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Learning styles of newly admitted students: Implications for science educators

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Abstract
The present study examined the preferred learning style(s) among newly admitted NCE and Degree biology students of Bamidele Olumilua University of Education, Science and Technology, Ikere, Ekiti State, Nigeria. A total of 85 NCE and 95 Degree newly admitted biology students were used for the study. Neil Fleming's VARK model_was used and a validated Questionnaire on VARK of 7.0 Version was adapted and administered on the sampled students. Finding from the results showed that kinesthetic learning style is the most preferred of all the learning styles among all NCE and Degree sampled biology students. It was also showed that, there is no gender difference in the ordering of preferred learning styles as Kinesthetic, Read/write, Visual and Aural. Hence, the study recommended that tactile learning where students carry out physical activities rather than listening to lectures only should be accorded priority if meaningful learning must take place among the students.

Keywords: learning styles, gender, nce students, degree students

Introduction

Background to the Study

Educations remains a veritable pathway to unlocking the potentials of individuals toward solving arrays of problems confronting man, totality of his environment and by extension, the outer space. The adoption of education as an instrument per excellence (NPE, 2014) by Nigeria further reiterates the place and importance of education in the society. The uniqueness of individual student in the classroom cannot be over-emphasised. This uniqueness features prominently in the way and manner they learn. Hence, learning style is unique because it is inherent, Manurung (2015) opined. It was further posited that the variation of students in grasping and restoring knowledge were influenced by learning styles. The concept of learning styles remain extremely popular (Cherry, 2018); this is in spite diverse opinions as to whether students learn at their best when they are multimodal or unimodal.

The present study is hinged on the theory of "matching hypothesis" proposed by Walster, Aronson, Abrahams and Rottman (1966) [6]. This hypothesis is further supported by "Aptitude-Treatment Interaction" by Cronbach and Snow (1977). The matching hypothesis theory puts that "if a teacher matches instruction to the individual learning styles of his or her students, the latter will perform better, or at least they will appreciate the instruction more". The Aptitude-Treatment Interaction posits that "some instructional strategies (treatments) are more or less effective for particular individuals depending upon their specific abilities". As a theoretical framework, ATI suggests that optimal learning results when the instruction is exactly matched to the aptitudes of the learner.

The place and importance of students' learning styles cannot be undermined. Abdullah (2012) [1] had positioned that "students should be informed about their learning styles". Though, studies by Maryem & Buket (2009) and Ivana (2018) have argued that learning styles do not have effects on academic outcomes. On the converse, Yusuf, Ali, Rabia and Huluk (2015) [7] posited that students' success is related directly with the right learning styles. Demirbas and Demirkan (2003) had found out that there were significant differences between the performance scores of students having diverse learning styles at various stages of design process.

Nancy and Roger (2006) remarked that many instructor at the post-secondary level still do not realise the significance difference of students' learning styles. It was asserted that teachers must understand the learners (students) learning styles for improved learning. In the view of Sarasin (1999) [5], it was maintained that particularly importance for University faculty is to understand individual differences (including differences in learning styles) Kinesthetic Activities have been found to help ingrain learning into long-term memory by turning a lesson into a physical experience. Remarkably, when learners engage in kinesthetic learning activities, they are able to move round, touch and interact with objects of the lesson. By extentsion, kinesthetic learning activities make learning full of fun.

Statement of Problem

The poor learning outcomes of students in Biology and that of science courses generally in their first year of study in higher institution of learning is worrisome to say the least. Though, there are plethora of factors that have been adduced for this poor performance. Considering the pace of technological evolution and its incursion into the teaching-learning process; also, the recent paradigm shift to online lectures occasioned by the Covid 19 pandemic, it is expedient to ascertain which learning style (s) is/are popular among the newly admitted students. This is to afford conscious effort by lecturers at integrating those popular students' learning styles for optimal and meaningful learning with desirable academic performance.

For the purpose of this study, one research question and

there hypotheses were addressed.

Research Question

What is/are the preferred learning style(s) of newly admitted students in the learning of biological concepts?

Hypotheses

HO 1: There is no significant difference in the preferred learning styles of NCE and Degree students in the learning of biological concepts

HO 2: There is no gender difference in the preferred leaning styles of NCE students in the learning of biological concepts

HO 3: There is no gender difference in the preferred learning styles of Degree students in the learning of biological concepts.

Methodology

The present study adopts ex-post factor type of research. Simple random sampling was used to select 85 NCE (48 females; 37 males) and 95 Degree (53 females; 42 males) newly admitted biology students for the study. A validated VARK model learning styles of 7.1 version was adopted and administered on the sampled students. The questionnaires were analysed by employing descriptive analysis such as frequency count, percentages, and t-test statistic.

Results and Discussion of Findings

This section presents data analyzes and interpretation of the results. The results are presented by employing descriptive analysis and hypotheses testing such as frequency count, percentages, and t-test statistic. While frequency count and percentages proffer answers to the items of the questionnaires given to the respondents in the field, t-test statistic is used to test the four hypotheses formulated at the 0.05 level of significance.

Respondents' Demographic Characteristics

Students' responses to the items of the questionnaire were analyzed descriptively. The variables of consideration include students' gender, students' program, and students' learning style.

Table 1: Frequency and Percentage of students' Gender

	NCE		Degree	
Gender	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Male	37	43.5	42	44.2
Female	48	56.5	53	55.8
Total	85	100	95	100

Table 1 above shows the frequency and percentage of students' gender in College of Education, Ikere-Ekiti (COE), and University of Nigeria, Nsukka (UNN) programmes selected for study. The table indicates that for the COE program, 37 (43.5%) male students and 48 (56.5%) female students were selected while for the UNN program, 42 (44.2%) male students and 53 (55.8%) female students participated in the study.

Table 2*:* Frequency and Percentage of Students' Program

Program	Frequency	Percent
NCE	85	47.2
Degree	95	52.8
Total	180	100.0

Table 2 above shows the frequency and percentage of students' program of study in the College of Education, Ikere-Ekiti, and University of Nigeria, Nsukka (UNN) programmes selected for study. The table indicates that 85 (47.2%) NCE students, and 95 (52.8%) degree students participated in the study.

Research Question 1: What is the preferred learning style of newly admitted NCE students in learning of biological concepts?

Table 3: Preferred learning style of newly admitted biology NCE students

S/n	Items	Knm (%)	Rnr (%)	Vsl (%)	Aul (%)	Rmk
1	My preferred learning style in learning biological concepts	39 (45.9)	21 (24.7)	15 (17.6)	10 (11.8)	KNM

KNM = Kinesthetic, RNR = Read/Write, VSL = Visual, AUL = Aural

Table 3 shows the preferred learning style of biology NCE students in learning biological concepts. The table revealed that most of the respondents indicated "Kinesthetic" (45.9%) as their preferred learning style, followed by "Read/Write" (24.7%), then "Visual" (17.6%), and lastly "Aural" (11.8%).

Research Question 2: What is the preferred learning style of newly admitted degree students in learning of biological concepts?

Table 4: Preferred learning style of newly admitted biology degree students (Do you mean Degree?)

S/N	ITEMS	KNM (%)	RNR (%)	VSL (%)	AUL (%)	RMK
1	My preferred learning style in learning biological concepts	45 (47.4)	24 (25.3)	17 (17.9)	9 (9.5)	KNM

KNM = Kinesthetic, RNR = Read/Write, VSL = Visual, AUL = Aural

Table 4 shows the preferred learning style of biology degree students in learning biological concepts. The table revealed that most of the respondents indicated "Kinesthetic" (47.4%) as their preferred learning style, followed by "Read/Write" (25.3%), then "Visual" (17.9%), and lastly "Aural" (9.5%).

Research Question 3: What is the preferred learning style of newly admitted male and female NCE students in learning of biological concepts?

Table 5: Preferred learning style of newly admitted male and female biology students

S/N		ITEMS	KNM (%)	RNR (%)	VSL (%)	AUL (%)	RMK
1	Male	My preferred learning style in learning biological concepts	17 (46.0)	9 (24.3)	7 (18.9)	4 (10.8)	KNM
2	Female	My preferred learning style in learning biological concepts	22 (45.8)	12 (25.0)	8 (16.7)	6 (12.5)	KNM

KNM = Kinesthetic, RNR = Read/Write, VSL = Visual, AUL = Aural

Table 5 shows the preferred learning style of male and female biology NCE students in learning biological concepts. The table revealed that most of the male respondents indicated "Kinesthetic" (46.0%) as their preferred learning style, followed by "Read/Write" (24.3%), then "Visual" (18.9%), and lastly "Aural" (10.8%). Similarly, most of the female respondents indicated "Kinesthetic" (45.8%) as their preferred learning style, followed by "Read/Write" (25.0%), then "Visual" (16.7%), and lastly "Aural" (12.5%).

Research Question 4: What is the preferred learning style of newly admitted male and female degree students in learning of biological concepts?

Table 6: Preferred learning style of newly admitted male and female biology students

S/N		ITEMS	KNM (%)	RNR (%)	VSL (%)	AUL (%)	RMK
1	Male	My preferred learning style in learning biological concepts	20 (47.6)	10 (23.8)	8 (19.1)	4 (9.5)	KNM
2	Female	My preferred learning style in learning biological concepts	25 (47.2)	14 (26.4)	9 (17.0)	5 (9.4)	KNM

KNM = Kinesthetic, RNR = Read/Write, VSL = Visual, AUL = Aural

Table 6 shows the preferred learning style of male and female biology degree students in learning biological concepts. The table revealed that most of the male respondents indicated "Kinesthetic" (47.6%) as their preferred learning style, followed by "Read/Write" (23.8%), then "Visual" (19.1%), and lastly "Aural" (9.5%). Similarly, most of the female respondents indicated "Kinesthetic" (47.2%) as their preferred learning style, followed by "Read/Write" (26.4%), then "Visual" (17.0%), and lastly "Aural" (9.4%).

Test of Hypotheses

Hypothesis 1

There is no significant difference in the preferred learning style between newly admitted NCE, and newly admitted degree biology students.

Table 7: t-test analysis of students' response

Variable	N	Mean	SD	df	$T_{CAL.}$	$T_{TAB.}$	Decision
NCE Students	85	3.27	1.13	178	0.65	1.96	Not significant
Degree Students	95	3.49	1.02				

P < 0.05 significance level

Table 7 shows the result of analysis of the preferred learning style between newly admitted NCE and degree students. The table revealed that mean rating for NCE students (3.27) was less than the mean rating for degree students (3.49) with a mean difference of (0.22). The t-test revealed that t-calculated (0.65) was less than the critical t-value (1.96) at the 0.05 significance level. Hence, the null hypothesis was upheld. This means that there is no significant difference in the preferred learning style between newly admitted NCE, and newly admitted degree biology students.

Hypothesis 2

There is no significant gender difference in the preferred learning style among newly admitted NCE biology students.

Table 8: t-test analysis of NCE students' response

Variable	N	Mean	SD	df	$T_{CAL.}$	$T_{TAB.}$	Decision
Male (NCE)	37	2.97	0.67	83	0.45	1.96	Not significant
Female (NCE)	48	2.92	0.56				

P < 0.05 significance level

Table 8 shows the result of analysis of the preferred learning style among NCE biology students. The table revealed that mean rating for male students (2.97) was greater than the mean rating for female students (2.92) with a mean difference of (0.05). The t-test revealed that t-calculated (0.45) was less than the critical t-value (1.96) at the 0.05 significance level. Hence, the null hypothesis was upheld. This means that there is no gender difference in the preferred learning style among newly admitted NCE biology students.

Hypothesis 3

There is no significant gender difference in the preferred learning style among newly admitted degree biology students

Table 9: t-test analysis of degree students' response

Variable	N	Mean	SD	df	$T_{CAL.}$	$T_{TAB.}$	Decision
Male (degree)	42	2.98	0.63	93	0.52	1.96	Not significant
Female (degree)	53	3.07	0.82				

P < 0.05 significance level

Table 9 shows the result of analysis of the preferred learning style among newly admitted degree biology students. The table revealed that mean rating for male students (2.98) was less than the mean rating for female students (3.07) with a mean difference of (0.09). The t-test revealed that t-calculated (0.52) was less than the critical t-value (1.96) at the 0.05 significance level. Hence, the null hypothesis was upheld. This means that there is no gender difference in the preferred learning style among newly admitted degree biology students.

Conclusion and Recommendations

Learning styles are innate. The quest for appropriate learning style(s) for students is nonetheless a daunting task which must be accorded needed attention in the classroom. It should be noted that, just as there could not be the best teaching method for all manners of students, there may not also be the best learning styles for all manners of students. However, certain categories of learners may prefer certain

learning style(s) to another. Hence, preferred learning styles by learners if adopted will obviously engender them to the classroom activities. In inference from the above study, it becomes imperative for science educators to be cognizance of students' learning styles with a view to engage them through appropriate teaching methods. Obviously, when a teaching method matches, and is appropriate for the learning style of students, the teaching-learning process does not only become productive, but also with its attendant improved academic outcomes. Reoll (2018) succinctly puts that learners with kinesthetic learning style have hard time learning through traditional lecture-based schooling, because the body does not make the connection that they are doing something when they are listening without movement. Hence, this study recommends tactile learning where students carry out physical activities rather than listening to lectures only, with accorded priority, if meaningful learning must take place among the students.

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