LEARNING STYLES AND LEARNING OUTCOMES AMONG UNDERGRADUATE STUDENTS OF THE UNIVERSITY OF ILORIN COLLEGE OF HEALTH SCIENCES

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ABSTRACT

Background: For effective teaching and instructional design, it is essential to comprehend students' learning styles and how they relate to learning outcomes. Aim: With an emphasis on learning outcomes in the context of anatomy instruction, this study sought to identify several learning styles among undergraduate students in the College of Health Sciences, University of Ilorin. Methodology: A descriptive cross-sectional survey was carried out among undergraduate students registered in the College of Health Sciences, University of Ilorin, Nigeria. The participants were chosen by a random sampling technique, yielding a sample size of 170 students with ages ranging from 18 to 25 years. To determine the students' preferences for visual, auditory, and kinesthetic (VAK) learning, a learning style questionnaire was given to them. The Chi-square test and other descriptive statistics were used to analyze the association between learning styles and learning outcomes. Result: According to this study's findings, students' chosen learning styles had little bearing on the knowledge they retained. Additionally, it was shown that undergraduate Anatomy students had a strong preference for the visual learning approach, although Nursing and Medical Laboratory Science (MLS) students did not. Also, no correlation between learning styles, gender, or the combination of learning styles and gender with academic accomplishment was discovered. Conclusion: It was concluded that using the VAK model assessment of learning styles, no significant relationship exist between learning styles and learning outcomes of students who took anatomy courses in the University of Ilorin.

KEYWORDS: Learning Styles, Anatomy, Learning Outcomes, Health Sciences, VAK Model.

INTRODUCTION

Each learner exhibits distinctive learning traits, among which learning style plays a vital role. Learning is a highly individualized process. A person's individual method of absorbing and assimilation of knowledge from their surroundings is referred to as their learning style 1(İlçin et al., 2016). These learning styles directly affect how students learn and are a major factor in how well they perform academically2 (Rahman & Ahmar, 2017). Designing efficient and customized learning experiences requires a thorough understanding of the connection between learning preferences and academic achievement 3(Husmann & O'Loughlin, 2019).

According to the theory of experiential learning, learning is the process through which experiences are transformed into knowledge1 (İlçin et al., 2016). Rita Dunn further defines learning styles as distinct approaches pupils take to process novel and difficult knowledge, hence promoting effective learning4

(Dunn & Dunn, 1993). According to Stander et al. (2019), learning styles can be defined as cognitive, emotional, and psychosocial behaviours that offer insights into how learners perceive, engage with, and respond to the learning environment5.

Learning styles can be used as powerful tools by both students and teachers to enhance their respective teaching and learning processes1 (İlçin et al., 2016). With a solid understanding of learning styles, educators may avoid the one-size-fits-all mentality and instead meet the individual needs of each of their pupils. Additionally, knowing students' learning styles might help identify their learning challenges and promote successful learning6 (Khanal et al., 2019).

This project seeks to revolutionize the way undergraduate students are taught anatomy by examining the connection between learning styles, academic achievement, and learning methodologies. A more personalized and effective learning experience

might be provided by taking learning styles into account in educational practices, which would ultimately result in better academic results (7).

The current study focuses on examining learning preferences and their relationship with academic performance among University of Ilorin undergraduate students offering anatomy courses in the college of health sciences by utilizing the inventory style questionnaire. The goal is to improve how anatomy instruction is delivered to undergraduate students by taking into account their unique learning preferences.

MATERIALS AND METHODS

In order to shed insight on the efficacy of adapting educational techniques based on individual learning styles, the inquiry into the type of learning styles and association between learning styles and academic performance among undergraduate anatomy students at the University of Ilorin was undertaken. Educators may create learning experiences that cater to the different requirements of students by knowing and taking into account these styles, which will ultimately result in improved academic success in the study of anatomy. This study used a cross-sectional research methodology. The University of Ilorin was picked as the study location because of the variety of students it attracts and the availability of anatomy courses. The study population was made up of first-, second-, and third-year undergraduate students at the College of Health Sciences. The participants were chosen by a random sampling technique, yielding a sample size of 170 students. Ages ranged from 18 to 25 years for the sample's 90 female participants and 80 male participants. All participants were either presently enrolled in or had previously completed anatomy courses while enrolled in the BSc, BCS, or MBBS programmes.

Data Gathering

A systematic questionnaire (Appendix 1) and a consent form were used to collect the data. Age, gender, undergraduate year, monthly pocket money, family income, number of children in the household, and the distance from the dormitory to the school were among the demographic items on the questionnaire. The Learning Strategies Survey, which evaluated participants' learning styles on a 5-point scale, was also included in the questionnaire8 (Vaseghi, 2012). The average grades in each participant's anatomy courses were used to gauge academic success.

Considerations of Ethics

Participants in this trial were at low risk, therefore formal ethical approval was not necessary. All subjects, however, provided informed consent before being enrolled in the study. Data on participants'

identities and confidentiality were scrupulously safeguarded throughout the entire research process.

Data Analysis

In order to facilitate future analysis, data from the surveys were extracted and entered into a specially designed Microsoft Excel spreadsheet. The demographics, learning preferences, and academic achievement of the participants were compiled using descriptive statistics, such as means and percentages. Chi-square analysis was used to examine the link between learning preferences and academic success, with a 0.05 p-value established as the significance level. The data were examined using the Statistical Package for the Social Sciences (SPSS).

RESULTS

Population of the Study Participants

There were 170 students in total who took part in the study, with a mean age of 21.5 ± 1.7 years and a range of 17 to 25 years. 52.9% of the participants were females, while 47.1% were males. The bulk of thier parents had jobs, and all of the participants were single. Most students said they had no health problems.

Variable	Frequency	Percentage
Gender		
Male	60	47.1
Female	90	52.9
Age		
17-20	91	53.6
1-25	79	46.4
Level		
200	51	30.0
300	34	20.0
400	85	50.0
Department		
Anatomy	108	63.5
Medicine	32	18.8
MLS	2	1.2
Nursing	2	1.2
Physiology	18	0.6
Physiotherapy	8	4.7
Faculty		
BMS	158	92.9
BCS	10	5.9
Nursing	2	1.2
Marital Status		
Single	170	100
Ethnicity		
Igbo	12	7.1
Yoruba	153	90.0
Hausa	5	2.9

Cont. Table 1: Demogrhic Information of Respondents

Parent Occupation		
Civil Servant	111	65.3
Entrepreneur	49	28.8
Health Worker	10	5.9
Family Income		
100-200K	58	34.1
200K	103	60.6
50-100K	8	4.8
<50K	1	0.6
Number of Children in the Family		
1-4	123	72.4
5-9	51	24.2
>10	6	3.6
Monthly Pocket Money		
3,000 - 10,000	26	15.2
11,000 - 20,000	43	25.3
20,000 - 30,000	50	29.4
>30,000	51	30.0
1st Choice Course		
Anatomy	47	27.6
Medicine	97	57.1
Nursing	9	5.3
Optometry	1	0.6
Pharmacy	7	4.1
Physiology	4	2.4
Physiotherapy	4	2.4
Vet Medicine	1	0.6
Mode of UTME		
Entry Mode	156	91.8
Direct Entry	14	8.2
Any Health Issue		
No	163	95.9
Yes (Asthma)	7	4.1
Hall of Residence		
Campus	72	42.4
Off Campus	98	57.6
Distance to School		
<20km	11	57.9
>20km	8	42.1

Table 1: Demographic Information of Respondents

Each Learning Style's Mean Distribution and Standard Deviation

The student's mean scores and standard deviations for the various learning styles were computed. The visual learning style parameter had the highest mean score 25,89. showing that more students use this form of learning than any other table 2 show the complete results.

Learning Style	Mean	Standard Deviation
Visual	25.89	7.286
Auditory	23.7	7.8
Kinesthetic	22.634	7.525

Table 2: Mean and Standard Deviation of Various Learning Styles

Preferred Learning Method among Students

The findings suggest that the majority of students (55.9%) consistently use the visual method of learning, which is subsequently followed by the kinesthetic (31.8%) and auditory (31.8%) styles. Table 3 displays the detailed distribution.

Learning Style	Percentage
Visual	55.9
Auditory	31.8
Kinesthetic	31.8

Table 3: Percentage Distribution of Students' Learning Style

Gender and the Association of Visual Learning Styles

The majority of both sexes consistently employ the visual learning style, with males accounting for 40 (50.0%) and females accounting for 42 (24.7%), according to a cross-tabulation between the visual learning style and gender. There was no statistically significant difference between the groups, though (χ^2 = 8.209, df = 4, p = 0.054). Table 4 displays the complete results.

3.5 Relationship between Academic Performance and Auditory Learning Styles

The majority of students who scored above average (17.6%) and the majority of students who scored around average (11.2%) frequently used the visual learning style, according to a cross-tabulation between the auditory learning styles and academic achievement. However, there was no statistically significant distinction between the groups (χ^2 = 7.15, df = 12, p = 0.084). Table 5 displays the complete results.

Relationship between Students' Departments and Kinesthetic Learning Style

The majority of students in the anatomy department (24.7) always use the visual and audio learning styles compared to those in other departments. This is

followed by students in the medical field (7.1%), who occasionally use the kinesthetic learning style, and students in the field of physiology (4.7%), who always use the kinesthetic learning style. MLS and nursing students are the ones who employ the visual style the least. Between the measured variables, there was a statistically significant difference ($\chi^2 = 7.389$, df = 20, p = 0.03). Table 6 displays the complete results.

Gender	Never	Rarely	Sometimes	Often	Always	Total
Male	2	4	12	22	40	80
Female	0	2	7	39	42	90
Total	2	6	19	61	82	170

Table 4: Association Between Visual Learning Styles and Gender

Grades of Students	Above Average (A-B)	Average (C)	Below Average (D-E)	Bad (F)	Total
Auditory Learning Style					
Never	1 (0.65%)	2 (1.2%)	1 (0.6%)	0 (0.0%)	4 (2.4%)
Rarely	5 (2.9%)	3 (1.8%)	0 (0.0%)	0 (0.0%)	8 (4.7%)
Sometimes	25 (14.7%)	16 (9.4%)	2 (1.2%)	0 (0.0%)	43 (25.3%)
Often	29 (17.1%)	26 (15.3%)	6 (3.5%)	0 (0.0%)	61 (35.9%)
Always	30 (17.6%)	19 (11.25%)	4 (2.24%)	1 (0.6%)	54 (31.8%)
Total	90 (52.9%)	66 (38.8%)	13 (7.6%)	1 (0.6%)	170 (100%)

Table 5: Association Between Auditory Learning Styles and Academic Performance

Department / Kinesthetic learning style	Anatomy	Medicine	MLS	Nursing	Physiology	Physiotherapy	Total
Never	2 (1.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (1.2%)
Rarely	8 (4.7%)	1 (0.6%)	0 (0.0%)	0 (0.0%)	1 (0.6%)	1 (0.6%)	11 (6.5%)
Sometimes	31 (18.2%)	12 (7.1%)	0 (0.0%)	0 (0.0%)	4 (2.4%)	2 (1.2%)	49 (28.8%)
Often	25 (14.7%)	8 (4.7%)	1 (0.6%)	1 (0.6%)	5 (2.9%)	3 (1.8%)	43 (25.3%)
Always	42 (24.1%)	11 (6.5%)	1 (0.6%)	1 (0.6%)	8 (4.7%)	2 (1.2%)	65 (38.3%)
Total	108 (63.5%)	32 (18.8%)	2 (1.2%)	2 (1.2%)	2 (1.2%)	8 (4.7%)	170 (100%)

Table 6: Association Between Kinesthetic Learning Style and Departments of the Students

DISCUSSION

The findings of this study provide important light on the learning preferences of students in the University of Ilorin College of Health Sciences and the possible effects these learning preferences may have on the way the subject is taught and learned. The results support the idea that students have a variety of learning preferences and are consistent with earlier studies 5,9,10. Knowing these preferences will help guide instructional practices.

The discovery that visual learning is the most popular learning technique among students studying anatomy is consistent with the results of earlier investigations. A study by a group of researchers for instance, indicated that visual learning was the most popular learning method among medical students, indicating a preference for visual assistance in medical education10. In order to understand complicated anatomical structures, visual learning is frequently related with the use of diagrams, pictures, and other visual representations5,9. Therefore, in order to increase student engagement and comprehension, anatomy educators should think about including visual elements into their lesson plans.

This study's findings about the importance of kinesthetic learning in anatomy students are in line with earlier studies. According to studies11,12 kinesthetic learners can better absorb and retain anatomical information through hands-on activities like dissection and anatomical models. For instance, Vorstenbosch et al.'s (2013) study found that kinesthetic learning activities enhanced medical students' spatial awareness of anatomical components13. The learning experience for these students may therefore be improved by offering possibilities for kinesthetic engagement in anatomy courses, such as through interactive labs or simulated procedures 12,14,15.

Despite the fact that gender variations in learning styles were not discovered to be statistically significant in this study, it is still crucial to take into account the previous research. According to certain studies, men seem to prefer the visual and kinesthetic learning styles whereas women tend to favour the read/write and auditory learning styles 8,16. In consonance with findings of our research, other researchers, have found no appreciable variations between genders in preferred learning styles17,18. The unique sample characteristics or other contextual factors may be to blame for the lack of statistically significant gender differences in this study. To fully comprehend how gender and learning styles interact in anatomy teaching, more research is required.

The results of this study, which suggest learning styles may not significantly affect students' success in anatomy courses, are consistent with earlier studies. Inconsistent and ambiguous evidence was found in a study by Reddy et al. (2018) that looked at the association between learning styles and academic achievement across different fields19. Similar results were found in a study that involved Iranian medical students and found no correlation between preferred learning styles and academic success in anatomy courses10. According to these results, while adapting teaching strategies to students' chosen learning preferences may increase engagement and happiness, it may not always result in better academic performance in the study of anatomy.

The department-specific variations in preferred learning styles that were found in this study emphasise how crucial it is to take disciplinary distinctions into account when developing instructional tactics. In order to effectively engage pupils and promote learning, certain disciplines may call for different techniques. Studies that looked into the preferred learning styles of medical students in various specialties revealed that they varied depending on the discipline20,21,22. Therefore, when developing instructional strategies that complement their students' preferred learning styles, anatomy educators should take into account the special needs and peculiarities of their particular department.

CONCLUSION

The results of this study add to our knowledge of how anatomy students learn, emphasising the lack of substantial differences based on gender, department, or academic standing. The findings show that students' preferred learning methods do not significantly affect their academic performance. It is crucial to note that while nursing and MLS students showed the lowest preference for this strategy, visual learning was discovered to be the leading method among students studying anatomy. Additionally, there was no discernible connection between learning styles, gender, or their interaction with academic accomplishment.

These results are consistent with earlier studies that suggested the influence of learning styles on academic achievement can be modest or inconclusive. Although recognising and catering to students' preferred learning styles might increase engagement and pleasure, it may not always result in better learning outcomes in the subject of anatomy. In order to accommodate students' varied learning preferences, teachers should use a balanced approach that incorporates different instructional approaches,

integrating visual, aural, read-and-write, and kinesthetic elements.

Exploring additional variables that can affect learning results in anatomy teaching calls for more investigation. Insights into improving teaching practises and fostering student success in anatomy classes may come from examining the efficacy of particular instructional strategies and interventions catered to individual learning preferences.

Overall, this study highlights the significance of taking into account the various learning preferences of anatomy students and adapting teaching strategies accordingly. Instructors may establish an inclusive learning environment that supports all students, regardless of their chosen learning style, by incorporating a variety of instructional approaches.

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