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Learning Style Preferences of Undergraduate Pharmacy Students in Niger Delta University

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A – research concept and design; B – collection and/or assembly of data; C – data analysis and interpretation; D – writing the article; E – critical revision of the article; F – final approval of article.

Abstract

Background: Students have preferences about how they like to learn, which affects rate of understanding, assimilation and application of knowledge. Learning styles include assimilating (analytic), diverging (imaginative), converging (common sense) and accommodating (dynamic) styles. Visual, auditory, kinesthetic, tactile, group and individual are other learning preference classification. Appreciation of learning styles by trainers would ensure more productive training outcomes. Data on learning style preferences among pharmacy students in Nigeria is limited

Objectives: To identify learning style preferences among pharmacy students in Niger Delta University.

Methods: A cross sectional study of learning style preferences of 300 consenting undergraduate pharmacy students was carried out. Data collection instruments were the validated 6-item Kolb's Learning Style Inventory (LSI) and the Perceptual Learning Style Preference Questionnaire (PLSPQ). Data collected were entered and analyzed using SPSS version 23. Level of significance was set up at $p< 0.05$.

Results: A total of 279 questionnaires were returned, giving a response rate of 93.0%; majority were female (70.3%). Following Kolb's LSI, the dominant learning style was diverging (48.0%), followed by assimilating (27.6%). Using PLSPQ, the major learning style preferences included tactile (35.4%), visual (34.6%) and kinesthetic (33.6%) learning styles. There was a significant association between gender and learning style preference.

Conclusion: Majority of pharmacy students in the study were diverging learners. Also, almost similar proportions were visual, kinesthetic and tactile in term of preferences. All learning styles must be taken into consideration in training students.

***Keywords**:* Learning style preferences, Pharmacy students, Niger Delta University

INTRODUCTION

Research has shown that students learn in various ways (Budeva *et al*., 2015; Ridwan *et al.*, 2019). Recognizing factors that affect how students learn is important to guarantee effective learning and enhanced learning performance. Student learning style is one of the factors that should be taken into consideration. Students learn better when teaching methods are suited to fit their learning styles (Ridwan *et al*., 2019; Yousef, 2016). Learning is more effective when the educator appreciates the variance of students and merges the teaching and learning process (Damavandi *et al*., 2011). Learning styles are the way learners most efficiently and effectively perceive, process, store and recall information (Zhou, 2011).

Various tools exist that can be used to determine learning style preferences. One of the most widely

used is the Kolb's Learning Style Inventory (LSI) (Kolb, 1971). Kolb developed the Experiential Learning Model to envision experiential learning as a way of appreciating the various ways that people learn experientially. Learning based on experience, referred to as experiential learning (Kolb, 1984) is regarded as an important part of how people learn, grow and develop. The Learning Style Inventory developed by Kolb has four learning styles: assimilating, diverging, converging and accommodating styles. Factors that influence learning style include personality type, educational specialization, and choice of career. (Kolb, 1984).

Reid's Perceptual Learning Style Preference is a form of sensory learning style. It shows how learners interact with their environment and use various senses to deal with new information (Reid, 1987) Under the perceptual learning styles are six learning styles; four are based on perception: visual, auditory, tactile, kinesthetic, and two preferences for social learning; individual and group (Nejati and Borzabadi, 2008).

Pharmacy students undergo a rigorous training programme in which they are expected to have specialised knowledge and skills required to meet the standards of pharmacy practice. The learning style of these students would have a great impact on the effectiveness of their learning and academic performance. Several studies have been carried out to assess teaching styles among undergraduate pharmacy students in Nigeria (Azu and Osinibi, 2011; Bukar *et al.,* 2018; Odunayo *et al.,* 2016). To the best of the authors' knowledge, studies have, however not been carried out on preferential learning styles among undergraduate pharmacy students in Nigeria.

This study therefore aimed to identify learning style preferences among pharmacy students in Niger Delta University in Nigeria.

METHODOLOGY

Study design and study setting

The cross-sectional study was conducted between August and October 2019. The setting was Faculty of Pharmacy, Niger Delta University. Niger Delta University, one of Nigeria's leading universities is located on Wilberforce Island in Bayelsa State, South-South Nigeria. The university has 13 faculties among which is the Faculty of Pharmacy.

Inclusion and exclusion criteria

Inclusion criteria was all consenting undergraduate pharmacy students. Excluded were postgraduate pharmacy students and students from other faculties in the university.

Study population

Study population was all undergraduate pharmacy students, from year 1 to 5 who consented to participate in the study.

Sample size determination and sampling technique

The total population of Pharmacy Students in Faculty of Pharmacy at Niger Delta University was 525. The minimum sample size of 223 was obtained using Raosoft sample size calculator (Raosoft, 2019) at 95% confidence level and 5% confidence interval. A total of 300 consented undergraduate pharmacy students were sampled within the study period.

Data collection

Data collection tool was a self-administered questionnaire; the first section consisted of demographic information of respondents. The second section consisted of David Kolb Learning Style test which is based on Kolb' Experiential Learning Theory while the third section consisted of the Perceptual Learning Style Preference Questionnaire (PLSPQ) developed by Reid, 1984.

The Kolb's questionnaire comprises of six sentence stems followed by four possible endings to the sentence. The respondent respond to statements on how they learn, and rank each of the four sentence endings from 4 to 1 based on the sentence ending they agree with. Thus 4 corresponds with the sentence ending they agree with most, the second greatest preference is 3, then 2, while 1 corresponds to the sentence ending they agree with least. This ranking process is done 6 times. Each number is chosen once per statement.The score for each of the four sentence endings for the six sentence beginnings is written, with a total of 24 answers, in four columns. The four columns represent Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC) and Active Experimentation (AE). Each column is then added up. The lowest possible score for any column is 6, and the highest is 24, but most scores for a column will be more in the middle. The total off all four columns will be 60. Those with highest scores for CE and RO, for example, are diverging Learners. Highest scores for RO and AC are assimilating Learners. Highest for AC and AE are Converging Learners, while highest score for AE and CE are accommodating Learners (See Appendix 1).

The Perceptual Learning Style Preference Questionnaire was designed to identify the perceptual learning style preferences of students. There are six learning styles; visual, auditory, kinesthetic, tactile,

group and individual learning styles. There are five statements for each learning style and a total of thirty statements. Respondents are to respond to each statement by choosing answers from a 5-point Likert scale from strongly agree, agree, neutral, disagree or strongly disagree each with a corresponding numerical score from 5 to 1 respectively. The score for each learning style is calculated and multiplied by 2. The learning style score with score of 38-50 is the major learning style preference, style with score 25-37 is the minor learning style preference while style with score 0-24 is negligible (See Appendix 2).

The survey questionnaires were distributed to the students in their various lecture halls. The questionnaires were numbered serially. Each class of students were given questionnaire only once to prevent duplication through multiple filling of questionnaire by the students. A short briefing was given to provide clarification on the survey. Students were given ample time to answer the questionnaires and they were collected on the same day.

Data analysis

Data collected were analyzed using Statistical Package for Social Sciences (SPSS) Program version 23. Frequency and percentages were used to describe the study population. The Chi-square test was used to assess the association between categorical data. A confidence interval of 95% and p-value <0.05 were considered significant.

RESULTS

Demographic data of Respondents

Out of the 300 questionnaires distributed, 279 were retrieved giving a response rate of 93.0%. Majority of the participants (70.3%) were female. The most represented age group was 20-29 years (71.7%) followed by those below 20 years (21.9%). The highest number of participants were from 300 level (33.3%), followed by 500 level (23.3%). Details are in Table 1.

Table 1: Demographic data of Respondents

Variables	Frequency n (%)		
Age	**Male**	**Female**	**Total**
<20	13(4.7)	48(17.2)	61(21.9)
20-29	63(22.6)	137(49.1)	200(71.7)
>30	7(2.5)	11(3.9)	18(6.5)
Marital status			
Single	76(27.2)	185(66.3)	261(93.5)
Married	6(2.2)	11(3.9)	17(6.1)
Divorced	1(0.4)	0(0.0)	1(0.4)
Level of studies			
100	1(0.4)	30(10.7)	31(11.1)
200	10(3.6)	28(10.0)	38(13.6)
300	30(10.7)	63(22.6)	93(33.3)
400	17(6.1)	35(12.6)	52(18.7)
500	25(9.0)	40(14.3)	65(23.3)

Learning style preferences among respondents in accordance with Kolb's LSI.

The distribution of the learning style preferences among the participants; diverging (48.0%), assimilating (27.6%), converging (12.9%) and least, accommodating learners (11.5%) as shown in Table 2.

Table 2: Learning style preferences among respondents in accordance with David Kolb's Learning Style Inventory

Learning styles	Gender n (%)				
	Male	**Female**	χ^2	**df**	**p value**
Diverging	37(13.2)	97(34.8)	9.962	3	0.02
Assimilating	21(7.5)	56(20.1)			
Converging	8(2.9)	28(10.0)			
Accommodating	17(6.1)	15(5.4)			

Major learning style preferences of respondents using PLSPQ

The major social learning style of respondents in the study was individual learning style (38.9%), while the major perceptual learning styles were tactile (35.4%), visual (34.6%) and kinesthetic (33.6%) learning styles as shown in Figure 1.

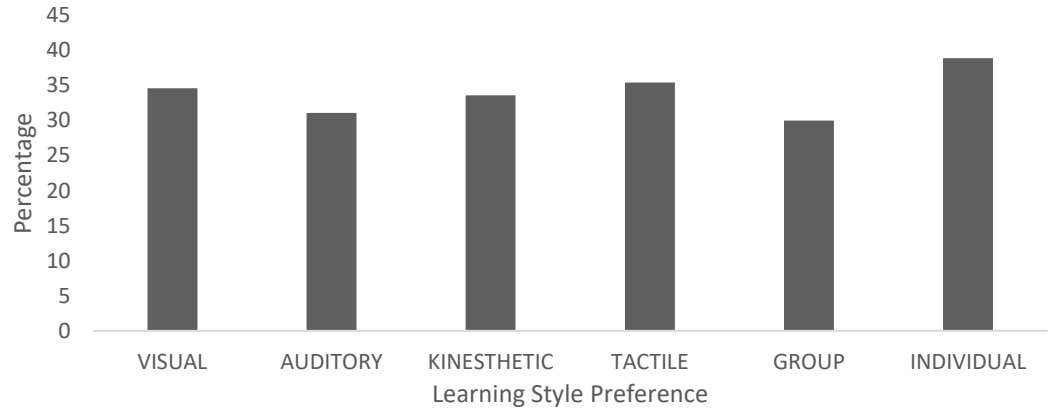

Fig 1. Major learning style preference of respondents using PLSPQ

Minor learning style preferences

The predominant minor learning style preference in the study was auditory learning style (65.7%) while the least was individual learning style (55.4%) as shown in Fig 2.

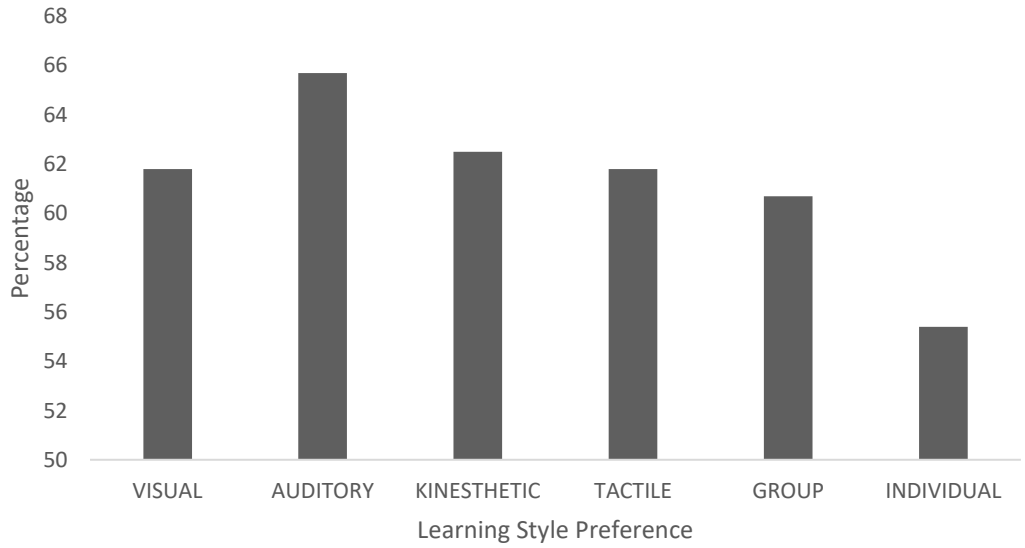

Figure 2. Minor learning style preferences of respondents

Negligible learning style preferences of respondents

The predominant negligible learning style preference was group learning style (8.6%) followed by individual learning style (5%) while the least were tactile and visual learning styles (both 2.5%) as shown in Figure 3.

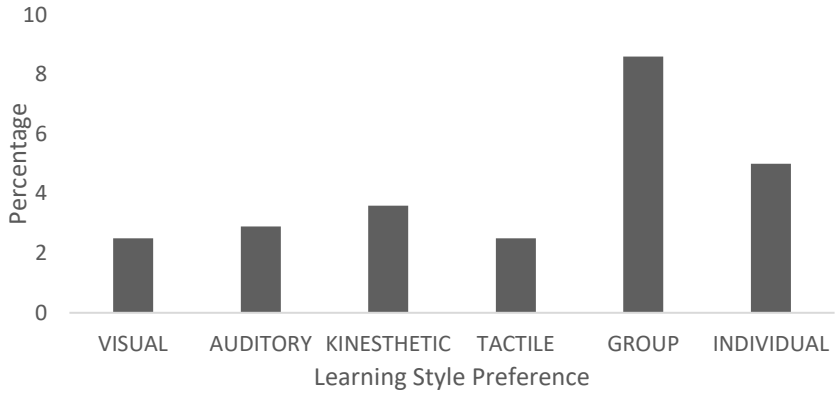

Figure 3. Negligible learning style preferences of respondents

DISCUSSION

The research identified the preferred learning styles of undergraduate pharmacy students using two instruments. In accordance with the Kolb's Learning Style Inventory, diverging learning style was the dominant learning style among the pharmacy students, which is similar to a study by Kamran *et al*, 2022 in which diverging learning style was the predominant learning style among medical students and another study at the Nelson Mandela Metropolitan University's Faculty of Health Sciences in which diverging learning style was the predominant learning style among nursing students (Vawda, 2005). Diverging learners are more creative and imaginative. They view concrete situations from many different points of view. They prefer lectures and detailed, systematic information (Kolb, 2005).

After the diverging learning style, the assimilating learning style was the most common learning style among the respondents. This learning style highlights thinking capability involving systematic, sequenced, logical and detailed information (Akran and Burhan, 2018) Assimilators deal with abstract ideas and use inductive reasoning to generate theories. They prefer reading, lectures and writing papers (Kolb, 2005). They have the most cognitive approach, preferring to think than to act. In another study of undergraduate pharmacy students by Williams *et al*., 2013, converging and assimilating styles of learning were the predominant learning styles. Although diverging and assimilating were the predominant learning styles, the other learning styles should not be neglected when revising the pharmacy curricula as the teaching methods should benefit all students. That is why a variety of teaching methods should be implemented in pharmacy education to cater to all learning styles and provide a fair environment for all types of learners. Since learning is an ever-changing process, it would be possible to challenge students to learn through different methods than the methods they are already comfortable with and at the same time enhance their preferred way of learning.

There was a significant association between gender and Kolb's LSI which is similar to the study carried out by Collins *et al.,* 2019 which found a statistical association between learning mode between men and women. It however differs from studies by Adesunloye *et al.,* 2008 and another study carried out by Kamran *et al* 2022 in which there was no association between gender and learning style.

The scoring for the six perceptual learning styles determine whether they are major, minor or negligible learning styles. The prominent being major learning style then minor and negligible style. The major perceptual learning style is the preferred learning style (Obralic and Akbarov, 2012). In the study, major perceptual learning styles included kinesthetic and tactile learning styles which is similar to results obtained by Reid (1987) in which kinesthetic and tactile learning styles were the major learning styles. Kinesthetic learners prefer learning through practical sessions such as case-based and ward-based teaching methodologies and being physically involved in classroom activities, while tactile learners optimize their learning by hands-on experiences such as laboratory experiments and building models (Nge and Eamoraphan, 2020). Visual learning style was also a major learning style. Visual learners prefer visual stimuli such as videos, graphics and presentations and written instructions for classwork (Inam and Haq, 2022; Shen 2018). The predominant minor learning

style was auditory learning style. A minor learning style is a style in which the learner can still function, but not as well as the major learning style (Obralic and Akbarov, 2012). Auditory learners learn more by listening to lectures and remember information that has been explained to them in discussions, thus they may prefer interactive small group discussions with audio-visuals (Shen, 2018). Group learning style was a predominant negligible learning style as opposed to individual learning style which was a predominant major learning style preference of respondents. A negligible learning style is the style that is more difficult for the individual to learn by (Reid, 1984). Group learning style preference refers to individuals who prefer to share and receive ideas from others in class or in group discussions (Jamulia, 2018). Thus it can be implied that more pharmacy students in the study prefer to learn individually as opposed to group learning.

CONCLUSION

The dominant learning style preferred by the pharmacy students in Niger Delta University in this study was diverging followed by assimilating learning style. A good proportion of the students are represented in perceptual learning style with kinesthetic being the most prevalent.

ETHICAL CONSIDERATIONS

Ethical Approval was obtained from the Faculty Research Committee of the Faculty of Pharmacy, Niger Delta University.

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