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**Original Research** 

# Learning Style Preference and Its Correlation with Gender

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#### Abstract

**Background:** Learning styles have been investigated and classified by several scholars. One of such investigations is the Gender of the individual which can affect learning style. This study investigated the difference in the means of learning styles and its correlation with gender among community health officer trainees at the University of Port Harcourt Teaching Hospital, Nigeria.

**Methodology:** This is a correlational descriptive study, and a census was carried out. A structured questionnaire was utilized and a VARK learning style inventory was used.

**Results:** The reliability of the research instrument using the Cronbach alpha method, the VARK learning style questionnaire had a reliability coefficient of .755, for the subscales visual .455, aura .351, read/write, and kinaesthetic .753. With 60 respondents the means were visual 2.633, aura 4.2833, read/write 3.7500, and kinaesthetic 5.1833 while the standard deviation is visual 1.765, aura 2.429, read/write 2.53534, and kinaesthetic 2.88474. Multiple Analysis of Variance (MANOVA) was conducted to assess the means of the four learning styles concerning gender. The F ratios for the univariate analysis show that males and females did not differ across the four learning styles according to VARK (aural, visual, kinaesthetic, and read/write learning styles), significantly i.e. p < 0.05. Precisely the computed F = .032, P > .05, i.e., p = .859, i.e., p = .859 revealed that no statistical difference occurred between males and females with visual learning styles. **Conclusion:** The study concluded that community health officer trainees possessed different learning styles

and most of them used the kinaesthetic learning style. However, the community health officer trainees were significantly different in their responses to the learning style model according to the VARK inventory of learning styles, but no relationship existed between learning style and gender.

Keywords: Learning Style Preference; Gender; VARK; Kinaesthetic Learning.

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## **Introduction:**

Different individuals learn in different ways hence they possess diverse learning styles. Learning styles can be defined as the characteristics an individual possesses, displays, feels, or behaves while learning [1,2]. Some scholars presume that learning is a complicated issue [3]. Learning style determines the learning process, performance, and outcome [4]. The term learning style began to appear in literature in 1970 [5]. Studying the learning style of students is important as it acts as a guide to the tutor to decide and use the teaching methods that will be effective for learning by the student [6]. The classroom is a diverse community of learning for both those impacting the knowledge which is the teachers and those receiving the academic instruction which are the students [7]. This is because both the educator and teachers possess different personalities, learning and teaching styles. There are different models of learning styles innovated by different scholars, for instance the VARK learning style model was developed by Fleming in 2001[7]. Some of the factors that affect learning styles are gender, age, academic ability, culture, and critical thinking. The assessment of gender refers to how men and women perceive and feel things.

Studying the learning styles of students will assist the teacher in identifying the learning style preferences of the students [3,8,9]. Students should be encouraged to use their preferred style of learning. This will help and improve learning [3]. Most students tend to learn better when they are taught with a method that correlates with their preferred learning style [1]. In the process of learning, some tutors do not know the differences that exist in the learning preferences of their students and the need to apply different teaching methods that suit the diverse learning styles of the students [10].

Previous studies have exhibited a difference in the way men and women learn [5]. One of the elements that influences learning style is gender hence it needs to be investigated and studied [10]. The preferences of styles of learning of students are different. [11,12] Men and women learn differently. In a study conducted among 240 freshman medical students, there was a significant relationship that existed between gender and single model learning style. The male students preferred the kinaesthetic learning style while the female students preferred the aura style of learning [3]. This study was conducted among medical, pharmacy, nursing, and health services management students at Isfahan University of Medical Sciences in Iran in 2021. There was a significant difference between the preferred learning style and gender ( $x^2 = 13.53$ , p = 0.009)<sup>3</sup>.

A study was conducted on how gender affects learning style [1]. Some of the students preferred only one style of learning while some others used more than one style of learning. There was a preference for the kinaesthetic, aura, and visual styles of learning in this survey [1]. A study was conducted on the learning styles of 50 ophthalmology fresh clinical students at the University of Ibadan using the VARK learning style inventory questionnaire. Most of the students, 28.1% preferred the aura learning style, 28% kinaesthetic, 22.8% read/write and the least preferred learning style was visual 21.1[13].

A study investigated the interaction that existed between learning style and gender. They demonstrated that the learning outcomes between female and male students are different [14]. A study investigated if any relationship existed between gender, learning style, and the outcome of learning among 30 students studying a German education study programme. There was a difference in the preferred learning styles of students the females and males. The male students preferred the auditory style of learning while the female students preferred the kinaesthetic and visual learning style [10].

A review of an additional study [3] that investigated the relationship that existed between learning style and the cognitive performance of undergraduate students studying nursing showed that the students preferred different learning styles. Most of the students preferred the visual style 29.5%. Others preferred the read/write learning style 24.4%, the kinaesthetic learning style 28.4%, and the aura learning style 17.6%.

This study therefore aimed to investigate the learning styles of community health officer trainees and its correlation with gender. The specific objectives of the study were to identify the different learning styles of community health officer trainees and identify the relationship between learning styles and gender of community health officer trainees.

### Methodology

This is descriptive correlational research that was conducted at the College of Community Health of the University of Port Harcourt Teaching Hospital, Nigeria. This study was carried out at the College of Community Health at the University of Port Harcourt Teaching Hospital located along the east-west road in Port Harcourt, southern Nigeria. It is located at Alakahia in Obio –Akpor local government area. The population of the study is trainees undertaking the community health officer training programme during the 2021/2022 academic session. The community health officers training programme is a two-year course. This study is a census hence there is no sample and no sample size was calculated. The number of trainees recruited for study was 60, 20 trainees in the first year and 40 trainees in the second year of study. Primary data was used for this study as data was elicited from a self-administered questionnaire was used to elicit data from the respondents. The questionnaire was divided into two parts. Section one: demographic details comprising of questions related to age, gender, marital status, level of study, job tenure, and location of practice. Section two comprised 16 questions that investigated learning styles adapted from the VARK learning style version 8.01, 2019.

The VARK instrument has been validated by other researchers [4,7], but the validity and reliability of the study instrument was determined by distributing the questionnaire to 30 medical students at the University of Port Harcourt. The construct validity was determined using the multivariate factor analysis. The reliability of the instrument was determined using the Cronbach alpha method of internal consistency. The VARK learning style questionnaire had a reliability coefficient of .755 while the various sub-learning styles of visual learning style had a coefficient alpha of .455, aura .351, read/write .402, and kinaesthetic .753. The data that was generated from the complete questionnaires were organized and entered to an Excel program spreadsheet. It was then imported into the statistical package for social sciences (SPSS), a statistical analysis programme for data analysis and interpretation to answer the research questions and hypotheses of the study. The research questions were answered using mean and standard deviation. The hypotheses were tested using a one-way repeated measure of analysis of variance ANOVA and one-way multiple analysis of variance MANOVA. The ethical approval for this study was obtained from the ethical committees of the University of Port Harcourt and the University of Port Harcourt Teaching Hospital.

### Results

Sixty questionnaires (60) were distributed to the study respondents and all the questionnaires were retrieved. This gave a response rate of 100%. The results of this study were obtained from the statistical analysis. Table 1 shows that the Visual Learning Style with an N of 60, has a Mean of 2.633 and a Standard Deviation of 1.765. The mean score of 2.633 suggests that, on average, participants have a moderate preference for visual learning. Visual learners tend to grasp information better when presented in visual formats like diagrams, charts, and images. The relatively moderate standard deviation of 1.765 indicates that the responses within the group are somewhat consistent around the mean, signifying a moderate level of agreement in their visual learning preference.

Aural Learning Style with an N of 60, has a mean of 4.2833 and a Standard Deviation of 2.429. The mean of 4.2833 for the aural learning style indicates that participants also have a high preference for aural learning. This suggests that participants are receptive to learning through listening, such as lectures, discussions, and audio materials. The higher standard deviation of 2.292 compared to the visual style suggests that there is somewhat more variability in participants' preferences for the aural learning style.

Read/Write Learning Style had a Mean of 3.750, a Standard Deviation of 2.535, and an N of 60. With a mean of 3.750, participants exhibit a slightly higher preference for the read/write learning style. This means that participants find written or text-based materials to be effective for their learning. The high standard deviation of 2.535 suggests that there is variability in responses within the group, indicating a relatively consistent agreement on the read/write learning style preference.

The kinaesthetic Learning Style had a Mean of 5.183, a Standard Deviation of 2.288, and an N of 60. The highest means among all four styles was observed for the kinaesthetic learning style at 5.183. This indicates that participants, on average, have a relatively strong preference for the kinaesthetic learning style, which involves hands-on activities, movement, and physical engagement. The standard deviation of 2.884 indicates a higher level of variability in preferences within the group.

The varying means show that the responses to the different styles of learning are different. The kinaesthetic learning style stands out with the highest mean indicating that it is the most preferred style of learning among the respondents indicating that participants, on average, have a relatively strong preference for kinaesthetic learning, which involves hands-on activities, movement, and physical engagement. The aural style follows suggesting that participants are receptive to learning through listening, such as lectures, discussions, and audio materials. The read/write style follows closely, suggesting a preference for text-based learning and visual styles have the lowest means, indicating it as the least preferred learning style.

Table 2 provides data including means, standard deviations, and participant counts (N) for each learning style within different gender groups. It shows that for Visual Learning Style, females (N = 47), had a Mean of 2.6383 and Std. Dev. = 1.73738. While male (N = 13) had a Mean of 2.5385 and Std. Dev. = 1.94145. The mean scores for both female and male community health officer trainees in the visual learning style are different but relatively similar with the mean score for females higher than for males. The standard deviations indicate a moderate level of variability within each group.

It shows that for Aural Style of Learning of the females (N = 47) had a Mean of 4.3830 and Std. Dev. Of 2.43662. While male (N = 13) had a mean of 3.9231 and Std. Dev. of 2.46514. In terms of the aural learning style, the mean score for females is higher than for males. This suggests that female community health officer trainees might have a slightly stronger preference for the aural learning style compared to their male counterparts.

Table 2 shows also that the Read/Write Learning Style that females (N = 47) had a mean of 3.8298 and a Std. Dev. of 2.59865 while male (N = 13) had a mean of 3.6923 and Std. Dev. = 2.65784. The means for the read/write learning style for females was higher than for males indicating that it is different in the read/write style of learning with preference between female and male community health officer trainees.

It shows that for the Kinaesthetic Style of Learning the female (N = 47) had a Mean of 5.0851 and Std. Dev. of 2.99877 while male (N = 13) had a Mean of 5.5385 and Std. Dev. = 2.50384. In the kinaesthetic style of learning, males have a higher mean score than females. This suggests that male community health officer trainees might slightly prefer the kinaesthetic style of learning compared to their female counterparts.

The data suggests that while there are some variations in learning style preferences based on gender, the differences are not consistent across all learning styles. Female participants seem to have a higher mean in the visual, aural, and Read /write learning styles, while male participants appear to have a slightly higher mean in the kinaesthetic learning style.

Table 1; Mean, and SD Analysis of the different responses of the VAI	RK style of learning which are visual,
aural, read/write, and kinaesthetic learning styles	

Learning Styles	Mean	Std. Deviation	Ν
Visual Learning Style	2.6333	1.76565	60
Aural Style Learning Style	4.2833	2.42928	60
Read/Write Learning Style	3.7500	2.53534	60
Kinaesthetic Learning Style	5.1833	2.88474	60

Table 2; Mean and SD Analysis of the difference between the aural, visual, kinaesthetic, and read/write learning styles based on the gender of community health officer trainees

Learning Styles	Sex	Mean	Std. Deviation	Ν	
	Female	2.6383	1.73738	47	
Vieual	Male	2.5385	1.94145	13	
Visual	Total	2.6167	1.76685	60	
	Female	4.3830	2.43662	47	
A	Male	3.9231	2.46514	13	
Aurai	Total	4.2833	2.42928	60	
	Female	3.8298	2.59865	47	
Read/Write	Male	3.6923	2.65784	13	
	Total	3.8000	2.58942	60	
	Female	5.0851	2.99877	47	
Kinaesthetic	Male	5.5385	2.50384	13	
	Total	5.1833	2.88474	60	

A repeated measure of analysis of variance (ANOVA) was used to determine whether the means of the four learning style groups differed significantly. The repeated measure ANOVA was performed to analyse the differences in responses to the four learning style subscales according to VARK.

Table 3 shows the F value for the "learning styles" factor, its associated significance level, and effect size ("Partial Eta Squared"). As the data violated the assumption of sphericity, we look at the values in the "Greenhouse-Geisser" row. Thus, it can be observed that when using an ANOVA with repeated measures with a Greenhouse-Geisser correction, the means scores of the four learning style groups were statistically significantly different F (2.501, 147.579) = 8.832, p < .0005). The partial eta square which measures the proportion or percentage of variance in the learning style accounted for by the grouping variable which invariably tells how large of an effect the independent variable(s) had on the dependent variable as shown in Table 3. The ANOVA with repeated measures tables therefore, revealed that these differences are statistically significant F (2.501, 147.579) = 8.832, p = .0000 < .0000).

The p-value associated with the F-statistics was .0000, which is less than the significance level of  $\alpha = 0.05$ . The respondents are statistically different in their responses on the VARK learning style which are visual, aural, read/write, and kinaesthetic learning styles.

Multiple analysis of variance (MANOVA) was conducted to assess whether the means of the four learning style groups differed significantly based on gender. The F ratios for the univariate analysis in Table 4show that males and females did not differ across the four learning styles according to VARK (aural, visual, kinaesthetic, and read/write learning styles), significantly i.e. p < 0.05. Precisely the computed F = .032, P >.05, i.e., p = .859, i.e., p = .859 revealed that no statistical difference occurred between males and females with visual learning styles. Also, the effect size of .001 was very small showing that the proportion or percentage of the variance or effect of visual learning style on gender is small. It shows also that computed F = .361, P > .05, i.e., p = .550, i.e., p = .550 illustrates that the styles of learning between the female and male trainees were not statistically different. Also, the size of .006 effect was very small showing that the proportion or percentage of the variance or effect of aural learning style on gender is small. It further shows that the computed F = .028, P > .05, i.e., p = .867 i.e., p = .867shows that concerning the males and females in relation to the read/write style of learning, they are statistically different. Also, the effect size of .000 shows that there was no proportion or percentage of the variance or effect of read/read learning style on gender. It shows as well that the computed F = .248, P >.05, i.e., p = .620, i.e., p = .620 which shows that there was no statistical difference between males and females with kinaesthetic learning styles. Also, the effect size of .004 was very small showing that the proportion or percentage of the variance or effect of kinaesthetic learning style on gender is small. The multivariate analysis also shows that the styles of learning (aural, visual, kinaesthetic, and read/write

The multivariate analysis also shows that the styles of learning (aural, visual, kinaesthetic, and read/write style of learning), did not differ significantly between males and females as seen by Wilk's  $\Lambda$ =.527, p = .716 >.05. Furthermore, the effect size of .037 was very small showing that the proportion or percentage of the variance or effect of the four learning styles on gender is small. This implies that gender or sex (male or female) does not significantly make a difference in the styles of learning (aural, visual, kinaesthetic, and read/write styles of learning) preference of community health officer trainees.

Source		Type III Sum	Df	Mean Square	F	Sig.	Partial	
		of Squares					Eta	
							Square	
	Sphericity Assumed	204.313	3	68.104	8.632	.000	.128	
G ( 1	Greenhouse-Geisser	204.313	2.501	81.681	8.632	.000	.128	
Styles	Huynh-Feldt	204.313	2.621	77.953	8.632	.000	.128	
	Lower-bound	204.313	1.000	204.313	8.632	.005	.128	
	Sphericity Assumed	1396.438	177	7.889				
Error	Greenhouse-Geisser	1396.438	147.579	9.462				
(Styles)	Huynh-Feldt	1396.438	154.637	9.030				
	Lower-bound	1396.438	59.000	23.668				

 Table 3; Repeated Measure ANOVA Analysis of the different responses of the four subscales of the learning styles model according to VARK learning styles

	Univariate Analysis						Multivariate Analysis (Wilks Lambda)					
Source	Learning Styles	Type III Sum of Squares	D f	Mean Square	F	sig	Partial Eta Square	Valu e	F	Df	Sig	Partial Eta Square
	Visual	.102	1	.102	.032	.859	.001					
Sex	Aural	2.154	1	2.154	.361	.550	.006	.963	.527	4,55	.716	.037
	<b>Read/Write</b>	.192	1	.192	.028	.867	.000					
	Kinaesthetic	2.093	1	2.093	.248	.620	.004					

Table 4 One-way MANOVA Analysis of the difference between the aural, visual, kinaesthetic, and read/write learning styles based on the gender of community health officer trainees

# Discussion

This study explored learning style and its correlation with the gender of community health officer trainees. The data generated from the complete questionnaires were analyzed and findings made. The phenomenon of learning style had previously been studied across other disciplines. The learning styles of community health officer trainees were investigated learning style will enable the educators to adjust their teaching techniques to the style of learning of the student [15]. The respondents of this research preferred the kinaesthetic learning style with a mean of 5.183 and a standard deviation of 2.288. This was followed by aura learning style with a mean of 4.288 and a standard deviation of 2.42928.

This agrees with other studies where most of the learners preferred the kinaesthetic learning styles [2,4,7,16-18]. It disagrees with another study where the preferred learning style of the study respondents was the visual learning style [19]. It also disagrees with another study where the preferred learning style was the read/write learning style <sup>[3]</sup> and another study where the aura learning style was the preferred learning style [8]. The respondents are statistically different in their responses to the VARK learning style model. The results of this study agree with some studies where there was a difference in the learning styles used by the respondents [3,4,14,20-22].

However, it agrees with a study where the higher achievers preferred the kinaesthetic learning style while the low achievers preferred the read/write learning style [23]. In the study conducted 60% of the study respondents preferred the visual style of learning, 19% preferred the aura learning style, 39% read/write, and 52% kinaesthetic [24]. It disagrees with a study where there was no statistical difference in the preference for any particular learning style <sup>[25].</sup> Some students in a particular class possess different learning styles, tutors should incorporate different styles of teaching methods into their teaching. It has been postulated that students learn better when they are taught in their preferred learning style. Hence, educators should use teaching styles that are closely equivalent to the different learning styles the students in the class exhibit.

The findings of this study showed a computed F .032 and there was no statistical difference between the four types of learning styles according to the VARK learning style model which are visual, aura, read/write, and kinaesthetic learning styles. This means that there was no statistical difference between the male and female community health officer trainees in relation to their gender. This agrees with a study where no association existed between gender and learning style [17]. The results of this study also agree with some other study [26]. It also agrees with another study where no relationship existed between the learning style of the students and their gender ( $x^2$ ) =.302); p> 0.05); the visual learning style was the preferred learning style of the females 27. There was no association between learning style and

gender in another study [23]. The results of this study also agree with other studies where there was a correlation between gender and learning styles [6,12-14].

However, the results of the study disagree with another study where there was a relationship between learning style and gender 28. The chi-square was used for the statistical analysis of the data. The chi-square was 2.83 at a significance of .42. It also disagrees with a study where there was a positive correlation between gender and learning style <sup>[29]</sup>.

Both men and women have preferences for different learning styles because their responses to the various subscales of the VARK learning style inventory were different. The analysis of the research data revealed that the respondents possessed different learned learning styles as there was a significant difference in their responses to the VARK learning style model. There was no significant relationship between gender and learning style. The findings from this study will help the tutors to design and change the way they teach their students to correspond to the preferred learning styles of the students. It is useful for researchers to conduct the same study among students in another field of study and use a different learning style inventory model and scale to measure learning style. Some others showed that there was a significant relationship between gender and learning style [3,7,30].

This study explored the learning style of community health officer trainees to determine the different types of learning styles using the VARK learning style model (visual, aura, read/write, and kinaesthetic) and the correlation between learning style and gender. The data gathered from the respondents were analysed and findings were made. Learning style is a phenomenon that has been studied across different disciplines. The learning styles of community health officers' trainees were studied. Community health officers are a category of health workers who work in the primary health centres in Nigeria. Studying their learning style will enable their tutors to adjust their techniques of teaching and to accommodate the learning styles of the different students [15]. The community health officer trainees preferred the kinaesthetic learning style. This was followed by the aura learning style. This agrees with other studies where most of the learners preferred the kinaesthetic style of learning [16,17,24,31,32] and disagrees with another study [19] where the preferred learning style of the respondents was the visual style of learning.

### Conclusion

Different individuals learn in different ways. There were different styles of learning and how it was perceived and used by the students. The study was a census conducted among community health officer trainees undergoing the community health officers training programme at the College of Community Health affiliated with the University of Teaching Hospital.

The study concluded that community health officer trainees possessed different learning styles and most of them used the kinaesthetic learning style. However, the community health officer trainees were significantly different in their responses to the learning style model according to the VARK inventory of learning styles but no relationship existed between learning style and gender.

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