	1.96	0.000	Significant at 0.05

Difference between the Study Habit of Private and Public School Students

Q4: Is there any difference between the study habits of Private and Public secondary school science students in North-West Nigeria?

Ho3: There is no significant difference between the study habit of Private and Public Secondary School Science Students in North West Nigeria

Results of the independent t-test statistics show that significant difference exists between private and public school students' study habits. This is because the calculated P value of 0.000 is below the 0.05 level of tolerance while t-cal value of 3.568 is greater than the t-critical value of 1.96. The private school students had a higher mean study habit score of 152.33 than the public school students' study habit score of 146.22. Hence the null hypothesis is rejected. From the figures on the table above, research question number four could be answered thus: there is difference between the study habit of Private and Public Secondary School Science Students in North West Nigeria. The difference is in favour of students of private schools. This result agrees with the finding of Nagappa *et al.* (1995) in Kalaivani and Babu (2011). It therefore means that the previous finding (Ehiozuwa, Oladipo and Etim, 1988) that students of private schools perform academically better than students of public schools may not be rooted in their innate ability but on the way they study. It behoves teachers of public

The results of the independent t-test statistics above showed that significant difference exist between high academic performing students and low academic performing students' study habits. Reason being that the calculated P value of 0.000 is less than the 0.05 level of tolerance while t-calculated value of 18.861 is greater than the 1.96 t-critical value at 1,794 degree of freedom. The high academic performing students have higher mean study habit of 157.52 than the low academic performing students with mean study habit of 137.15. Consequently, the null hypothesis which states that there is no significant difference in the study habits of low academic performing and high academic performing secondary school science students in North West Nigeria is hereby rejected. This finding, unequivocally, proves that the poor academic performance of secondary school science students in North-West Nigeria is rooted in their lack of effective study habit. This finding further reinforce that of Ehiozuwa (2003); although that study majorly focused on low academic performing students of FCE Zaria, a tertiary institution in one of the states in North –West.

Difference among the Study Habits of Secondary School Science Students' in Kaduna, Kano, Katsina and Zamfara States

Q6: Is there any difference among the study habits of secondary school science students in
Kaduna, Kano, Katsina and Zamfara States of North-West Nigeria?

Table 9. Independent t-test Statistics between Low and High Academic Performing Students in their Study habit

Variable	N	Mean	SD	SE	DF	T cal	T crit	P	Remark
Study Habit of High Acad Perf. Students	873	157.52	21.590	0.731	1,794	18.861	1.96	0.000	Signif at 0.05
Study Habit of Low Acad Perf. Students	923	137.15	24.023	0.791					

Table 10 (a). Analysis of Variance (ANOVA) Statistics of the Difference among the Study habit of Secondary School Science Students in Kaduna, Kano, Katsina and Zamfara States of North West Nigeria

Variations	Sum of Squares	DF	Mean of Squares	F- ratio	F- crit	P	Remark
Between Groups	88,460.292	3	29486.764				
Within Groups	1,036,199.683	1,792	578.236	50.994	2.60	0.000	Significant at 0.05
Total	1,124,659.975	1,795					

Ho5: There is no significant difference among the study habits of Secondary School Science Students in Kaduna, Kano, Katsina and Zamfara States of North West Nigeria

According to the results of the Analysis of Variance (ANOVA) statistics significant differences exist in the study habits of secondary school science students in Kaduna, Kano, Katsina and Zamfara states. Reason being that the ANOVA calculated P value of 0.000 is less than the 0.05 level of significance, while the calculated F ratio value of 50.994 is greater than 2.60 F critical value. Hence, the null hypothesis which states that there is no significant difference in the study habits of secondary school science students in Kaduna, Kano, Katsina and Zamfara states of North West Nigeria, is hereby rejected. In view of the above conclusion, the answer to research question number six is that, there is difference in the study habits of secondary school science students in Kaduna, Kano, Katsina and Zamfara states of North West Nigeria. Katsina state has the highest score in study habit, followed by Kano state, next is Kaduna state and lastly, Zamfara state. This is more clearly shown in the figures in tables 10 (b) and (c) below.

Table 10 (b). Descriptive Statistics of the Mean Study habit of Secondary School Science Students in Kaduna, Kano, Katsina and Zamfara States of North West Nigeria

State	N	Mean SH	SD	SE
Kaduna	450	149.53	21.665	1.021
Kano	450	150.95	24.551	1.157
Katsina	421	153.22	20.078	0.979
Zamfara	475	135.55	28.518	1.309

The above descriptive statistics table revealed the mean study habits of secondary school science students in Kaduna, Kano, Katsina and Zamfara states. Katsina state secondary school science students had the highest mean study habit of 153.22 followed by Kano state with 150.95 mean study habits, next are secondary school science students of Kaduna state with mean study habit of 149.53. The lowest mean study habit of 135.55 was scored by students from Zamfara state.

Table 10 (c). Post Hoc multiple Comparisons using LSD test on the Differences in the Study habit of Secondary School Science Students in Kaduna, Kano, Katsina and Zamfara States of North West Nigeria

	(I) State	(J) State	Mean Diff (I – J)	SE	Signif
LSD	Kaduna	Kano	-1.427	1.603	.374
		Katsina	-3.692	1.630	.024
		Zamfara	13.977 *	1.582	.000
LSD	Kano	Kaduna	1.427	1.603	.374
		Katsina	-2.265	1.630	.165
		Zamfara	15.404 *	1.582	.000
LSD	Katsina	Kaduna	3.692 *	1.630	.024
		Kano	2.265	1.630	.165
		Zamfara	17.669 *	1.610	.000
LSD	Zamfara	Kaduna	-13.977 *	1.582	.000
		Kano	-15.404 *	1.582	.000
		Katsina	-17.669 *	1.610	.000

***** = The mean difference is significant at the 0.05 level

The multiple comparisons using Least Significant Difference (LSD) test above revealed that significant difference exist in the mean study habits of Zamfara state students compared with students from three other states. Katsina state mean study habit is significantly different from Kaduna and Zamfara states'. Kano state mean study habit is significantly different from Zamfara state's. Kaduna state mean study habit is significantly different from Katsina and Zamfara states'. This means that there is significant difference among the study habits of secondary school science students in Kaduna, Kano, Katsina and Zamfara states of North West Nigeria. This is a very interesting finding which requires further investigations to unravel the cause.

Recommendations

Consequent upon the findings of this study, the under-listed recommendations become imperative:

- School counsellors should carry out routine study needs assessment of secondary school science students in North-West, Nigeria. This will enable them embark on remedial intervention before things degenerate to a very bad level.
- Teachers, in collaboration with counsellors, should devote more time to the teaching of how to study effectively to

their students. Particularly recommended method here for adoption is the PQRST and Robinson's (1974) SQ3R study technique. PQRST is an acronym for Preview, Question, Read, **S**ummary, Test while the letters in SQ3R describe the actual steps that the learners are made to follow in order to improve their study skills. S – for "Survey"; Q – for "Question"; R1 – for "Read"; R2 – for "Recite"; and R3 – for "Review". By so doing, precious time and energies would not be dissipated teaching students science contents when they have not learnt how to study with maximum results.

- In teaching students how to study, attention should be paid to the core areas of study that are covered in Bakare's (1977) study habit inventory, which include "homework and assignment", time allocation", "reading and note-taking", "study period procedures", "concentration", "written work", "examinations", and "teacher consultation".
- Teachers and counsellors should emphasize to the students the importance of use of personal time-table in effective study. Besides merely informing them, the students should be taught how to, and be helped to prepare personal time-table for private study. Some important activities they could be encouraged to mark out time for in their private study time table include sleep, eating, lectures and tutorials, private study, leisure, travel, and free time (Ikeotuonye and Bashmir, 1986).
- One particular area of study habit that students should be taught about is examination writing. This is because all the efforts in attending lectures, writing notes, doing home work and assignments, and reading would amount to exercise in futility if they cannot write and pass examinations well.
- Seminars and workshops should be organized for parents/guardians of secondary school science students so as to place them in a position to be able to help their children/wards cultivate good study habits. This is very necessary because the quest to see to it that our students acquire effective study habit should be a joint responsibility of all stakeholders. The Parents-Teachers Association meetings could serve as an avenue of reaching out to parents on this issue.
- Also, seminars, conferences and workshops should be regularly organized for teachers on how to assist their students to study.
- When it comes to the issue of effective study, the role of the environment in which the individual carry out his/her study in achieving maximum concentration and assimilation of learned material cannot be over-emphasized. This implies that apart from telling the students the right place to study, efforts should also be made to provide them with a conducive place for study. It is in this regards that governments at all levels are called upon to build and properly equip public libraries in the major towns and villages where students can carry out their study after school hours.
- The school authorities, communities, governments and non-governmental bodies should provide incentives to students to study. This could be done by way of giving prizes, scholarship awards, etc to students who have excelled in academics.
- Science teachers should establish with their students rapport that is necessary for the students to develop positive attitude towards them. This is because, it has been observed that a student's attitude towards his/her teacher usually affects the student's behaviour towards the study and performance in the teacher's subject, either for better or for worse.
- In view of the findings of this study that males are superior to females, and older students have better study habit than their younger counterparts, it is suggested that parents/guardians should desist from overloading their daughters/wards with house chores, so as to give them ample time for study. The burden of house work should, in the same vein, be lessened on younger students.

Conclusion

The results of this study reveal that there is significant difference between the study habits of male and female, younger and older, private and public, low and high academic performing students, and among the study habits of secondary school science students in Kaduna, Kano, Katsina and Zamfara states of North West Nigeria. Since students who have good study habit do well academically and those who have poor study habit also perform poorly in academics, these findings would help pinpoint factors to emphasize in teaching and counselling of science students in particular and students in general to teachers and counsellors who work directly with them. Also, school administrators and school proprietors who manage human and material resources will get to know where they should channel their resources and energies to in their quest for better academic performance of students. In the same vein, these findings will provide parents/guardians not only the basis on which to guide their children/wards, but also an aid to more accurately predict and interpret their children/wards' academic performance. Lastly, the governments at various levels would get to focus their attention on an important area that had hitherto been overlooked, and thereby avoid wastage of their merger resources on factors that are not too crucial to increased academic performance of secondary school science students.

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