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Differential Students' Study Habit and Performance in Mathematics

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Abstract
In order to access students' students study habit and performance in mathematics, the study adopted a descriptive survey using the Students' Study Habit Assessment Scale (SSHAS) instrument. A sample of 400 SSII Students randomly selected from a population of about 2,108 students in 16 public secondary schools in Port Harcourt Local Government Area were used. The instruments reliability coefficient was 0.86, calculated using the Pearson Product Moment Correlation (PPMC) formula. The stated research questions were discussed using mean. Hypothesis was tested at 0.05 significant levels using t-test and ranked order correlation coefficient (Spearman rho). Findings of the study revealed that students' do have preference to specific study habits while studying mathematics. Students' with high level of concentration, when devoted more time to problem solving had high performance irrespective of gender. There are no significant differences between students' study habits and their performance in mathematics. Based on these findings, it is recommended that mathematics teachers should adopt a wide range of instructional strategies in the teaching of mathematics at the senior secondary school level. Appropriate workshops and in-service training for mathematics teacher should be organized periodically, by the state government.
Keywords: Study Habits, Students' Performance, mathematics Teaching

Introduction

Mathematics is one of the compulsory subjects students learn at primary and post-primary education levels in Nigeria. Baiyelo (1987) state that, these seems to be a growing nexus between mathematics education as the foundation of science and technology and a nation's ability to become prosperous and economically independent. This underscores the reason for making mathematics compulsory in the various curriculums of primary and secondary schools. The study of mathematics should aid individuals in ordering, organizing and investigating their environment hence its knowledge should be made to attain more generality of the people (Ohuche, 1988; Baez, 1979).

Students' performance in mathematics varies across different nations due to the difference in the adopted teaching strategy as well as students study habits. Some students' get disgusted with methods that render them inactive in the learning process as well as fancy text backs that have not much for students' selection of exercises, activity and less engendering towards a richer understanding of the subject matter.

Studies revealed that major contextual influences such as students' environment, family and historical and cultural contexts influence their learning (Acido, 2010). The study habits of students could be positive and yielding high level of cognition while their negative attitudes can be distorting, repulsive and consequently lead to poor performance; as well as affecting the impact on students' acquisition of reasoning skills. Acido (2010) confirms an obvious observation that students' interest in things that he or she needs to learn determines his or her acquisition of certain skills or abilities. Indicators of good study habit among students' are organized notes, lessons and materials, having a regular time and place for studying lessons, making decisions about priorities concerning time and goals, good parental models and personal responsibility over what one does or does not do (Acido, 2010; Charnley, 2006 & Covey, 2007).

In order to improve students study habit, Mackeracher (1996) suggested the use of learning partnerships group discussions and case studies for students to maintain a consistent pattern of learning behavior. Lock (1981) opined that learners should improve on their personal developments skills, process skills and expression skills. Personal development skills denotes personal discipline and good management skills while the process skills are the methods and techniques students adapt when studying which incorporates reflective thinking process. However, students' performance in Mathematics has been on a decline over the years.

TABLE 1: Performance of students' in Mathematics (WAEC: May/June/1991 -2002)

Year	Total Entries	Total No. who sat	No. of failures	% of failure	No. of students' who obtained credit & above	% of Credit & above
1991	299,338	294,079	261,352	87.3	32.727	11.1
1992	366,196	361,506	282,480	77.1	79,026	21.9
1993	498,775	491,755	438,196	87.9	53,559	10.9
1994	526,525	518,118	434,926	82.6	83,192	16.1
1995	466,971	462,237	386,193	82.7	76,080	16.5
1996	519,656	514,342	462,755	89.1	51.587	10.0
1997	621,841	616,923	569,671	91.6	47,252	7.7
1998	640,624	635,685	565,098	88.2	70,587	11.1
1999	648,120	642,819	584,961	90.3	57,858	9.0
2000	537,266	530,074	356,258	66.3	173,816	32.8
2001	886,909	843,991	493,245	55.6	350,746	41.6
2002	1,004,308	949,139	806,550	80.3	142,589	15.0
2003	550,029	518,516	281,139	51.1	237,377	45.8
2004	309,660	309,531	142,992	46.2	166,539	53.8
2005	943,371	634,604	426,460	45.2	208,244	32.8
2006	1,040,117	1,023,102	649,147	62.4	373,955	36.6
2007	925,288	908,235	598,826	64.7	309,409	34.1
2008	968,475	940,200	661,855	68.3	278,345	29.6
2009	998,282	902,350	559,692	62.0	342,658	38.0
2010	1,004,308	949,139	806,550	80.3	142,589	15.0
2011	1,045,317	1,004,102	895,540	89.2	148,690	14.8
2012	1,695,878	1,046,722	397,566	37.0	649,156	62.0

Table 1.0 indicates that the percentage of failure is very high between 1991 and 2011, with a percentage failure of 87.3 – 89.2%. it was only in 2012 that the percentage of credit level pass exceeded 61.0% with a reduction percentage failure of 37.0%. This showed an alarming dismal performance of students.

A lot of factors have been adduced for being responsible for this problem in recent times. Ajewole (1990), Egbugbara (1989) lamented that most teachers of Mathematics tend to be more committed to the coverage of the subject matter content than they are to students' acquisition of special skills which would help the student to operate on the content and even deal with novel situations. If students study habit do not improve, assimilation of mathematics concepts would be difficult, if not impossible. Louis (2003) advised that students should adopt his ten steps, improve your study skills module. These steps in a nutshell are that learners should:

(i) modify their behavior towards Mathematics learning by use of Association learning concept. This concept allows for personal reinforcement through positive programs like games and watching of television-usually after a tedious class.
(ii) separate the study of subjects that are alike to avoid interference.
(iii) avoid studying when tired and use of best time for preparation.
(iv) ensure appropriate note taking, memorize actively read and study at the same time.
(v) use appropriate text books that convey concepts in the appropriate order.

Students of high level of motivation base on availability of teaching/learning resources in schools conduciveness of the learning environment are likely to develop good study habit. Students' low and highly performances in mathematics bear with the level of student commitments/interest, teacher pedagogical content knowledge in Mathematics, provision of learning materials/resources for mathematics.

Although gender differentiation exists in study habit among students, Charles 0gan & Alamina (2014) posited a non-differential case. Ossai (2012) in his study of the effect of Age and Gender Differences in study habits, a framework for Proactive Counseling Against Low Academic Achievement, maintained gender differences existed. Female students are better than their male counterparts in time scheduling, concentration, listening, note taking and reading. It is therefore, the intent of this present study to investigate differential students' study habit and performance in Mathematics.

Statement of the problem

Individual differences in study habit have affected mastery of subject areas in education as revealed by students performances, A credit in Mathematics is required for students' entry into professional courses such as

Engineering, Science, Medicine, Education and Economics but recently the performance of students in Mathematics was quite low in table1. If this trend continues, students' pursuit for higher education will be hampered. It is the intent of this study to find out whether this may be attributed to students' study habit.

Aim and objectives of the study

The main aim of this study is to determine the effect of students' study habit and their performance in Mathematics. Specifically the objectives of the study were to:

(1) determine the study habits used by students' in studying mathematics
(2) determine the relationship between the student study habit and performance in mathematics
(3) determine whether there is gender differentiation in study habit and their performance.

Research questions

The following research questions were stated to guide the study:

(1) what are the SS1 students study habits in Mathematics?
(2) how does the students study habit relate to their performance in mathematics?
(3) how does the study habit of boys and girls affect their performance in mathematics.

Research hypothesis

The following null hypothesis was formulated for this study.

HO1: there is no significant difference between students study habit and their performance in Mathematics.
HO2: there is no significant relationship between students study habit and their performance in Mathematics.
HO3: no significant difference between the study habits and performance of the boys and girls in Mathematics.

Methodology

The study adapted a descriptive and correlation design in order to describe the effect of study habits of students' on mathematics and determine if a negative or positive relationship exists between students' performance in Mathematics and their study habits.

Population of the study

The population the study is about two thousand one hundred and eight (2,018) students' (male and female) in public secondary schools Port-Harcourt Local Government Area of Rivers State.

Sample and sampling technique

A sample of favour hundred students (400) were randomly selected for this study while a stratified random selection of the schools were used for this study.

Instrument for the study

The Students' Study Habit Assessment Scale (SSHAS) which was a structured Likert Scale type questionnaire comprising of 9 items closed ended questions was used for students' self-rating exercise, in order to describe their study habit in mathematics. The reliability of the instruments is calculated as 0.86, calculated by the use of Kuder-Richardson 21 for measurement of the internal consistency of the items.

Analysis of Data

The data obtained from students' responses were analysed using the mean rank order descriptive statistics while the hypothesis were tested 0.05 significance level using the t-test and rank order correlation coefficient (RHO), inferential statistics.

Results

RESEARCH QUESTION 1

What are the SS 1 students study habits in relation to mathematics?

Table 4:1 – Students' study habit in mathematics

S/N	STUDENTS STUDY HABITS IN MATHEMATICS	NO. OF RESP.	SA4	A3	D2	SD1	MEAN SCORE (X)	RANK ORDER OF STUDY HABITS
1.	I study mathematics even when I am very tired	400	150 (600)	165 (495)	70 (140)	15 (15)	3.13	1
2.	I study mathematics first by deciding what area to study	400	150 (600)	160 (480)	70 (140)	20 (20)	3.10	2
3.	I study mathematics for about 50 minutes and then take about ten minutes break before starting again	400	140 (560)	160 (480)	75 (150)	25 (25)	3.04	3
4.	I practice mathematics always with textbook	400	120 (480)	155 (465)	80 (160)	45 (45)	2.90	4
5.	I study mathematics with a friend(s), quiz each other, compare notes and predict test question	400	110 (440)	140 (420)	134 (268)	16 (16)	2.86	5
6.	In solving a problem, I pay much attention to details	400	100 (400)	168 (504)	98 (196)	34 (34)	2.84	6
7.	I study mathematics for a very long period without regard to my time table	400	98 (392)	160 (480)	105 (210)	37 (37)	2.80	7.5
8.	I feel good when I solve mathematics problems by myself	400	95 (380)	163 (489)	110 (220)	32 (32)	2.80	7.5
9.	I study mathematics with a high level of concentration	400	60 (240)	70 (210)	100 (200)	170 (170)	2.05	9

Grand mean: $\frac{4+3+2+1}{4} = 2.5$

Table 4.1 shows students study habit in the concepts taught in senior secondary school I mathematics. Students study mathematics when they are tired ($\overline{X}$:3.13 >2.5) hence may not have enough comprehensive of the math concepts due to boredom. The essence of studying choice topics by the student is tantamount to, leaving out those areas that may appear troublesome hence creating deficiency in these items ($\overline{X}$: 3.04>2.5). Although practicing mathematics problems based on textbook exposes the child to learn concepts in mathematics, students' may lack exploratory knowledge of the subject matter. However, studying mathematics with a high level of concentration is a good learning habit ($\overline{X}$: 2.5>2.05). Based on the rank, students having a rank of 1, 2,3,4,5 and 6 have poor reading habit in mathematics while those with 9.0 have high and acceptable reading habit. In summary, students in the research area based on table 4.1 revealed poor reading habit.

Hypothesis I: There is no significant difference in the study habits of students and their performance in mathematics?

Table 1.0: Students' study habit and performance in mathematics.

N	MEAN	SD	df (N-2)	Cal t-value	t-critical	Decision
400	2.835	0.905	398	-0.067	1.960	Accepted

Table 1.0 indicates that the calculated t-value -0.067 is less than the table value of 1.960 at 0.05 levels of significance. Therefore the null hypothesis is retained. There is no significant difference in the study habits of students and their performance in mathematics.

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Research Question 2

What relationship exists between students' study habits and their performance in mathematics?

TABLE 4.2 : Relationship of Students performance to studyhabits

S/N	STUDY HABIT	% RANGE SCORES FROM JSS 3 RESULT	MID POINT SCORE	GRADE OBTAINED	RELATIVE DISTRIBUTION OF RESPONSES TO STUDY HABIT (SH)									
					SH.1	SH.2	SH.3	SH.4	SH.5	SH.6	SH.7	SH.8	SH.9	TOT. RESP
1.	I study mathematics even when I am very tired	20-24	22.0	FAIL	25 (35.1)	6 (8.5)	8 (8.5)	7 (10)	7 (10)	6 (8.5)	5 (7.1)	4 (5.7)	4 (5.7)	70
2.	I study mathematics first by deciding what area to study	25-29	27.0	FAIL	7 (12.7)	20 (36.3)	4 (7.3)	5 (9.0)	4 (7.3)	4 (7.3)	3 (5.4)	5 (9.0)	5 (5.4)	55
3.	I study mathematics for about 50 minutes and then take about ten minutes break before starting again	30-34	32.0	FAIL	6 (11.5)	5 (9.6)	19 (36.5)	4 (7.6)	6 (11.5)	4 (7.6)	4 (7.6)	2 (3.8)	2 (3.8)	52
4.	I practice mathematics always with textbook	35-39	37.0	FAIL	4 (8.3)	6 (12.5)	5 (10.4)	19 (39.5)	5 (10.4)	3 (6.2)	3 (6.2)	2 (4.1)	1 (2.0)	48
5.	I study mathematics with a friend(s), quiz each other, compare notes and predict test questions	40-44	42.0	WEAK PASS	2 (4.6)	4 (9.3)	3 (6.9)	5 (11.6)	18 (41.8)	4 (9.3)	1 (2.3)	3 (6.9)	3 (6.9)	43
6.	In solving a problems, I pay much attention to details	45-49	47.0	PASS	4 (7.3)	2 (4.8)	2 (4.8)	1 (2.4)	2 (4.8)	19 (46.3)	3 (7.3)	4 (9.7)	5 (12.2)	41
7.	I study mathematics for a very long period without regard to my time table	50-54	52.0	REDIT	4 (12.5)	1 (3.1)	2 (6.2)	2 (6.2)	2 (6.2)	3 (9.4)	16 (50.0)	4 (12.5)	2 (6.2)	32
8.	I feel good when I solve mathematics problem by myself	55-59	57.0	CREDIT	1 (2.9)	2 (5.8)	1 (2.9)	2 (5.8)	2 (5.8)	3 (8.8)	3 (8.8)	15 (44.0)	5 (14.7)	34
9.	I study mathematics with a high level of concentration	60-64	62.0	ALPHA	1 (4.0)	0 (0)	1 (4.0)	2 (8.0)	1 (4.0)	2 (8.0)	2 (8.0)	2 (8.0)	14 (56.0)	25
	TOTAL		378.0											400
	Midpoint mean (x)		42.0											

Table 4.2 indicates the relationship of students' performance to their study habit. Students who failed, scoring an average mark of 22, 27, 32 and 37 had very poor study habit such as studying mathematics when tired, making choice of area of study and practice mathematics always with text book. However, students who had weak pass; pay much attention to details and solve problems on their own. Those who study mathematics for a very long time and more so with a high level of concentration had high performance in mathematics rated 47, 52, 57 and 62. Furthermore, students had mean score of 42 in the subject in general, indicating average pass mark among learners.

Hypothesis II: There is no significant relationship between students study habit and their performance in mathematics.

Table 2: Correlation of students study habits and performance in mathematics

Study habit	Rank order I	Rank order II	Difference	D^2	Rho(e) cal-value	t-critical	decision
1	1	1	0	0	0.99	1.960	Accepted
2	2	2	0	0			
3	3	3.5	-0.5	0.25			
4	4	3.5	0.5	0.25			
5	5	5	0	0			
6	6	6	0	0			
7	7.5	7	0.5	0.25			
8	7.5	8	0.5	0.25			
9	9	9	0	0			

The table 2.0 shows that the calculated Rho (e) value of 0.99, have a perfect positive correlation co-efficient. The null hypothesis which states, that there is no significant relationship between study habits and their performance is rejected. There is a positive significant (99%) relationship between students' study habits and their performances in mathematics.

RESEARCH QUESTION 3

What are the study habits of Boys and Girls Mathematics?

Table 4.3: Study Habit of Boys and Girls

S/N	STUDY HABITS	BOYS 172 RESPONSE Frequencies					GIRLS 228 RESPONSE Frequencies				
		SA	A	D	SD	MEAN	SA	A	D	SD	MEAN
1.	I study mathematics even when I am very tired	40 (160)	50 (150)	50 (100)	37 (37)	2.57	60 (240)	58 (174)	63 (126)	47 (47)	2.57
2.	I study mathematics first by deciding what area to study	38 (152)	34 (102)	68 (136)	32 (32)	2.50	56 (224)	54 (162)	65 (130)	53 (53)	2.50
3.	I study mathematics for about 50 minutes and then take about ten minutes break before starting again	28 (112)	43 (129)	72 (144)	29 (29)	2.40	45 (180)	60 (180)	68 (136)	55 (55)	2.41
4.	I practice mathematics always with textbook	30 (120)	48 (144)	61 (122)	33 (33)	2.44	41 (164)	78 (234)	56 (112)	53 (53)	2.47
5.	I study mathematics with a friend(s), quiz each other, compare notes and predict test questions	27 (108)	50 (156)	61 (122)	34 (34)	2.41	40 (160)	60 (180)	75 (150)	53 (53)	2.40
6.	In solving a problem, I pay much attention to details	29 (116)	30 (90)	58 (116)	55 (55)	2.19	39 (156)	45 (135)	50 (100)	94 (94)	2.13
7.	I study mathematics for a very long period without regard to my time table	24 (96)	28 (84)	64 (128)	56 (56)	2.12	40 (160)	34 (102)	59 (118)	95 (95)	2.10
8.	I feel good when I solve mathematics problem by myself	20 (82)	30 (90)	65 (130)	57 (37)	2.10	44 (176)	31 (93)	60 (120)	93 (93)	2.11
9.	I study mathematics with a high level of concentration	16 (64)	29 (87)	75 (150)	52 (52)	2. 05	40 (160)	33 (99)	41 (82)	115 (115)	2.00

Grand mean: $\frac{4+3+2+1}{4} = 2.5$

Table 4.3 reveals the different study habits of boys and girls in mathematics. There is no gender differentiation among the learners in their decision to arbitrary choice of concepts in mathematics. Both sexes also study mathematics even when they are tired, taking about 50 minutes to study mathematics and using just ten minutes for a break. However, the girls practice mathematics using their textbooks more than the boys ($\overline{X}$: 2.47 > 2.44). Collaborative study of the subject matter are carried out effectively by both boys and girls, in terms of studying with concentration, the boys studied with a high concentration than the girls (2.05 > 2.00). This implies that the boys contributed to the high performance of students in mathematics more than the girls as discussed in table 4.2.

Hypothesis III (HO_3): No significant difference between the study habits and performance of the boys and girls in mathematics.

Table 3.0: Students study habit and performance in mathematics classified by gender.

Students	No	Mean	SD	df	Cal t-value	t-critical	Decision
Boys	172	2.309	0.70	398	0.091	1.960	Accepted
Girls	228	2.299	0.60				

The calculated t-value of 0.091 is less than the table value of 1.965 at 0.05 level of significance therefore; the null hypothesis which states that there is no significance difference between the study habits of boys and girls in mathematics is accepted.
This means that there is no significant difference between the effect of study habits on boys and girls on their performance in mathematics.

DISCUSSION OF FINDINGS

The result of the findings indicates that a significant positive relationship exist between students study habits and their performance in mathematics. The study habit has a significant role or influence on the level of performance. This agreed with the findings of Lock(1981). Students' study habit rather than their inability to comprehend mathematical expressions, affects their performance in mathematics.
Hussain (2006) survey report on effects on Guidance services on study attitudes, study habits and academic achievement advocated for the inclusion of study habits in the curriculum, for both males and females. The essence of this is indicated by the result of this study that males and females performance in mathematics are differentially affected by their study habits. Crede and Kuncel (2008) also established through research, mathematics instructional policy and classroom performance.

Recommendation

Based on these findings, the following recommendations are made:

1. mathematics teachers should adopt a wide range of instructional strategies in order to improve study habits of students – such strategies should include the use of mathematical charts, diagrams, models as well as encourage students; to cultivate positive study habit.
2. teachers should accept the responsibility of developing through teaching, students' study habits.

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