

Influence of Learning Styles Preference on Senior Secondary School Chemistry Students' Study Habits

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The study was carried out to determine the influence of visual, auditory, kinesthetics, tactile, group and individual learning styles on the study habits of senior secondary school chemistry students. These were with the view to examine the influence of learning styles preference on senior secondary school chemistry students study habits in Osun State. The descriptive survey research design was adopted for the study. Two hundred senior secondary school II (SSSII) chemistry students chosen from five intact classes were selected as samples for the study. Data gathered were analysed using statistical package for the social sciences (SPSS). Furthermore, Analysis of Variance (ANOVA) was used to test all the hypothesis raised in the study. The results showed that all the learning styles (visual, auditory, kinesthetics, tactile, group and individual) significantly influenced the study habits of senior secondary school chemistry students in Osun State.

Keywords: learning styles, study habits, chemistry, learning outcomes, academic performance

INTRODUCTION

Knowledge acquisition through learning is vital to human existence and survival through ages. Learning is a major process everyone experiences either consciously or unconsciously through systematic and repeated occurrence of events. Unique skills, abilities and potentials that are inherent and being showcased by man are products of effective learning (Subotnik, Olszewski-Kubilius, & Worrell, 2011). The process of learning is continuous and happens throughout human existence on earth. Learning can be immediate, induced by an event or interaction with the environment. Basically, learning is defined as a permanent change in behaviour of an individual which occurs as a result of receiving and processing of relevant information in the form of instruction. According to Hsieh, Jang, Hwang, and Chen (2011) the characteristics, strengths and preferences in the form in which instructional information is been received and processed by an individual is termed learning styles.

Learning styles play a major role in students' learning activities and achievement of desirable goals and favourable learning outcomes (Sen and Yilmaz, 2012; (Malacapay, 2019). The fact is that each student has a preferred and unique method of learning that suits his or her learning performance. Learning style is a personal characteristic that enables a student to process and transform knowledge received into personal habit. Students learn in various ways and methods such as visual image or presentation, listening to music while some students learn actively when subjected to hands-on activities. The adequate knowledge of learning style will help a student to learn using the best

Citation: Oyetola, O., & Adetokunbo, O. T. (2025). Influence of learning styles preference on senior secondary school chemistry students' study habits. *Anatolian Journal of Education*, 10(1), 81-90. <https://doi.org/10.29333/aje.2025.1016a>

strategies thereby maximizing learning potentials for better learning outcomes (Alavi & Toozandehjani, 2017). Learning style is the cognitive, effective, and psychosocial indicators of how students perceive, interact with and respond to the learning environment for efficient and productive learning outcomes.

Learning style is focused on the manner with which students retain, absorb, process, and comprehend instruction based on strength, weaknesses and preference of the learning environment. Cornett (n.d) as cited in Bidabadi & Yamat (2010) argued that learning styles make up the overall patterns that give meaningful direction to learning activities. Citing Reid (n.d), Vaseghi, Barjesteh, & Shakib (2013) opined that learning styles constitute the individual, natural, habitual, and favorite strategies of absorbing, processing, and retaining new information and skills. Ldpride (n.d) in Hawkar (2014) submitted that the identification of students' learning styles will enhance students' learning potential, help students' overcome learning challenges at every stage, and also assist in recognizing the most effective way of studying among others. Also, Ldpride (n.d) in Hawkar (2014) stated further that the benefits a student derives in having a sound knowledge of his/her learning styles to include: improvement in students' self-esteem and self-confidence, learning how to best optimize learners' brain, knowing students' academic strengths and weaknesses, learning how to make learning more enjoyable, increasing motivation for learning, and learning how to strengthen students' innate abilities and skills.

Moreover, study habit is a significant factor that determines student's performance in a given instructional tasks, though this habit may be difficult to develop in this era of rapid technological advancement and inventions such as the internet and mobile phones that might encourage distractions among students (Mapua, 2016). According to Bashir & Mattoo (2012), study habits are well planned and structured pattern of study which yielded a form of constant trend on students' understanding of subjects taught and having good results in examination. Since the intention of a learner is to have good academic performance when what has been learnt is being evaluated. Therefore, learners need to develop a good study habit in order to achieve better academic performance. Also, Arieta, Gementiza & Saco (2017) maintained that study habits play a critical role in the academic success or failure of students, this is because student's ability, effort and intelligence are major components of study habits. Additionally, Ebele (2017) reiterated that there cannot be an encouraging academic performance if students fail to develop good study habits that can promote active learning. Therefore, learning style(s) is imperative but study habits could tremendously reduce the issues of underachievement that is still on the rise among Chemistry students (Gettinger & Seibert, 2002; Rana & Kausar, 2011).

Chemistry is a science subject that plays a key role in the technical and technological development of a nation (Matlin & Abegaz, 2011). The subject provides relevant skills that can be utilized in boosting the economic strength of a nation. The fact remains that developing nations like Nigeria cannot be ranked among other developed nations of the world if the teaching and learning of Chemistry at all levels of education is not adequately catered for because the subject is needed to solve majority of the challenges facing the growth of the nation.

The performance of secondary school science students in Chemistry both in internal and external examinations over the years in Nigeria is continually deteriorating and highly discouraging despite the importance of Chemistry to the development of a nation (Odebunmi, Oluwasogo, & Folahan, 2016). Some of the factors responsible for this menace as reported by Researchers include: crude method of instructional delivery by teachers that is deficient of students' participation (Osuafor & Ijenwa, 2017), negative attitude exhibited by students, lack of standard Chemistry laboratory (Raimi, 2015), poor science background (Adesoji, 2016), students' poor knowledge of their preferential learning styles and poor study habits of students (Adesokan, 2013) among others. Studies have shown that there exists a

relationship between the learning styles and study habits of students and this will have a greater influence on the academic performance. Therefore, it is necessary to find out the influence of learning styles on the study habits of science students in Chemistry since there is a dearth of studies on this.

Objective of the Study

The major objective of the study was to determine the influence each of the different learning styles namely; visual, auditory, kinesthetics, tactile, group and individual learning styles on secondary school chemistry students' study habits in Osun State.

Research Hypotheses

The following research hypothesis were generated based on the objective:

H₀₁: There is no significant influence of visual learning style on the study habits of chemistry students.

H₀₂: There is no significant influence of auditory learning style on the study habits of chemistry students.

H₀₃: There is no significant influence of kinesthetics learning style on the study habits of chemistry students.

H₀₄: There is no significant influence of tactile learning style on the study habits of chemistry students.

H₀₅: There is no significant influence of group learning style on the study habits of chemistry students.

H₀₆: There is no significant influence of individual learning style on the study habits of chemistry students.

Literature Review

Learning style is an important contributor and indicator which cannot be overemphasized when it comes to meaningful and effective learning outcomes in teaching-learning process. Studies have shown that effective learning in any learning environment can be facilitated if teachers are adequately aware of the learning styles of students been taught in the class (Zhao & Ting, 2013; Jacobsen, Eggen, & Kauchak 2009 in Prasetya, Fadirubun, Sitohang, & Hidayati 2024; Sarabi, Asiabar, Jafari, Sadeghifar, Tofighi, Zaboli, Peyman & Shams, 2014) since the academic success or failure of a student is premised on the type of learning style possessed by such student (Sternberg & Zhang, 2010).

Learning styles have been given different definitions by Researchers in the past. According to Brown (2000) in Abbas (2012) defined learning styles as the way an individual student observe and process instructional information in a learning environment. Also, Celcia-Murcia (2001) cited in Gilakjani (2012) posited that learning styles are the general strategies of learning used by students when receiving instruction on any subject matter that can add values to his /her perception, interaction and response to the learning environment. Researchers like González, (2011) observed that there is the tendency for learning style to be imitated by students especially when the pattern is positive and this will consolidate the preferential learning style developed by students.

Studies like (Arhin, 2018; Siahhi & Maiyo, 2015; Loveless, 2017) have shown that study habits play crucial roles in the academic effectiveness of students in terms of performance and learning outcomes. Therefore, the academic success or failure of a student depends on the sound development of good study habits and vice versa. Yazdani and Godbole (2014) stressed that study habits are developed behaviour in students that improves motivation to effectively process what was learnt to enhance

efficient academic performance in students. Grohol (2020) highlighted some approaches that students can employ in order to have good study habits. Some of these approaches include: development of right attitude to academic works like doing of assignment, attending of lectures etc., choosing the right environment to study, minimizing distractions during studying, setting a genuine reading schedule and setting of goals with timeline among others. Furthermore, consistent attending to assignments and class activities, promptness in taking and reading of lecture notes, adequate preparation prior to the commencement of examination, regular consultation and the use of the library are indicators of good study habits (Loveless, 2017).

Rana and Kausar (2011) established that possession of proper study habits assist students to develop skills required to think critically in order to adequately select, analyze and synthesize occurrences and phenomena that will catalyze the accomplishment of their academic goals and achievements. In the same vein, Kwakye, Arhin, & Brown (2020) itemized factors like time management, reading and concentration, note-taking, homework/assignment, and practice for examination as five major indicators of study habits that play substantial roles in enhancing students' academic performance at all academic levels.

Dalmolin et al. (2018) conducted a study and revealed the existence of positive association between the academic performance and learning styles of students. In the same vein, a study conducted by Magulod Jr. (2019) that focused on the relationship between learning styles and academic performance, the results of the study showed a significant relationship between learning styles and academic performance of the selected students. The study conducted by Fatemeh and Camellia (2018) showed that divergent learning styles is most preferred learning styles as it enhances students' academic achievement.

METHOD

The study adopted descriptive survey research design. The population of the study consisted all senior secondary school students offering Chemistry in Ile-Ife, one of the ancient towns in Osun State, Nigeria. The sample for the study comprised two hundred students that were purposively selected based on the student's choice of chemistry as one of the subjects and willingness to register and write chemistry as one of the subjects in the Senior Secondary School Certificate Examinations conducted by the West African Examinations Council. The age range of the selected students was between 13 and 15 years. Five Schools were selected using simple random sampling technique. In each of the selected schools, an intact class of senior secondary school year two students were used. Two research instruments were used for the study. The two instruments were: (i) The Perceptual Learning Style Preference Questionnaire developed by Reid (1984). The Perceptual Learning Style Preference Questionnaire is a 30 – item Likert type questionnaire that categorized learning styles of students into six classes of visual, auditory, kinesthetic, tactile, group, and individual learning styles and this was used to assess the learning styles of the sampled students and (ii) Study habits inventory. This is a 19 – item Likert type questionnaire adapted from College of the Redwoods (1994) and was used to determine the study habits of the selected chemistry students. Data collected were analysed using Analysis of Variance (ANOVA).

FINDINGS AND DISCUSSIONS

Research Hypothesis One: There is no significant influence of visual learning style on the study habits of students.

Table 1

Analysis of Variance (ANOVA) of the influence of visual learning style on the study habits of students

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	3727.62	30	124.25	43.98	.000
Within Groups	477.50	169	2.83		
Total	4205.12	199			

The analysis of Table 1 showed that there was a significant influence of visual learning style on the study habits of students ($F_{(30,169)} = 43.98$; $p < 0.05$). Therefore, the null hypothesis was rejected. The finding is similar to that of Awang and Sinnadurai (2011) which showed a significant correlation between study habits and academic achievement.

Research Hypothesis Two: There is no significant influence of auditory learning style on the study habits of students.

Table 2

Analysis of Variance (ANOVA) of the influence of auditory learning style on the study habits of students

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3564.895	30	118.830	31.170	.000
Within Groups	644.285	169	3.812		
Total	4209.180	199			

Result in Table 2 showed that the auditory learning style significantly influence the study habits of chemistry students ($F_{(30, 169)} = 31.170$; $p < 0.05$). Therefore, the null hypothesis that states that there is no significant influence of auditory learning style on the study habits of students was rejected. This finding is related to that of Fatemeh and Camellia (2018) that revealed a positive relationship between learning styles and academic performance of students. In addition, the findings of Magulod Jr. (2019) also corresponds with the findings of this study which observed a significant relationship between academic achievement and learning styles.

Research Hypothesis Three: There is no significant influence of kinesthetics learning style on the study habits of students.

Table 3

Analysis of Variance (ANOVA) of the influence of kinesthetics learning style on the study habits of students

Model	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3501.603	30	116.720	38.593	.000
Within Groups	511.117	169	3.024		
Total	4012.720	199			

Result in Table 3 showed that there was a significant influence of kinesthetics learning style on the study habits of students ($F_{(30,169)} = 38.593$; $p < 0.05$). Therefore, the null hypothesis that states that there is no significant influence of kinesthetics learning style on the study habits of students was rejected. The finding agrees with the result of the study conducted by Ibe (2015) that there is statistically significant influence of kinesthetics learning style on the academic achievement of biology students in Imo State, Nigeria.

Research Hypothesis Four: There is no significant influence of tactile learning style on the study habits of students.

Table 4

Analysis of Variance (ANOVA) of the influence of tactile learning style on the study habits of students

Model	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4505.979	30	150.199	80.430	.000 ^b
Within Groups	315.601	169	1.867		
Total	4821.580	199			

Result in Table 4 showed that there was a significant influence of tactile learning style on the study habits of students ($F_{(30,169)} = 80.430$; $p < 0.05$). Therefore, the null hypothesis that states that there is no significant influence of tactile learning style on the study habits of students was rejected. This finding is comparable with the findings of the studies carried out by Dalmolin et al. (2018) likewise Vaishnav (2013) which showed a significant relationship between learning styles and academic performance of students.

Research Hypothesis Five: There is no significant influence of group learning style on the study habits of students

Table 5

Analysis of Variance (ANOVA) of the influence of group learning style on the study habits of students.

Model	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7540.278	30	251.343	112.2	.000
Within Groups	377.802	169	2.236		
Total	7918.080	199			

Result in Table 5 showed that there was a significant influence of group learning style on the study habits of students ($F_{(30,169)} = 112.432$; $p < 0.05$). Therefore, the null hypothesis that states that there is no significant influence of group learning style on the study habits of students was rejected. The findings of this study oppose that of Varughese (2007) which showed no significant influence of group learning style (extrovert) on their study habits.

Research Hypothesis Six: There is no significant influence of individual learning style on the study habits of students.

Table 6

Analysis of Variance (ANOVA) of the influence of individual learning style on the study habits of students.

Model	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6003.477	30	200.116	23.519	.000
Within Groups	1437.943	169	8.509		
Total	7441.420	199			

Result in Table 6 showed that there was a significant influence of individual learning style on the study habits of students ($F_{(30,169)} = 23.519$, $p < 0.05$). Therefore, the null hypothesis that states that there is no significant influence of individual learning style on the study habits of students was rejected. This finding opposes the findings of Mozaffari et al. (2020) who found that there was no statistically significant relationship between learning styles (individual learning style inclusive) and academic achievement in the two groups of sampled students.

CONCLUSION

Based on the findings of the results of the study, it was ascertained and discovered that all the types of learning styles possessed by chemistry students significantly influenced their study habits. This implies that the learning style possessed by a student towards chemistry could significantly determine the study habits of the students towards chemistry.

SUGGESTIONS

Therefore, it was suggested that chemistry teachers should consider the individual learning styles of students while preparing and delivering chemistry lessons in the class so that all students will be actively involved in the class irrespective of the learning style possessed by the students. Future studies can be conducted to know the influence of learning styles on the study habits of students in other subjects in Arts and Social Science category.

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