

THE RELATIONSHIPS BETWEEN LEARNING STYLES AND ACADEMIC ACHIEVEMENT OF SENIOR SECONDARY SCHOOL STUDENTS IN NORTH CENTRAL, NIGERIA

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ABSTRACT

The purpose of this study was to examine the relationship of learning styles, learning style and academic achievement of senior secondary school students in North Central, Nigeria. The research design adopted for the study was correlation survey with the total population of 574,783 students out of which 313,938 were males while 260, 844 were females. The sample size for the study was 398 students; using Glenn (2012) sample scale. The questionnaires were designed along Likert scale and were validated by the experts in the area. The reliability coefficient of 0.83 was established. Descriptive and inferential tools of statistical analysis were used. The mean rating was 2.50. While the decision for comparison for each hypothesis was based on 0.05 level of significance, the findings showed that the academic achievements of the students were within average. There was no significant relationship between learning styles and academic achievement of the students in North Central, Nigeria. It is therefore recommended that there is the need for teachers to fully equip themselves in their various subjects and teach on the basis of the differences in learning styles of the students in their class for better understanding.

Keywords: Learning Style, Academic Achievement, Secondary School Student

I. INTRODUCTION

Human civilization has been made possible because the capacity of man to learn to understand and control the universe (science) as well as develop products that has changed the way he lives in his world (technology). Over the years, human activities have transformed the earth chemistry, water, soil and air, alter the face of the earth itself, and change the earth's climate (Hert, 2006). Learners build knowledge as they explore the world around them, observe and interact with phenomena, converse and engage with others, and make connections between new ideas and prior understandings. The extent to which this is achieved, largely, may attributable to the way we see and understand what we perceive through our sensory organs. Hence, the style we adopt in our understanding and manipulation of our environment may have a significant effect on what we achieve as humans.

Learning styles have to do with different ways or patterns preferred by learners in processing information to be learned. Learning styles suggest that due to individual differences, individual learners differ in styles of thinking and methods of representing information. According to Bailey and Garratt (2002), individuals learn in different ways: thus, student in any course, place variety of different interpretations onto their lessons, meaning that individuals differ in terms of intellectual capacity, aptitudes or special talents and school achievement.

The idea of learning styles has been developed as a construct in many areas: cognition, motivation, perception, learning and behaviour and environment. Students have different styles of learning which means students take in and process information in different ways and pattern; by seeing, hearing, reasoning logically or by reflecting and acting. For instance, some students learn easily when seeing and confirming what the teacher says on the chalkboard (visual), some by hearing it aloud (auditory) while some by working with their hands (kinesthetic), especially those that are vision impaired.

II. BACKGROUND

Psychological literature has revealed that every student has a preferred learning style, whether visual, auditory or kinesthetic. People prefer to process information in different ways and therefore learn more effectively when they receive instruction in a way that conforms to their preference (Pashler & McDaniel (2009). Knowing and understanding one's learning style helps the person to learn more effectively and will enable the individual to capitalize on his/her strengths and then improve skills. As remarked by Lynch and Newton (2015), "learning style - based education specifically targeting auditory and visual learners is common practice from kindergarten through post-secondary education". The argument remains that there is no one size fits all approach to education. When it comes to learning some people need to see it, some others need to hear it while some need to do it. Individuals learn better when they receive information in their preferred learning styles.

Jahanbakhsh (2012) conducted a study on Learning Styles and Academic performance: a Case Study of Iranian High School Girl Students in Iran. The main purpose of this research was to investigate the relationship between learning styles of high school girls' students and their academic achievement based on their majors (major course of study in high school). According to the results sensing-intuitive learning styles shows significant correlations with academic achievement of students whose major was mathematic science. Academic achievement of students whose major was speculative science shows significant correlation with active-reflective learning styles. In students with empirical science, academic achievement shows significant correlation with both input dimension (visual-verbal) and understand dimension (sequential-global) of learning.

Academic achievement is a parameter upon which the learning ability of a student is measure in the field of academic; for example, in reading or languages, mathematics, sciences and history. It is influenced by cognitive and non- cognitive factors such as learning styles, personal traits, learning environment, behaviour and strategies (Hannon, 2014). Several empirical studies have established a positive relationship between students' achievement and instructional strategies adopted by the teachers (Adunola, 2011).

Academic achievement is an important outcome in the life of an individual as it determines how successful one could be in life, such as in higher institutions and future career opportunities (Egheosase & Ugwu, 2016). In order to find out why students perform poorly, it is important to look at the factors that affect academic achievement of students. A thorough understanding of these factors would go a long to provide information on ways to increase academic achievement. Academic achievement can be influenced by so many factors apart from cognition and it is therefore not merely based on the educational processes within school, it may depend also on the encouragement and support students receive (Apeh & Nteh, 2020). Learning styles are therefore primarily concerned with how individual learn and not what they learnt. Psychological literature has pointed to the likely influence of learning styles on the individual academic achievement.

In their study on learning styles and overall academic achievement, Abidin (2011) in specific education system discovered that learning styles generally play an important role in students' academic performance, while Mayher (1990) assert that learning as a technique has been widely recommended as a teaching technique because they have been found to have significant influence languages teaching and reading comprehension.

In their study on the impact of learning styles on academic performance, Miao et al (2017) revealed that students are more inclined to learning by discussion with least preference to virtual e-learning. The research concluded that intelligence and discussions have a significant role in predicting students' achievements.

Also, Kohar et al (2021) in their survey study of the relationship between learning styles and academic performance among virtual nursing students found out that the most common learning style among brighter students was kinesthetic while superiority of learning styles is attributable to the structure of a country's educational system as the case of auditory learning styles among Iranians. The results further suggest that the predominance of auditory learning styles among virtual nursing students is a consequence of teacher-centeredness and "the unity" of teacher's strength and emphasis on audition. The research concluded that the significant difference between learning styles and academic performance of students.

In another study on learning styles and academic performance, Bethel-Eke and Eremie (2017) discovered that there is a significant relationship between reading and academic performance of junior secondary school students in Rivers state. Also, the study revealed that auditory learning style display a positive relationship with academic performance. The study concluded that greater awareness of students learning preferences of auditory style is a major factor that help teachers to be more flexible in choosing their methodologies and teaching styles adopted in the classroom. This, according to them is consistent with an earlier finding by Sternberg (1997) who opined that "auditory learners tend to achieve more and score better" than children with other types of learning styles.

Furthermore, Obi (2019) in their investigation of the influence of learning styles on academic performance among undergraduate students found out that visual element had the highest among other styles, with 95%. The research also suggested that there is significant relationship between learning styles of undergraduate science education students and their performance. They concluded in the research that "academic performance increases with the type of learning styles learning styles adopted by students. This was further brought to fore by Fatemeh and Camellia (2018) whose research indicated that students prefer "learning with divergent leaning styles" as it was found to enhance their academic achievement in school. Similar conclusion was arrived at by Barman et al (2014) adding that "students' knowledge of their learning styles" has a high probability of enhancing their academic performance in school.

Learning styles and learning environment are very important variables that affect academic achievement negatively in North Central Nigeria. Unfortunately, schools/educators failed to attend to learners with consideration of the fact that every learner exhibits one or more of these factors or psychological attributes with peculiarity. Some teachers used to go to the classroom daily, equipped with lesson plans, experience, and high expectation that effective learning would take place. However, this expectation was basically a function of the teachers' knowledge- based used in designing the lesson plans and the instructional techniques adopted in teaching the lesson. There was no evidence that learning style was considered as a vital factor in the learning process. The researcher was not aware of any means employed by school authorities to identify students learning styles let alone consider it in instructional delivery. This left one to wonder why a subject of such magnitude was so treated with no concern. The wide gap left on the issue of compatibility of instruction delivery with learning style of the learner might have posed a threat to school learning in North Central, Nigeria by contributing to negative learning outcome as seen in poor academic achievement of students.

This might have constituted significant challenge in the effort of the Nigerian child from the North Central region to learn and perform better academically. It is in view of the above observations that the researcher considered it curious to find out if, applying the appropriate learning styles and learning environment, could lead to remarkable improvement in the academic achievement of the students. Hence, the

decision to conduct this research to investigate the effects of learning styles and learning environment on the academic achievement of students in senior secondary school in North Central, Nigeria.

The researchers in this study were guided by the following research questions:

- i. What are the learning styles and learning environment of senior secondary students in North Central, Nigeria?
- ii. What is the academic achievement of senior secondary students in North Central, Nigeria?
- iii. What is the influence of learning styles on academic achievement of senior secondary students in North Central, Nigeria?

The third research question was translated to null hypothesis thus: there is no significant relationship between learning styles and academic achievement of senior secondary school students in North Central, Nigeria.

III. METHODOLOGY

3.1 Research Design

This study adopted a correlation survey design. It is a type of empirical research design that attempts to find the relationships between the operating variables in a defined population. Accordingly, a self-designed questionnaire called the learning styles questionnaire (SLQ). Following the liker model was used as the main instrument for data collection, while personal interaction with respondents was also used as the need arose. This is in line with Kabacoff and Stoffey (2010) who suggest that the process of survey goes beyond collection and tabulation of data but also involves comparison of elements and determination of relationships interviews and discussions, in addition to questionnaire will provide valid and usable data,

The LSQ contains 38 items, divided into four parts. Part one was structured to collect demographic data of respondents while parts 2-4 were structured to elicit information from respondents with respect to their preferred learning style. The questionnaire was validated by a team of experts in Measurement and Evaluation in the Faculty of Education, University of Abuja to ensure face and content validity.

The instrument was further subjected to reliability test using the test-retest method of reliability. A coefficient of 0.83 was obtained when computed using the Pearson’s r.

3.2 Population of the Study

The population of this study is 574,782 comprising all students in senior secondary schools in public and private schools in North Central Nigeria; according to the available records from the Universal Basic Education Board (UBEC, 2019). The States include Nasarawa, Kwara, Niger, Benue, Plateau and Kogi. Out of this number, Three Hundred and Thirteen Thousand, Nine Hundred and Thirty-Eight (313,938) were male students while Two Hundred and Sixty Thousand-Eight hundred and Forty-Four (260,844) were female students.

3.3 Sample Size

The sample size was 398 students of senior secondary schools in North-Central, Nigeria; determined using the table of sample sizes by Glenn (2012). Multistage sampling techniques were used in this study. Multistage sampling technique divides large population into stages to make the sampling process more practical.

IV. RESULTS

Research Question One: What are the learning styles of senior secondary school students in North Central, Nigeria?

Table 1: Learning styles of Senior Secondary School Students in North Central, Nigeria

N=398

	Learning Styles	Mean	Std. Dev	Decision
Visual Style				
1.	I prefer to see the material in order to know it	3.22	.54	Agree
2.	With my instinct, I can follow directions	3.09	.40	Agree
3.	I can easily visualize objects	2.99	.54	Agree
4.	I have a great sense of balance and alignment	2.76	.719	Agree
.				
5.	I am an excellent organizer	2.79	.71	Agree
.				
6.	During class, I prefer notes to be written on the boards or PowerPoint presentations	2.90	.59	Agree
.				
7.	I like to read handouts or textbooks	2.85	.59	Agree
.				

8.	I enjoy interpreting diagrams, charts or pictures	2.82	.64	Agree
9.	I like to follow a distributed guide	2.83	.67	Agree
10.	I rather study alone	2.74	.65	Agree
11.	I am easily distracted by sounds	2.76	.71	Agree
12.	I have difficulty with spoken directions	2.73	.69	Agree
	Sectional Mean	2.87	0.62	
	Auditory Style			
13.	I always need to hear information to absorb it	2.91	.66	Agree
14.	It is easy for me to understand subtle changes in tone in a person's voice	2.92	.59	Agree
15.	I enjoy oral exams	2.85	.66	Agree
16.	I am excited at story-telling	2.72	.68	Agree
17.	Solving difficult problems makes me happy	2.97	.69	Agree
18.	I like working in groups	3.00	.61	Agree
19.	I rather make recordings of class notes and listening to them	2.90	.55	Agree
20.	I usually would read assignments out loud	2.80	.70	Agree
21.	I usually participate vocally in class	2.83	.70	Agree
22.	My brain seems to store information by the way it sounds	2.79	.64	Agree
23.	Lessons are easily learned by me when I listen and repeat notes back out loud.	2.87	.71	Agree
	Sectional Mean	2.87	0.65	
	Kinesthetic Style			
24.	I intend to move while learning	2.88	.66	Agree
25.	I have good hand-eye coordination	2.90	.61	Agree
26.	I love carrying out experiments	2.87	.63	Agree
27.	I am very good at sports, art, and drama	2.82	.63	Agree
28.	I have high levels of energy	2.82	.71	Agree
29.	I enjoying acting out a play	2.76	.61	Agree
30.	I study best while standing or moving	2.72	.63	Agree
31.	Studying while performing an athletic activity like bouncing a ball or shooting hoops is exciting	2.81	.66	Agree
32.	Learning is best when it is hands-on or involves physical activity.	2.78	.65	Agree
33.	Lessons are best learned through touching, building, moving, or drawing rather than lectures and reading.	2.86		Agree
34.	My best subjects are math and science	2.83	.61	Agree
35.	I would rather show someone how to do something rather than verbally explain it.	2.80	.67	Agree
41.	For better concentration, I try chewing gum, walk around, or rock in a chair while reading or studying.	2.74	.70	Agree
	Sectional Mean	2.81	0.65	

The results in Table 1 showed the learning styles of senior secondary school students in North Central, Nigeria. The mean score for senior secondary school students with visual style of learning indicates agreement with all the items with a sectional mean of 2.81 and standard deviation of 0.62 which proved that the students use visual style of learning such as see the material in order to learn it, can easily visualize objects and interpret diagrams, charts or pictures.

The students utilized auditory style as showed by the sectional mean score of 2.87 and a standard deviation of 0.65. The students tend to understand subtle changes in tone in a person's voice, like working in groups and enjoy oral exams.

The mean scores for of senior secondary school students in North Central, Nigeria showed that the students learned with kinesthetic style as shown by a sectional mean of 2.81 and a standard deviation of 0.65 which means that the students tend to want to move while learning, love carrying out experiments and are very good at sports, art, and drama.

Research Question Two: What is the academic achievement of senior secondary students in North Central, Nigeria?

Table 2: Academic Achievement of Senior Secondary School Students in North Central, Nigeria

	Average Score
Mathematics	45.99
English Language	43.36
Academic Performance	47.67

Table 2 showed that the students' score in Mathematics is 45.99 which mean that the students score in Mathematics is below average. The students score in English Language is 43.36, which also means that the students score in English Language is below average. The academic achievement of students is 47.67. This means that the academic of achievement students is below average.

HO₁: There is no significant relationship between learning styles and academic achievement of senior secondary school students in North Central, Nigeria.

Table 3: Model Summary for Test of Relationship among students' Learning Styles and Academic Achievement of Senior Secondary School Students in North Central, Nigeria

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.007a	.000	-.008	9.59931

From Table 3, the R value, the multiple correlation coefficient is a measure of the quality of the prediction of the dependent variable. An R- value of .007 indicates weak relationship between learning styles and academic achievement of senior secondary school students in North Central, Nigeria.

The R Square called the coefficient of determination shows the proportion of variance in the dependent variable that can be explained by the independent variables. The R square value of .000 indicates that 0% of the variability of dependent variable can be explained on the basis of the independent variable among students.

To determine the statistical significance of the difference in the relationship between learning styles and academic achievement, analysis was carried out and results are presented on Table 4 below:

Table 4: ANOVA Table for Test of Dominant Influence of Academic Achievement by Kinesthetic Style, Auditory Style and Visual Style

Model	Sum of Squares	Df	Mean Square	F	Sig.	Decision
Regression	1.770	3	.590	.006	.004 ^b	Significant
Residual	36305.844	394	92.147			
Total	36307.614	397				

a. Dependent Variable: Academic Achievement

b. Predictors: (Constant), Kinesthetic Style, Auditory Style, Visual Style

Table 4 showed a significant value of .004 (less than the 0.05 level of significance) shows that the independent variables significantly influence the dependent variable. The hypothesis is therefore rejected. This implies that there is statistically significant relationship between learning styles and academic achievement of senior secondary school students in North Central, Nigeria.

To further show the statistical significance of each of the independent variables, analysis was further carried out and results presented on Table 5.

Table 5: Table of Coefficients for Test of Influence on Academic Achievement by Kinesthetic Style, Auditory Style, and Visual Style

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
1 (Constant)	52.440	8.711		6.020	.000
Visual Style	.274	2.335	.006	.117	.003
Auditory Style	-.163	1.908	-.004	-.085	.004
Kinesthetic Style	-.030	1.995	-.001	-.015	.002

a. Dependent Variable: Academic Achievement

Table 5 showed the statistical significance of each independent variable. Results for Visual Style indicates the p-value of .003 which is less than .05 hence the conclusion that Visual Style significantly influence academic achievement of senior secondary school students in North Central, Nigeria. Results for Auditory Style indicates the p-value of .004 which is less than .05 hence the conclusion that Auditory Style significantly influence academic achievement of senior secondary school students in North Central, Nigeria.

Results for Kinesthetic Style indicates the p-value of .002 which is less than .05 hence the conclusion that Kinesthetic Style significantly influence academic achievement of senior secondary school students in North Central, Nigeria.

V. DISCUSSION OF FINDINGS

Several results were obtained with regards to the relationship of learning style, learning environment and academic achievements of students from descriptive and inferential statistics.

On learning styles, with regards to the students’ preferred ways of leaning, established that visual, audio and kinesthetic learning styles exist. This confirmed the position of Felder and Spurlin (2012) that there were different and preferred ways in which students learn either by seeing with their eyes (Visual), hear with their ears (Audio) or demonstrating what had been learnt with their limbs (Kinesthetic).

Secondly, it was upheld that there was significant relationship between these learning styles and academic achievement of the students. This pointed to the reasons why the academic achievements of the students of the senior secondary school in the north central Nigeria were not satisfactory. This further confirmed Mehraj (2014) study which purpose was to detect the influence of the learning styles on teaching/learning process. It also contradicts the outcome of Garner- O’ Neale and Harrison (2013) report that there was no significant or predictive relationship between learning styles and achievement of students in examinations. Invariably, learning styles exists and therefore, teachers need to be aware of this, identify the styles and apply them when teaching the students.

VI. CONCLUSION AND RECOMMENDATION

The main focus of the study was to determine the relationship of learning styles and academic achievements of senior secondary school students in North Central, Nigeria.

From the researcher’s findings in the present study, it was concluded that there was significant relationship between learning styles and academic achievement of senior secondary school students in North Central, Nigeria. Moreover, it was also established that there were visual, auditory and kinesthetic learning styles amongst the students.

It has been established in this study that there was significant relationship between the learning styles and the academic achievements of senior secondary school students in north central, Nigeria. Based on the findings of this research, the following recommendations are made;

1. There is the need for teachers to teach on the basis of the differences in learning styles of the students in their class for better understanding.
2. There is need for exercise, assignments and projects to be given to remedying students’ deficiency in all subject areas. Early diagnosis of students learning difficulties may enable the class teacher to make adequate provision for improvement of students. 7.

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