

Full Length Research Paper

Interest and Sustenance as Correlates of Students' Performance in Senior Secondary Chemistry in Ogbadibo Local Government Area of Benue State, Nigeria

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The study investigated into interest and sustenance as correlates of students' performance in Senior Secondary chemistry in Ogbadibo Local Government Area of Benue State, Nigeria. Descriptive survey design was employed with five research questions and two hypotheses. The sample of 242 chemistry students' S.S II was used. The instrument was the Interest and Sustenance in Chemistry Questionnaires (ISCQ), divided into sections A and B. Mean and standard deviation were used to answer the research questions while the hypotheses were analyzed using Pearson Product Moment Correlation Coefficient before conversion to t-test for test of significance. From the analysis, it was found that there is a significant relationship between interest in chemistry and the students' performance in the subject. It was recommended that chemistry teachers should use all available instructional materials to arouse students' interest and sustain it so as to enhance performance.

Keywords: Interest, Sustenance, Correlates, Students' performance, Chemistry

INTRODUCTION

Interest is the feeling that prompts one to spontaneous activity. To Aggrawal (2010), interest is a powerful dictator and motivator in the learning process. The implication is that, students are likely to pay attention to learn, remember, imagine and read more readily when their interest and emotions are positively provoked. Interest is therefore a tendency to seek out and participate in any type of activity, which Okoli (2005) sees as a person's preference for one activity over another. Interest as a human sentiment, goes along with values, attitudes and other forms of human preferences. This means that interest motivates and compels attention (Kundu & Tutoo, 2007), operating at the realm of affective domain.

Factors that affect interest include personal and socio-economic/environmental factors. Personal factors, according to Aggrawal (2010) include students' physical, health and physical development, mental health and development, age, sex, pattern of instinctive behaviour, emotions and sentiments. The socio-economic status includes rearing practices in the family, cultural status,

education, among other aspects. Interest therefore makes the students to feel alert, awake and excited at the delivery of learning instructions in the chemistry class. The teacher would energize the students by introducing varieties into his/her teaching. The interest chemistry students develop has a powerful influence on their behaviour, which lasts unto older years, even after school, meaning that interest can affect students academic performance

The trends of candidate's performance in chemistry for May/June WAEC 2007-2010 showed that only 46.20% of the candidates passed at credit level while 53.80% failed (WAEC, 2013). This implies that students' performance in chemistry is poor. Generally, a credit pass in chemistry is needed for admission to higher institution of learning, to read science and technology based courses. This is because chemistry occupies a central position among various science-based courses (Achor & Eriba, 2010). There is a growing concern about the low proportion of women that are engaged in the study of science courses, especially chemistry. The low

patronage of sciences according to Agogo (2009), has affected their poor performance in the science subjects. The chemistry teachers may not be aware that their disposition to boys and girls in the class affect students' interest and their performance.

Interest aroused to learn a particular subject should be sustained for more enduring learning. Interest and its sustenance begin at the nursery and primary school, through secondary school before career choices are made at the tertiary school. Chadha (2007) informed that when a chemistry teacher rewards students' for performing homework and other class works regularly; they are bound to consistently do well. To him, prompt marking and grading of students' class works sustain their interest and enhance performance in the subject. For instance, Uhumuabi and Umoru (2005) investigated the relationship between interest and achievement in mathematics and sciences. They found that achievement of students in mathematics and sciences depend largely on students' interest they generate while studying these subjects. They further found that intrinsic and extrinsic interests are important determinants of achievements in mathematics and sciences.

Researchers have examined how teachers can increase students' interest and engagement in the classroom. To Mazer, (2012), students' interest can be triggered in the moment by certain environmental factors such as teacher behaviours. He discovered that increase in emotional arousal heightens a students' attention, which makes it easier to encode more information. This is why Mazer also informed that teachers' immediacy behaviours stimulate emotional arousal in students, which leads to greater emotional interest and learning engagement. The implication is that, these actions of interest demonstrated by the teacher during teaching makes students to experience cognitive interest and eventual greater academic achievement.

This study is anchored by Thorndike's connectionism theory. The theory of a hungry cat in a puzzle box with only one door as exit after correct manipulation of the door latch was explained. The cat learnt how to open the door because it generated possible interest through motivation. The experiment sums up the stages in the process of learning through drive, goal setting blocking, random movement, chance success and selection of proper way of manipulating the door latch by developing interest. This theory of "trial and error learning" explains that learning is nothing but the stamping in of the correct responses and stamping out of the incorrect ones through trial and error. Thorndike's law of readiness emphasizes that the child learns when he/she is ready to learn, and that learning takes place when it results in satisfaction and the learner derives pleasure out of it. This means that all pleasant experiences have a lasting influence and are remembered for a longtime, while the unpleasant ones are soon forgotten (Thorndike, 1977). This means that Thorndike's theory and laws have made the learning of chemistry purposeful and goal-directed

and has brought motivation to the learning. In a similar way, Shayo (2011) observed that human behaviour is influenced by the way people think about themselves and their environment. as the learners are motivated by the teachers' teaching so also the teachers should be motivated in order to transmit the knowledge to the student with enthusiasm.

Purpose of the study

The purpose of the study is to find out whether interest and sustenance are correlates of students' performance in senior secondary school chemistry. Specifically, the study was set out to:

- i. Find out whether chemistry teachers stimulate their students' interest in chemistry during teaching
- ii. Determine if interest in students are sustained in them over time.
- iii. find out whether there is any relationship between interest and students' performance in chemistry
- iv. ascertain if gender is a factor in the interest and sustenance of chemistry students at the secondary school
- V. find out whether gender is a factor in sustenance of students interest in chemistry.

Research Questions

The following research questions were raised and tested.

1. To what extent do chemistry teachers stimulate their students' interest during teaching?
2. To what extent is the interest of students in chemistry sustained in them?
3. To what extent does interest stimulate in students by the teachers affect their performance in chemistry?
4. Is gender a factor in the interest of students in chemistry?
5. To what extent is gender a factor in the sustenance of students' interest in chemistry?

Hypotheses

Two null hypotheses were formulated and tested at 0.05 level of significance

1. There is no significant relationship between students' interest in chemistry and their performance in the subject.
2. There is no significant relationship between female students' interest and their performance in chemistry.

METHODOLOGY

The study employed descriptive survey design. The study was undertaken in Ogbadibo Local Government Area of Benue State, Nigeria, and it is in Benue

Table 1: mean and standard deviation of students' interest in chemistry

S/No	Items on ISCQ	N	Mean	SD	Remarks
1	I am interested in chemistry because my school chemistry laboratory is well equipped	242	3.31	1.20	A
2	I am interested in chemistry because practicals are held regularly	242	3.37	1.31	A
3	I am interested in chemistry because our teacher ensures students' full participation	242	4.75	0.66	SA
4	I become more interested in chemistry when the teacher takes us to industrial sites	242	1.87	1.28	D
5	I am interested in chemistry because I would like to take up a science-related career	242	4.61	0.84	SA
6	I am interested in chemistry because my parents buy me chemistry textbooks regularly	242	4.26	0.79	A
7	Because I belong to a science club I like chemistry	242	3.91	1.11	A
8	Participating in science quizzes makes me interested in studying chemistry	242	4.13	0.94	A
9	Carrying out chemistry experiments arouses my interest in the subject	242	4.21	1.09	A
10	Teaching chemistry with teaching aids excites me	242	3.73	1.31	A
	Grand mean		3.43	0.97	A

SD= Standard Deviation

education zone C. it covers an area of about 198 square kilometers and a population of 128, 707 (Nigeria 2006 census).

There are 28 senior secondary schools in Ogbadibo Local Government Area (LGA) that are offering science subjects in the West African Senior School Certificate Examination (WASSCE), though many of these schools have no chemistry students for WASSCE examination in the last three years. The sample of 242 senior secondary (SS) chemistry students were used out of the 270 Senior Secondary 2 chemistry students that formed the population of the study

One instrument was used for data collection, which is Interest and Sustenance in Chemistry Questionnaire (ISCQ). The ISCQ instrument was constructed by the researchers. ISCQ contained two sections A and B. section A contained the bio-data while Section B contained 20 question items structured in line with the five point Likert scale of:

Strongly Agree (SA) - 5 points
 Agree (A) - 4 points
 Undecided (U) - 3 points
 Disagree (D) - 2 points
 Strongly Disagree (SD) - 1 point

The ISCQ was validated by two lecturers from Benue State University, Makurdi, Nigeria, in the Department of Curriculum and Teaching, Science Education, unit. Corrections were effected after validation before it was applied on the subjects. The ISCQ was analyzed using mean and standard deviation for the researcher questions and Pearson product moment correlation for the hypotheses. The correlation coefficient values were converted to t-test, for test of significance.

RESULTS

The data collected were presented, analyzed and interpreted, with relevance to the research questions and hypotheses for this study.

Note Remarks on the mean

1.0-1.49	=	SD
1.50-2.49	=	D
2.50-3.0	=	U
3.10-4.49	=	A
4.50-5.0	=	SA

Research Question one

To what extent do chemistry teachers stimulate their students' interest during teaching?

Table 1 shows that, items 1,2,6-10 "Agreed", items 3 and 5 are "Strongly Agree" while item 4 is "Disagree", and a grand mean of 3.43, meaning "Agree". This means that, chemistry teachers stimulate their chemistry students' interest to learn the subject.

Research Question two

To what extent is the interest of students in chemistry sustained in them?

From Table 2, items 11 and 13 are "Strongly Agree", items 14-17 are "Agree" while item 12 is "Disagree". Grand mean of 3.81 implies that interest of students in chemistry is sustained in them

Table 2: mean and standard deviation of students' interest sustenance in chemistry

S/No	Items on ISCQ	N	Mean	SD	Remarks
11	Doing assignments sustains my interest in chemistry	242	4.76	0.64	SA
12	Reading chemistry textbooks sustains my interest in the subject	242	1.87	1.28	D
13	Competitions on science quizzes sustained my interest in chemistry	242	4.64	0.79	SA
14	Listening to science programmes on radio sustains my interest in chemistry	242	4.29	0.80	A
15	Carrying out chemistry experiments on my own sustains my interest in the subject	242	3.94	1.10	A
16	Varying teaching methods sustains my interest in chemistry	242	3.53	1.27	A
17	Group work sustains my interest in chemistry	242	4.14	0.93	A
	Grand mean		3.81	0.97	A

Table 3: Mean and standard deviation of interest and students' performance

Interest	Mean performance	N	Standard Deviation
High interest	54.598	234	19.812
Low interest	31.250	8	29.237
Total	53.826	242	20.538

Table 4; Analysis of Pearson product moment Correlation "r" of chemistry students' interest and their performance and conversion to t-test

Variable	N	Mean	"r"	T _{cal}	T _{crit}	Decision
Interest	242	3.89	0.115	1.79	1.65	Sig
Performance	242	2.70				

S= Significant at $P \leq 0.05$

Research Question Three

To what extent does interest stimulates in students by the teachers affect their performance in chemistry?

Table 3 shows the mean and standard deviation of interest and students' performance in chemistry. The mean of 54.598 and standard deviation of 19.812 were observed for students with high mean interest and mean of 31.250 and standard deviation of 29.237 were for students with low mean interest. This implies that interest has influence on students' performance in chemistry, with a mean difference of 23.348 of high and low mean interest

Hypotheses one

There is no significant relationship between students' interest in chemistry and their performance in the subject.

Table 4 reveals that there is a significant relationship between interest and students' performance in chemistry. It shows t-calculated value of 1.79, degree of

freedom of 240 at 0.05 level of significance and t-critical of 1.65. This means that the null hypothesis is rejected. Therefore, there is a significant relationship between interest in chemistry and the students' performance in the subject.

Research Question four

Is gender a factor in the interest of students' in chemistry?

Table 5 shows a mean of 3.950 and standard deviation of 0.537 for male and mean of 3.833 and standard deviation of 0.572 for female students'. There is a mean difference of 0.117 between male and female chemistry students' interest in favor of the male.

Hypothesis two

There is no significant relationship between female students' interest and their performance in chemistry Table 6 shows that female interest is not a significant

Table 5 mean and standard deviation of male and female chemistry students' interest.

Gender	N	Mean	Standard Deviation
Male	121	3.950	0.537
Female	121	3.833	0.572
Total	242	3.892	0.557

Table 6: Analysis of Pearson product moment Correlation "r" whether female chemistry students' interest is related to their performance and its conversion to t-test

Variable	N	Mean	"r"	t _{cal}	t _{crit}	Decision
Female interest						
Arousal	121	3.83	0.082	0.90	1.66	NS
Female performance	121	2.74				

NS= Not Significant at $P \leq 0.05$

Table 7: mean and standard deviation of male and female students' interest sustenance

Gender	N	Mean	Standard Deviation
Male	121	3.671	0.628
Female	121	3.628	0.598
Total	242	3.650	0.612

factor in students' interest in chemistry. The table reveals that t-calculated (0.90) at 0.05 level of significance and degree of freedom of 240, having the t-critical value (1.66). This implies that there is no significant relationship between female students' interest and their performance in chemistry, meaning the hypothesis is not rejected.

Research Question Five

To what extent is gender a factor in the sustenance of interest of students' in chemistry?

Table 7 shows the mean of 3.671 and standard deviation of 0.628 for male and a mean of 3.628 and standard deviation of 0.598 for female students' interest sustenance in chemistry. There is a mean difference of 0.043 in favor that the male students sustain their interest in chemistry more than the females.

Discussion of findings

The study investigated into the interest and sustenance factors as correlates of students' performance in senior secondary school chemistry.

Research question one addressed the question of whether chemistry teachers stimulate students' interest in chemistry with a grand mean of 3.43, which means "Agreement" that chemistry teachers stimulate their students' interest while teaching. This is expected to

enhance their performance in the subject as interest usually motivates one to greater performance.

Research question two is on the extent to which the interest of students in chemistry is sustained in them. The grand mean is 3.81, meaning that the interest of chemistry students are usually sustained as the teacher teaches the subject. Chadha (2007) stressed the importance of homework, which enhances the students' interest in such a subject.

On the issue of research question three, it was found that there is mean performance of 54.598 for students with high mean interest and mean of 31.250 for students with low mean interest. This means that interest has influence on students' performance in chemistry. Hypothesis one showed that t-calculated value (1.79) is greater than the t-critical (1.65). The null hypothesis is rejected meaning that there is a significant relationship between interest in chemistry and the students' performance in the subject. This is in agreement with Woolfolk (2008) who established that rapid feedback to students after assignments, tests and examinations help to arouse students' interest in the subject for better performance. This is also in agreement with Mazer (2011).

Research question four addressed the issue of gender factors and the interest of chemistry students in the secondary schools. It is found that mean of 3.950 for

male and mean of 3.833 for the female chemistry students, with a mean difference of 0.117 between male and female chemistry students' interest in favour of the male.

Hypothesis two that is set to test this variable of gender showed that interest is not a significant factor in students' interest in chemistry. The t-calculated value (0.90) is less than t-critical (1.66) at 0.05 level of significance. This means that there is no significant relationship between female and male students' interest and their performance in chemistry. Njoku (2005) in the study recommended for gender sensitization to be intensified so as to arouse female students interest in science programmes.

Research question five on the extent that gender is a factor in the sustenance of interest of students gave a mean of 3.671 for male and a mean of 3.628 for female students' interest sustenance in chemistry. There is a mean difference of 0.043 in favour of the male chemistry students. The implication is that, male chemistry students sustain their interest in chemistry more than the female. According to Azeez and Kwasi (2008), in their study on gender disparity, education stakeholders should encourage women/girls in science technology and mathematics for greater performance. In a similar way, Njoku (2005) found that girls and women are under-represented in education, especially in science and technology education, and that something should be done to increase their participation in science and science-related courses.

RECOMMENDATIONS

Based on the findings, the following recommendations are made:

1. Chemistry teachers should use the instructional materials to arouse and sustain their students' interest in the subject for enhanced academic performance
2. Chemistry teachers should realize that interest has influence on students' performance in chemistry which must be harnessed, aroused and sustained for better performance.

CONCLUSION

The study showed a significant relationship between interest in chemistry and students' performance in the subject. The overall interest sustenance by chemistry students showed a high mean which has raised hopes of improvement on the academic performance by the students of chemistry. When chemistry teachers demonstrate interest in the class while teaching their

chemistry subject, the students' are motivated to learn with improved performance.

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