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Learning Styles among Undergraduate Anatomy, Pharmacy, and Medicine and Surgery Students at the University of Port Harcourt

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ABSTRACT

Every person is thought to have a particular learning style that they have cultivated over time. The learning style can be impacted by various factors, such as the environment, peer group, and culture. 900 undergraduate students from the University of Port Harcourt's Anatomy, Pharmacy, and Medicine and Surgery (MBBS) program participated in the study, which aims to assess their preferred learning styles and compare them to the work of other authors from other nations. The study used the Learning Style Questionnaire established by Honey and Mumford. 88.9% of the students were found to have a prevalence of quad-modal learning styles. This study has provided reference data on the learning styles of students in the departments of Anatomy, Pharmacy, Medicine, and Surgery. It will be helpful to Medical Educators. The information about students' learning styles can be used to develop a useful learning strategy. Further studies should be carried out on departments in the humanities or engineering to ascertain their learning styles. The results showed that there is a significant variation in the learning style of the present study and that of Indian and German students, likely due to environmental or geographical differences.

Keyword: Learning Style, Anatomy, *Pharmacy, Medicine and Surgery, University of Port Harcourt.*

Since students are the reason a university exists, their opinions must be addressed regarding how the institution's vision for teaching and learning development should be developed shortly and must be "up to date" [8]. Teachers use lectures, homework assignments, and tests to evaluate their students' learning, the response style that the instructor chooses has an impact on the learning and subsequent actions of the pupils [15]. One of the most important topics in the world of higher education nowadays is the investigation of how students might reconcile their academic requirements with the institution's policies. Students' engagement was controlled by intrinsic or autonomous motivation combined with a sense of competence and purpose since they frequently believed that learning at school was enjoyable, fulfilling, or helpful. When learning was

viewed as ideally difficult, students expressed excitement and dedication to their studies, and the feedback they received strengthened their perception of competence [19]. Teaching and learning concepts must be made clear since they influence methods of instruction, learning, and learning outcomes [10]. According to [4], standard economic factors like parental transfers, family income, and financial aid do not predict study behaviors. Instructors must have access to learning settings that minimize any potential drawbacks and highlight the benefits of collaborative learning [17]. One crucial component of teaching is teachers' comments on their students' written work [13].

The advancement of information technology and the consequent accessibility of microcomputers appear to have played a role in the recent changes in schooling. However, low student achievement and retention rates continue to plague anatomy educators, and low grades remain a problem for anatomy academics. The broad curriculum may be the cause of anatomy students' poor performance, according to empirically tested evidence in instructional techniques found in anatomical and medical education literature. Despite the extensive and well-intentioned educational literature on classroom teaching methods, the majority of instructional and teaching advancements in anatomical imaging, description, and viewing have hardly been tested to determine their effects on student learning patterns. According to several researchers, determining a student's learning style helps improve the educational process. Because of this, educators may modify their teaching strategies to better suit a particular student's class and learning preferences. In particular, a lecturer's method of instruction affects students' performance in the classroom.

A person's natural or regular method of absorbing and processing information is sometimes referred to as their learning style. "Characteristic cognitive, affective, and psychosocial behaviors that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment" is a standard description of "learning styles." Each student has a very different learning style. Therefore, the instructor must address the variety of learning styles among the students and create effective teaching strategies.

The two recognized teaching approaches is the electronic virtual experimental demonstration method.

and the conventional classroom teaching approach.

Learning management systems are quite effective in e-learning, but they don't offer much flexibility and may not be able to recognize a learner's needs. Using information technology as a fundamental part of classroom instruction has allowed for the practical application of problem-solving techniques in learning without regard to time or location constraints. Many instructors have been prompted by these technological advancements and developments to reevaluate conventional, standardized teaching strategies and emphasize the significance of taking student learning styles into account when creating and delivering course materials.

The percentage of knowledge gained by a student in the class is determined partially by the student's learning ability, prior preparation, capability of his/her learning style, and teaching method. Mismatches between an instructor's style of teaching and a student's method of learning have been cited as potential learning obstacles and this is the reason for using a variety of teaching modalities to deliver instruction. With the consolidation of multimedia technology and the internet, teaching and learning styles are assumed to be markedly influenced. Educators can easily get an insight into how students work and learn using the traditional teaching/learning format. However, the operation of an electronic virtual-based learning environment tends to have a far-reaching effect on students and can also accommodate different learning styles. The behavior of students in the learning management system (LMS) determines the detection of learning styles. As demonstrated by earlier research, understanding how pupils learn could improve instructional strategies. Several models and measures of learning styles have been described in the literature. Kolb put out a model with a four-stage cyclic structure that starts with a tangible experience

that encourages introspection and then moves into an abstract conceptualization that permits active experimentation. Kolb's concept is related to the Learning Style Inventory instrument (LSI). Learners' preferences for tangible versus abstract and action against thinking are the main emphasis of the LSI. The learners are then classified as accommodators, assimilators, convergers, or divergers. The Learning Style Questionnaire (LSQ), which Honey and Mumford developed as an alternative tool, is thought to have demonstrated validity and predictive accuracy in comparison to the LSI. The LSQ identifies four different types of learners: pragmatists (who learn by closely examining ideas with practical outcomes/perspective that explains or suits the idea), reflectors (who learn by reflecting on material content, objects, and illustrative examples), activists (who learn by exploring associations and interrelationships by: adapting and integrating observations into complex but logical theories), and theorists (who learn by critically analyzing ideas with practical outcomes/perspective that explains or suits the idea). Based on the aforementioned, it is imperative to assess how well students learn by medical sciences teaching methodologies, which have not been well investigated. Thus, this study exposes medical educators to the many ways that students learn and the potential need to implement appropriate teaching strategies and research to improve student learning.

Students' learning preferences in the departments of anatomy, pharmacy, and medicine and surgery (MBBS) must be assessed to ensure that they align with the teaching strategies used in medical education. As far as I'm aware, there aren't many studies on the University of Port Harcourt's medical students' preferred methods of learning. This is the primary factor for this research. However, the research is necessary because:

Medical students at the University of Port Harcourt must be cognizant of the various learning styles.

Medical educators must also understand and value the various learning preferences and styles of medical students.

Understanding medical students' learning preferences and styles will improve the University of Port Harcourt's teaching and learning environment.

AIM OF THE STUDY

This present study aims to evaluate the learning style preference among undergraduate Anatomy, Pharmacy and Medicine and Surgery students in University of Port Harcourt.

LEARNING STYLE INVENTORY TYPES AND THEIR USES

It has been demonstrated that pupils' learning styles differ greatly from one another. Few scholars have created different learning style techniques, such as Fleming's (VARK) Learning Style Questionnaire, Honey and Mumford's Learning Style Questionnaire (LSQ), and Kolb's Learning Style Inventory (LSI), to study people's learning styles across nations.

Kolb's Learning Style Inventory (LSI)

David Kolb created his learning style inventory based on his learning styles model, which was published in 1984. A four-stage learning cycle that allows the learner to "touch all the bases" is commonly used to illustrate Kolb's experiential learning style theory: [14].

Honey's and Mumford's Learning Style Questionnaire (LSQ)

[7] Developed the learning styles (LSQ) instrument based upon the work of Kolb's Learning Style Inventory (LSI) they pointed out that there is an association between the learning cycle of Kolb and their learning styles. They identified four distinct learning styles or preferences: [1].

Fleming's (VARK) Learning Style Questionnaire

The instructional preference model, which is used in the VARK learning styles inventory created [6], categorizes learning styles based on the preferred sensory method or how information is learned [16]. VARK stands for Visual, Aural, Read/Write, and Kinesthetic preference modalities.

Overview of Learning Style

Before 1979, the term cognitive style was commonly used to refer to the various techniques people used to perceive, think about, and solve problems [3]. Later, researchers came up with the term "learning style" to identify presentations and course material that matched specific cognitive styles [11]. In 1979, [9] presented a definition that was accepted by the National Association of Secondary School Principals (NASSP), which classified learning styles as cognitive, affective, and physiological factors that are indicators of how students perceive, interact with, and react to a learning environment. Since then, learning style has been defined by several scholars, primarily as a signal for individual differences. "A unique way developed by students when he/she was learning new and difficult knowledge" is how Rita Dunn defined the concept of learning style [5]. A person's natural or regular method of absorbing and processing information in learning contexts is sometimes referred to as their learning style. One way to think of learning is as a part of a broader personality constructs [18]. Learning style is the distinct manner in which learning is displayed during the learning process. This includes observable problem-solving techniques, decision-making behaviors, constraints faced during the learning environment, and responses to other people's expectations.

Models of Learning Style

The literature has described several learning style models and assessments. Kolb developed a four-stage cyclic model that starts with a concrete experience that encourages introspection and then moves into an abstract conceptualization that permits active experimentation[12] Kolb's model is associated with the learning style inventory instrument (LSI).

Learning Style Dimension

[9] Identified a number of learning style variables in 1979 that were thought to be most important for enhancing the learning process.

Field Independent vs. Dependent

Herman Witkin established the independent vs dependent dimension in 1962, and it has been said to have the most potential to enhance the educational process [20]. Its idea, which deals with learner perspectives, is the most studied of all the learning style dimensions. Learner differences in terms of competitiveness, attention span, interpersonal orientation, and degree of comfort with the learning environment's structure are reflected in the field-independent dimension.

RESEARCH DESIGN

A cross-sectional study will be conducted using the Honey and Mumford Learning Style Questionnaire (LSQ) on 900 volunteers from the University of Port Harcourt's departments of anatomy, pharmacy, and medicine and surgery, ranging from 200 levels to the final level.

STUDY AREA

University of Port Harcourt Choba Rivers State

STUDY MATERIAL

The main source of information for this study was printed learning Style Questionnaires (LSQ); relevant works and the internet were reviewed for the majority of this research.

STUDY DURATION:

This study spanned from January 2023 to June 2024

POPULATION OF THE STUDY:

Three hundred students each from the University of Port Harcourt's departments of anatomy, pharmacy, medicine and surgery make up the study's population. 900 volunteers in all, ranging from the 200th to the last level of the departments indicated.

SAMPLING TECHNIQUE

This study was conducted using a purposive sampling technique, in which samples were chosen based on specific criteria, ensuring that only students from 200 levels to the final level and those studying anatomy, pharmacy, medicine, and surgery were employed.

The research questionnaires included sections for the students' departments, genders, and levels.

CRITERIA FOR SELECTION

INCLUSIVE CRITERIA

The questionnaires were distributed to:

- Only Anatomy, Pharmacy, Medicine, and Surgery students
- Only 200 level to final level students

EXCLUSIVE CRITERIA:

The questionnaires were not distributed to:

- Students not in the aforementioned departments.
- Students below the 200 level

INSTRUMENTS FOR DATA COLLECTION:

Because the Learning Style Questionnaire (LSQ) was simple to read, complete, and understand, it was used. It included 40 questions with sections for the students' departments, genders, and levels.

Other studies looking into learning styles have used and tested the questionnaire.

METHOD

Students were informed of the study's purpose, given instructions on how to answer the questions, and given ten to fifteen minutes to complete the questionnaire before it was collected from them. Each student received a questionnaire after their informed consent was obtained.

METHOD OF DATA COLLECTION:

The students were asked to check or cross the box next to each statement as part of the straightforward evaluation process for the LSQ. When a student agrees with a statement more than they disagree with it, they mark it with a checkmark; when they disagree with a statement more than they agree with it, they mark it with a cross. All of the students who volunteered to participate completed the surveys in order to collect the necessary data.

SCORING OF QUESTIONNAIRE ON LEARNING STYLES:

The student's chosen learning style was then ascertained using the scoring sheet, which contained the questions organized into four learning columns. On the scoring sheet, a "1" is placed next to the question number for each statement or question that has been checked. There are no crosses. Ultimately, each learning column's 1s were totaled and compared. The student's preferred learning style was identified by taking the highest tally.

Results

RESPODENT INFORMATION

The demographics of the current study are displayed in the table below. The students are 24 years old on average. The age range is 18 to 30 years of age.

Table: Demography of the present study

DEMOGRAPHICS	NIGERIA (Present study)
Age range	18-30
Mean age	24
Male	444
Female	456

Undergraduate	900
Sample size	900
University	University of Port Harcourt Rivers State

Learning styles of students according to their gender and departments

The Honey and Mumford learning style questionnaire was used to assess the questionnaire and identify the learning styles according to gender. The following displays the learning preferences of anatomy students. In year two (2), 30.91% of the male students are quad-modal, compared to 46.35% of the female students.

Table 2: Learning patterns of Anatomy students based on their levels

			Male students				Female students			
Department	Level	Total no. of students	Sub-no. of students	Learning Styles	Learning preference	Percentage %	Sub- no. of students	Learning Styles	Learning Preference	Percentage %
Anatomy	2	110	3	T-A	bi-modal	2.73%	1	T-R	Bi-modal	0.91%
			3	T-P-R		2.73%	5	T-A-P		4.55%
			1	T-A-R	tri-modal	0.91%	1	T-A-R		0.91%
			3	P-A-R		2.73%	8	T-P-R	tri-modal	7.27%
			34	T-P-A-R	quad-modal	30.91%	51	T-P-A-R	quad-modal	46.35%
	3	90	1	T-A-R	tri-modal	1.11%	2	T-A	bi-modal	2.22%
			2	T-P-R		2.22%	2	P-A-R		2.22%
			43	T-P-A-R	quad-modal	47.78%	2	T-P-R	tri-modal	2.22%
							1	T-A-P		1.11%
							37	T-P-A-R	quad-modal	41.12%
	4	100	1	T-P-R	tri-modal	1%	1	T-A-R	tri-modal	1%
			1	T-P-A		1%	3	T-P-R		3%
			58	T-P-A-R	quad-modal	58%	36	T-P-A-R	quad-modal	36%

Pharmacy student's learning style

Based on their levels, the learning patterns of pharmacy students are displayed in the table below. It was found that 0.84% of the male students in their second year exhibited a bi-modal learning style. 6.78% of females and 7.62% of males exhibited tri-modal learning. Of the females, 34.74 % exhibited a quad-modal learning style, while 50.00% of the males did.

Table 3: Learning patterns of Pharmacy students based on their levels

			Male students				Female students			
Department	Level	Total no. of students	Sub-no. of students	Learning Styles	Learning preference	Percentage %	Sub- no. of Students	Learning Styles	Learning preference	Percentage %
Pharmacy	2	118	1	T-R	bi-modal	0.84%	8	T-P-R	tri-modal	6.78%
			4	T-P-R	tri-modal	3.39%	41	T-P-A-R	quad-modal	34.74%
			4	T-A-P		3.39%				
			1	P-A-R		0.84%				
			59	T-P-A-R	quad-modal	50.00%				
	3	82	33	T-P-A-R	quad-modal	40.24%	1	T-R	bi-modal	1.22%
							1	P-A-R		1.22%
							2	T-P-R	tri-modal	2.44%
							2	T-A-P		2.44%
							43	T-P-A-R	quad-modal	52.44%
	4	92	4	T-P-R	tri-modal	4.35%	2	T-P-R	tri-modal	2.17%
			1	T-A-R		1.09%	38	T-P-A-R	quad-modal	41.30%
			47	T-P-A-R	quad-modal	51.09%				
	5	8	3	T-P-A-R	quad-modal	37.5%	5	T-P-A-R	quad-modal	62.5%

Medicine and surgery students' learning style

According to their levels, the learning patterns of Medicine and Surgery (MBBS) students are displayed in the table below. It was found that the fifth level students solely preferred the quad-modal learning technique. Quad-modal learning was seen in 54.29% of female students and 45.71% of male students. A bi-modal learning style was present as 1.15% of the male and females students of level 2.

Table 4: Learning patterns of Medicine and Surgery students based on their levels

Department	Level	Total no. of students	Male students				Female students			
			Sub-no. of students	Learning Styles	Learning preference	Percentage %	Sub-no. Of students	Learning styles	Learning preference	Percentage %
Medicine and Surgery (MBBS)	2	87	1	T-P	bi-modal	1.15%	1	T-R	bi-modal	1.15%
			5	T-P-R	tri-modal	5.75%	2	P-A-R	tri-modal	2.30%
			2	P-A-R		2.30%	9	T-P-R		10.35%
			29	T-P-A-R	quad-modal	33.33%	38	T-P-A-R	quad-modal	43.68%
	3	75	1	T-P-R	tri-modal	1.33%	1	T-P-R	tri-modal	1.33%
			33	T-P-A-R	quad-modal	44%	1	T-A-P		1.33%
							39	T-P-A-R	quad-modal	52.01%
	4	103	1	T-A-P	tri-modal	0.97%	2	T-P-R	tri-modal	1.94%
			1	P-A-R		0.97%	55	T-P-A-R	quad-modal	53.40%
			1	T-P-R		0.97%				
			43	T-P-A-R	quad-modal	41.75%				
	5	35	16	T-P-A-R	quad-modal	45.71%	19	T-P-A-R	quad-modal	54.29%

Comparative Study of the Learning Styles in the Present Study and that of other Ethnic Groups

The results of the current study are compared with those of Indians and Germans in the table below. It was noted that different people had different learning styles.

Table 5: Comparative study between the present study and previous studies with other ethnic groups

Learning styles	INDIAN STUDENTS		GERMAN STUDENTS		NIGERIAN STUDENTS	
	number of subjects	Percentage %	Subjects	Percentage %	Subjects	Percentage %
Activist	3	7.32	4	10		
Pragmatist- Activist	1	2.44				
Pragmatist - Reflector	4	9.76	2	5		
Theorist - Activist - Reflector					5	0.6
Pragmatist - Activist - Reflector	1	2.44	1	2.5	12	1.3
Theorist - Pragmatist - Activist					1	0.1
Theorist - Pragmatist -	1	2.44			58	6.4

Reflector						
Pragmatist	2	4.88	12	30		
Reflector	24	58.52	11	27.5		
Theorist -Activist					5	0.6
Theorist - Reflector	1	2.44	3	7.5	4	0.4
Theorist - Pragmatist			2	5	1	0.1
Theorist	4	9.76	5	12.5		
Theorist - Activist-Pragmatist					14	1.6
Theorist- Pragmatist- Activist –Reflector					800	88.9

DISCUSSION OF FINDINGS

The results of the present study showed a combination of all the learning styles. According to the results of the study by [1], German business students belong to the Assimilating quadrant (42.9%), followed by the Converging quadrant (32.7%), indicating that they are theorists followed by pragmatists. Learning strategies are important because students respond to different types of educational processes that vary depending on the university and faculty. Some students are activists and will learn better with new educational experiences, while others are reflectors and prefer reflective learning strategies. Although the study's participants expressed a strong preference for pragmatic and reflective learning styles, German students' research focus may be one of the factors contributing to their perceived pragmatic approach. Additionally, there is less power distance in the teacher-student interaction. Therefore, one could say that German students adopt a practical, hands-on approach, asking questions when needed to solve problems. Germans live in a society that values individualism. This may help to explain why buildings are valued more highly by German pupils than individuals. Germans are thought to respect attention to detail [21]. According to the current study's findings, 88.9% of the students showed a preference for the four learning modalities (theorist, activist, pragmatic, and reflector). As a result, this survey has given baseline information about the learning preferences of students in the medicine and surgery, pharmacy, and anatomy departments. Medical educators and anatomists will benefit from the knowledge acquired from this endeavor.

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