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VARIANCES IN LEARNING STYLES OF FULL-TIME UNDERGRADUATE STUDENTS BASED ON DEMOGRAPHIC VARIABLES

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ABSTRACT: *The study, which was based on the VAK Learning Style Model, examined the learning style preferences and variances in the learning style of full-time undergraduate students in the Department of Basic Education, University of Education, Winneba (UEW), Ghana. Using the simple random sampling technique, 621 students were involved in the study. With the use of a questionnaire, quantitative data were obtained and analysed using frequency, percentage, mean, standard deviation, t-test, and Analysis of Variance (ANOVA). The study revealed that the students made use of all the three learning styles even though they dominantly preferred and used visual learning style as compared to auditory and kinaesthetic learning styles. At a significance of 0.01, the study found statistically significant differences in the learning style preferences of male and female full-time undergraduate students. There were also no statistically significant differences in the learning style preferences of the students based on age, level of study and residential status. Among the recommendations is that lecturers in the Department should adopt a variety of appropriate instructional practices and strategies that may optimise the diverse learning style preferences of the students*.

KEYWORDS: learning style preferences, sex, age, level of study, residential status

INTRODUCTION

There is no doubt that a country's socio-economic, scientific, and technological development is greatly dependent on the capability of its human resources. It is also asserted that gaining and making use of knowledge forms a crucial component of social interactions (Magulod, 2019; UNESCO, 2015). This is why one of the essential goals of education in any nation, including Ghana, is to train students to acquire skills that will make them independent students and problem solving individuals through digital literacy, especially in the 21st Century. The implication is that the skills acquired by the students while in school should be beneficial not only to them, their families, societies, and the nation as a whole.

Learning, which is seen as one of the essential and crucial processes an individual goes through in his or her lifetime, is also considered as a complex and a multi-faceted event in nature, including the interaction between teachers and students (Bhat & Govil, 2014; Caetano, Luedke, & Antonello, 2018). This implies that the provision of purposeful and quality university education in Ghana could enhance the general level of intelligence of students through the development of clear and sound thinking to appreciate the need for constructive changes in their societies. This could be the reason for the consensus among educationists and education researchers that the student is a key factor in the

process of education, especially during instructional activities. Hence, Amir, Jelas and Rahman (2011) argues that lecturers ought to strive to meet the numerous demands of students by modifying the learning environment. Escarlos Jr. and Escarlos (2018) agree to this and intimate that the personal characteristics, needs, aspirations, and capabilities of students should be studied by educators in order to strategise to enhance students' abilities to comprehend what they learn.

The quality of learning gained by students has a correlation with the quality of instructions in the classroom. This means that "teaching and learning supplement and complement each other" (Escarlos Jr. & Escarlos, 2018, p. 50). Gordon and Bull (2004) posit that for students to obtain and understand new concepts, they go through a cycle of events such as recognition, assimilation, experience and the ability to socialise the knowledge gained. However, researchers contend that most people, including university students, find it difficult to learn about themselves and about other people they relate with (Caetano, Luedke & Antonello, 2018). This challenge could be addressed when these students are able to identify their learning styles.

Obiefuna and Oruwari (2015) maintain that through varying strategies and experiences, students are able to obtain knowledge and comprehend concepts. This is substantiated by Lai and Lee (2019) that even though all individuals learn, they do not adopt the same way of learning. The assertion by Lai and Lee (2019) may be applicable to students in Ghanaian universities, including those in the Department of Basic Education, University of Education, Winneba (UEW), in their quest for quality education to develop skills in order to become lifelong students and problem solvers for national transformation and development.

The concept of learning style has gained a lot of importance and popularity, especially in the 21st Century where a strong conviction exist among psychologists and researchers about the impact of learning styles on academic achievement of students (Damavandi, Mahyuddin, Elias, Daud & Shabani, 2011; Farooq & Regnier, 2011; Metin, Yilmaz & Coskun, 2011). In this wise, the Department of Basic Education, University of Education, Winneba (UEW), Ghana, must, as part of its strategic plans, ensure that there is quality and adequate learning experiences among the students to provide an opportunity to reflect and consider their different learning styles and preferences to enable them attain the desired results for their personal and national development.

STATEMENT OF THE PROBLEM

Students of the Department of Basic Education, UEW, Ghana, who come from different backgrounds, are given opportunities to experience unique learning environment. According to Mlambo (2011) compatible learning and instructional styles enhances students' understanding of what is learned in their respective courses. However, it is a common knowledge that most lecturers in the Department do not make use of the students' learning style preferences in the course of instructional activities. Probably, these lecturers seem not to be aware of the learning style preferences of the students. As a result, the instructional processes and activities are based on individual lecturer's teaching style without considering the learning style preferences of the students. Thus, the undergraduate students of the Department of Basic Education are likely to prefer

certain courses to others because of how suitable the instructional style is to their learning style preference.

It also appears that most undergraduate students of the Department of Basic Education, UEW, Ghana, seem not to be conversant with the idea that different learning styles exist, and that each student is likely to prefer a particular learning style. This is realised during academic counselling sessions with students where they most of the time, ask of how to learn to improve their academic standards since they believe that their way of learning is not helpful. Researchers have argued that learning style preferences of students are greatly determined by demographic variables including sex, age, and classification such as course level and residential status (Hamidon, 2015; Obiefuna & Oruwari, 2015; Saadi, 2012). Even though some studies have been conducted on learning styles of students in some Ghanaian educational settings (Esia-Donkoh, 2019; Esia-Donkoh, Eshun & Acquaye, 2015; Ghanney, Appiah & Esia-Donkoh, 2019), there seems to be no study conducted using full-time undergraduate students of universities. It was therefore, our aim to conduct this study to fill this gap by investigating the learning style preferences of undergraduate students of the Department of Basic Education, UEW, Ghana, and finding out the demographic variables (sex, age, level of study, and residential status) that influence their learning style preferences.

RESEARCH QUESTION

What learning style preference is mostly exhibited by full-time (regular) undergraduate students in the Department of Basic Education, UEW?

HYPOTHESES

H_{01}: There is no statistically significant difference between male and female full-time undergraduate students on their learning style preferences.

H_{02}: There is no statistically significant difference in the learning style preference of full-time undergraduate students based on age.

H_{03}: There is no statistically significant difference in the learning style preference of full-time undergraduate students based on level of study.

H_{04}: There is no statistically significant difference in the learning style preference of full-time undergraduate students based on residential status.

LITERATURE REVIEW

The importance of learning style preferences of undergraduate students for effective and quality teaching and learning in the Department of Basic Education, University of Education, Winneba (UEW) cannot be downplayed. The reason is that each student is unique in terms of his or her learning approaches. It is thus asserted that individuals differ in specific human features including memory, motivation, decision making and language learning (Yanardöner, Kiziltepe, Seggie & Sekerler, 2014).

Generally, students process and understand information differently as a result of the preferences they have for particular learning styles (Cekiso, 2011; Gilakjani, 2011; Rau, 2012; John, Shahzadi & Khan, 2016). The argument is that these learning styles are based on the capabilities, environment, and past experiences of the students (Gilakjani, 2011; Mkonto, 2015). The implication is that even though a student may almost always exhibit preferred learning style, he or she may, in some situations, adopt a different

learning style. Mkonto (2015, p. 213) argues that "every learning style has its own attributes, and even though students interact with information differently, this does not imply a learning style is, in one way or the other, inferior to another".

Learning style, like most psychological constructs, has been examined, discussed, and understood in diverse way by experts (Hall & Moseley, 2005; Mkonto, 2015; Woolfolk, 2010), and as such, "varies in definitions, models, and the instruments used in its measurement" (Amir et al., 2011, p. 23). This implies that there is no strong consensus among scholars on the definition of learning style (Yanardöner et al., 2014). It is therefore argued that lack of a single definition of learning styles makes it is difficult to understand what learning styles really are (Gould & Caswell, 2006; Mkonto, 2015). For example, the concept of learning style is sometimes used interchangeably with cognitive style, learning strategy, learning preference, and study style (Cassidy, 2004). Keefe (1987), cited in Almigbal (2015, p. 350) define learning style as "the composite cognitive, affective and physiological characteristics that serve as relatively stable indicators of how a student interacts and responds to a learning environment". According to Ellis and Ibrahim (2015) learning styles are the strategies (which could be modified and learned) and efforts used by students to obtain knowledge. Learning styles are the preferred strategies used by students in order to absorb, process, understand, and retain information (Lai & Lee, 2019). Learning styles have also been defined as "the ways through which students start to focus on, process and remember new knowledge, concept, or information" (Dunn, 1984 cited in Amir, Jelas & Rahman, 2011, p. 22).

Felder and Spurlin (2005) cited in Corbin (2017, p. 68) define learning styles as the "strengths and preferences in the ways through which students obtain and process information". Citing Ghaedi and Jam (2014), Magulod (2019, p. 185) define learning styles as "the changes among students in using one or more senses to understand, organise, and retain experiences". Dunn and Grigg (2010) intimate that learning style involves biological and developmental traits of an individual, and that, the same environments and resources may be either effective or ineffective for individual or group of learners. These definitions suggest that learning styles are the distinctive and unique strategies, techniques and processes students adopt or adapt in perceiving, collecting, organising, thinking and internalising, and comprehending information to form concepts. Thus, the key issue in the definitions is that learning styles mainly involve the different ways through which students in the same environment with the same resources obtain and process information to be well understood.

Students vary in their learning processes through different learning modes as a result of differences in their cognitive processing. This implies that students are likely to make use of different and unique learning style preferences in their learning environment (Abidin, Rezaee, Abdullah & Singh, 2011; Nuzhat, Salem, Quadri & Al-Hamdan, 2011). Studies in educational settings have revealed that such differences are significant in knowing how students understand and learn new information and concepts (Contessa, Ciardiello & Perlman, 2005). According to Cassidy (2004) this is one of the reasons for the development of models by researchers to explain the uniqueness of students and their variances in obtaining, understanding, and retaining information. This is reiterated by Boström (2011) and Bacon (2004) that the effect of numerous

studies on learning styles throughout the world is the evolvement of many learning style theories and models.

Howie (2011) cited in Alkooheji and Al-Hattami (2018, p. 50) purports that "various learning style models exist with some being more personality or motivation based while others are educationally based". Over seventy models of learning styles have been identified and these focus on different aspects and features of learning styles including cognitive processes, learning processes, personality traits, thinking styles, self-awareness, and abilities (Boström & Hallin, 2013; Coffield, Moseley, Hall & Ecclestone, 2004). It is therefore believed that understanding and considering learning style preferences of students could help improve successes in educational delivery. Tulbure (2012) supports this view and points out that students are likely to enhance their academic achievement when teaching strategies are designed to suit their learning style preferences. In line with this, Akbulut and Cardak (2012) state that "provision of the same instructional conditions to all students can be pedagogically ineffective" (p. 835).

One of the models of learning styles is the Visual, Auditory and Kinaesthetic (VAK) Learning Style Model, considered as one of the classical sets of learning ideas in education (Li, Medwell, Wray, Wang & Liu, 2016). The Model describes how students are categorised as a result of learning through their sensory preferences (Saadi, 2012) by means of viewing, listening and touching (Federal Aviation Administration, 2009). Thus, Fareo (2015) asserts that students, in their learning processes, make use of three most common learning styles namely visual, auditory, and kinaesthetic learning styles.

According to Fleming (2015) students who prefer visual learning style are comfortable learning information presented to them in the form of graphs, pictures, diagrams, maps, charts, board illustrations, and films. They learn best by looking at the information available, taking detailed notes, and often using coloured highlighter pens to help them recollect important issues. Again, they prefer to watch videos about what they are taught or what they learn (Fareo, 2015; Fleming, 2015). Relatively, visual students, as observed by Fareo (2015), are more particular about the logical ideas of an issue than the practical importance. In understanding and remembering facts, as well as forming ideas and concepts, they mostly develop a mental picture of the phenomenon.

Auditory learning style basically refers to learning by hearing, and students who prefer this learning style are comfortable with information that is spoken and heard, such as listening to a lecture, or study groups where issues are discussed and debated aloud to enable them grasp the information they are learning (Fareo, 2015; Nel & Nel, 2013). They listen closely to what their facilitators say, read aloud any information they need to remember, and talk about things with other people. That is, they learn best by interacting with others in a speaking-listening exchange. Fareo (2015, p. 2632) intimates that "auditory learners prefer to gain information from audiotape, and in an attempt to remember any information, they often 'hear' the way it was told them, or the way the information was previously repeated aloud", and mostly, they have the skill of defining and solving problems.

Amran, Bahry, Yusop, and Abdullah (2011) postulate that students who prefer kinaesthetic learning style learn well when instructional activities are structured in a way that enable them to move around and act out ideas (role play). They prefer to observe and perform demonstrations during and after instructional hours, and doing something to learn from their own actions. Kinaesthetic learning style is referred to as learning by feeling where students prefer to move around while studying, and participate in "hands on" student learning experiences where they manipulate materials to learn new concepts (Fareo, 2015). Such students find it uncomfortable when they sit for long hours during instructional processes since they prefer to explore to obtain and understand concepts (Bennett, 2013, Leopold, 2012). They are often not happy about traditional lessons and ways of teaching, and as such, are sometimes falsely labelled as disruptive or slow students (Careers Advisory Service Computer Aid [CASCAID], 2019).

The VAK Model of learning style has been critiqued in many ways. For instance, Li et al. (2016) argue that students do not necessarily retain information through their senses but they do so based on their ability to make meaning out of the information they obtain. There is also no evidence of the validity and reliability of the VAK Model (Sharp, Bowker, & Byrne, 2008). The VAK Model of learning style mainly labels students in a particular way, and this limits their potential for learning experiences (Hattie, 2011).

According to May (2018) review of contemporary literature suggest that there is very little evidence to buttress the opinion that when instructional pedagogies suit learning style preferences of students, they improve on their academic achievement. It could be deduced from May's (2018) argument that even though students may have a strong conviction of their own learning style preferences, it has not been widely proven that these preferences really have strong influence on learning outcomes. However, studies from Marek (2013) and Dembo and Howard (2007) cited in Ramayah, Nasrijal, Leong, Sivanandan, & Letchumanan (2011) have also established that when learning styles of students are considered by educators during instructional activities, students tend to perform very well in their academic pursuits. The differences in the findings of these studies may be attributed to contextual differences in the study sample including sample characteristics and size, as well as the methodology employed in these studies.

In spite of these criticisms and contradictions, literature show the importance of the VAK Learning Style Model in many situations. For instance, Li et al (2016) reiterate the benefits of the VAK Learning Style Model in many situations irrespective of how its validity and reliability have been questioned. Dreeben (2010) also argues that the Model is widely used in the field of education as a result of its practical nature in assessing how students learn. This may be the reason for Byrnes' (2010) assertion that the VAK Learning Style Model helps lecturers in making use of different pedagogies during instruction and learning activities. This view is shared by Teevan, Michael and Schlesselman (2011) and Alavi and Toozandehjani (2017) that teachers' knowledge and awareness of the learning style preferences of students helps in using appropriate techniques to enhance learning. Students' educational experiences are also enhanced when their learning style preferences are incorporated in instructional activities (Dalmolin, Mackeivicz, Pochapski, Pilatti & Santos, 2018).

It is therefore difficult for one to deny the importance of VAK learning style in its effective application in different learning situations. Thus, learning outcomes are improved when lecturers plan for their students' learning style preferences (Dalmolin et al., 2018). It is therefore prudent for lecturers of the Department of Basic Education, UEW, Ghana, to consciously have an idea about the learning style preferences of their students in order to design appropriate and varied learning activities to achieve good learning outcomes.

Various studies on learning style preferences using different models, including the VAK Learning Style Model, have been conducted with different findings. One of such studies, undertaken by Alkooheji and Al-Hattami (2018) revealed that kinaesthetic learning style was mostly preferred by students, followed by visual and auditory learning styles. Adeniji (2015) discovered that students prefer kinaesthetic learning style more than auditory and visual learning styles. In another context, Elkalmi, Alshami, Ahmad, Khan, Rahman and Alkoudmani (2015) found out that majority of students used for their study preferred visual mode of learning, followed by kinaesthetic mode of learning. The least preferred mode of learning among the students was the auditory mode. Magulod (2019) also established from a study that the major learning style preference of students were visual and kinaesthetic learning styles, while auditory, and individual learning styles were considered as their minor learning style preferences. Similarly, Appiah's (2018) study disclosed that generally, visual learning style was more dominant among students as compared to kinaesthetic and auditory learning styles.

A study by Escarlos Jr. and Escarlos (2018) also showed that students preferred visual learning style as the major means of obtaining, processing, understanding and retaining information. It has been established through research that all over the world, majority (65.0%) of the population are visual students while auditory and kinaesthetic students form 30.0% and 5.0% respectively (Abante, Almendral, Manansala & Mañibo, 2014). It is also alluded by Nel and Nel (2013) that generally, visual students are considered the largest group of students in the classroom while auditory students make up at most 20.0% of students. These findings substantiate the assertion by Alharbi, Paul, Heskens, and Hannaford (2011) that learning styles vary, and as a result, students are likely to exhibit different learning styles depending on their programme or subject of study, and their learning environment.

Different personal variables have been identified to bring about differences in the learning style of students (Alkooheji & Al-Hattami, 2018). For instance, significant differences exist between male and female students in terms of their learning style preferences (Almigbal, 2015; Corbin, 2017; Saadi, 2012; Mohammadi, Mobarhan, Mohammadi & Ferns, 2015). A study by Alkooheji and Al-Hattami (2018) also found out that to some limited extent, sex had an effect on students' learning style preferences. On the other hand, some studies have established that there are no statistically significant differences in the learning style preferences of male and female students (Bhat & Govil, 2014; Elkalmi et al., 2015; Garner-O'Neale & Harrison, 2013; Lai & Lee, 2019; Shenoy & Shenoy, 2013; Yanardöner, Kiziltepe, Seggie & Sekerler, 2014).

Some studies have revealed that statistically significant differences exist in the learning style preferences of students as a result of age (Alkooheji & Al-Hattami, 2018; Corbin, 2017; Mohammadi et al., 2015; O'Donnell & Tobell, 2007). On the hand, other studies have observed no statistically significant differences in learning style preferences of students as a result of age (Appiah, 2018; Garner-O'Neale & Harrison, 2013). It has been established that there are statistically significant differences in students' learning style preference based on level of study (Almigbal, 2015; Obiefuna & Oruwari, 2015). Contrarily, Appiah (2018) found out that generally, there are no statistically significantly differences in the learning style preferences of students based on level or form of study.

It has also been established that there are no statistically significant differences in the learning style preferences of students based on residential status (Almigbal, 2015; Elkalmi et al., 2015; Mohammadi et al., 2015). However, statistically significant difference in learning style preferences of students in different teaching curriculum (level of study) have been observed (Almigbal, 2015).

METHODOLOGY

Two categories of students pursue are found in the Department of Basic Education, UEW, Ghana. These are students who either pursue their programme on full-time mode or the sandwich mode. For this study, we utilised the quantitative framework of the descriptive design (Harwell, 2011; McMillan & Schumacher, 2010). This design was adopted because we found it appropriate to collect data regarding the opinion of full time students from all the four levels of the Department in order to describe their learning style preferences, and the personal variables that bring out differences in their learning style preferences or otherwise. The accessible population for the study was 1,599 students (Planning Unit of UEW, 2019).

Adopting a random sampling technique, we obtained a sample of 800 students from whom quantitative data was collected through the use of a questionnaire we designed based on the VAK Learning Style Model. However, 621 questionnaires were retrieved and used for the analysis. Before distributing the questionnaire to the students, we encouraged them to be honest in the responses. Ethical considerations, including informed consent, anonymity, and right to withdraw from the study were also followed in collecting the data. The questionnaire had a reliability coefficient of 0.79, indicating the items were reliable (Creswell & Creswell, 2018).

ANALYSIS AND RESULTS

In analysing the data, we used frequency, percentage, mean, standard deviation, t-test and ANOVA were used. Simple frequency counts and percentages were used to analyse the demographic variables while the mean and standard deviation were used to analyse the research question which sought to investigate the learning style preference mostly used by the undergraduate students. In testing the hypotheses, t-test was used to find out the differences in learning style preferences of the students based on their sex and residential status. The ANOVA was also used to determine the differences in learning style preferences of the students based on their age and level of study.

Analysis of Demographic Variables

The results in Table 1 show the distribution of the respondents based in terms of their sex, level of study, age, and residential status.

Table 1*: Demographic Characteristics of Respondents*

Variables		Frequency	Percentage
Sex	Male	353	56.8
	Female	268	43.2
	Total	621	100.0
Level of Study	100	149	24.0
	200	189	30.4
	300	142	22.9
	400	141	22.7
	Total	621	100.0
Age (years)	<20	17	2.7
	20-24	315	50.7
	25-29	251	40.4
	30-34	27	4.3
	35-39	8	1.3
	≥40	3	0.5
	Total	621	100.0
Residential Status	Resident	149	24.0
	Non-Resident	472	76.0
	Total	621	100.0

From the results in Table 1, it is realised that out of the 621 respondents, 353 (56.8%) of the respondents were males while 268 (43.2%) were females. It is observed from the results that 149 (24.0%) of the respondents were Level 100 students, 189 (30.4%) were Level 200 students, 142 (22.9%) were Level 300 students, and 141 (22.7%) were Level 400 students. Again, 17 (2.7%) of the respondents were below 20 years, 315 (50.7%) were between 20 and 24 years, 251 (40.4%) were between 25 and 29 years. It is also realised that 27 (4.3%) of the respondents were between the ages of 30 and 34 years, 8 (1.3%) of the respondents were between 35 and 39 years while 3 (0.5%) were 40 years or above 40 years. This shows that about 566 (91.1%) of the respondents were between the ages of 20 and 29 years. With residential status, the results portray that 149 (24.0%) were residents in the University's halls, while 472 (76.0%) were residents in private hostels outside the University campuses. The possible reason for this is that the University operates an IN-OUT-OUT-OUT policy which allows only Level 100 students to be accommodated in the University's halls of residence.

Analysis of Research Question

The research question sought to investigate the learning style preference mostly used by full-time students of the Department of Basic Education, UEW, Ghana. The results are shown in Table 2.

Table 2: *Mean and Standard Deviation for Learning Style Preferences*

Learning Style Preferences	Mean	Standard Deviation
Visual Learning	3.73	0.51
Auditory Learning	3.08	0.50
Kinaesthetic Learning	2.71	0.51
Overall Learning Styles	3.15	0.36

The data in Table 2 shows that the full-time undergraduate students of the Department of Basic Education, UEW, preferred all the learning styles outlined in this study. However, ranked by the mean, it is deduced that the students mostly preferred visual learning styles (M=3.73, SD=0.51) as compared to auditory learning style (M=3.08, SD=0.50), and kinaesthetic learning style (M=2.71, SD=0.51).

Test of Hypotheses

The first hypothesis investigate whether or not there was statistically significant difference between male and female undergraduate full-time students' learning style preferences. The results obtained are shown in Table 2.

Table 2: *T-test Results for Sex and Learning Style Preferences*

Learning Style Preference	Gender	Mean	Std. Dev.	t	df	Sig. (2-tailed)
Auditory	Male	3.13	0.49	2.900	619	0.004
	Female	3.02	0.49			
Visual	Male	3.74	0.49	0.899	619	0.369
	Female	3.71	0.54			
Kinaesthetic	Male	2.79	0.52	4.297	619	0.000
	Female	2.61	0.49			
Overall Learning Style	Male	3.20	0.36	4.217	619	0.000
	Female	3.08	0.35			

Note: $p \leq 0.01$

The results show that the male students recorded higher means for auditory, visual, kinaesthetic, and overall learning styles as compared to their female counterparts. The deduction is that the male students used auditory, visual, and kinaesthetic learning styles more than the female students. The t-test results reveal that apart from the auditory learning style [t (619) = 2.900, p=0.004, 2-tailed] at 0.01 and visual learning style [t (619) = 0.899, p=0.369, 2-tailed] at 0.01 where there were no statistically significant differences, it was observed that statistically significant differences existed in learning style preferences between male and female students for kinaesthetic learning style [t (619) = 4.297, p=0.000, 2-tailed] at 0.01. Again, the results established that there was a statistically significant difference in the overall learning styles [t (619) = 4.217, p=0.000, 2-tailed] at 0.01 based on sex. Based on the interpretation of Eta Squared values as indicated by Pallant (2016), the Eta Squared value of 0.028 obtained in the overall learning style preferences implied that the statistically significant difference was small. From the t-test results, we failed to accept the null hypothesis that there is no statistically significant difference between male and female full-time undergraduate students in their learning style preferences.

Table 3 presents the results for the second hypothesis which investigated whether or not there was statistically significant difference in full-time undergraduate students' learning style preference based on age.

Table 3: *ANOVA Results for Age and Learning Style Preference*

Learning Style Preference	Age (Years)	Mean	Std. Dev.	Sum of Squares	df	Mean Square	F	Sig.
Auditory	≤ 20	2.99	0.63	0.568	5	0.114	0.460	0.806
	20-24	3.06	0.48	151.744	615	0.247		
	25-29	3.11	0.50	152.312	620			
	30-34	3.06	0.55					
	35-39	3.11	0.45					
	≥40	2.96	0.29					
	Total	3.08	0.50					
Visual	≤ 20	3.52	0.51	1.452	5	0.290	1.118	0.349
	20-24	3.73	0.51	159.771	615	0.260		
	25-29	3.75	0.50	161.223	620			
	30-34	3.67	0.52					
	35-39	3.50	0.47					
	≥40	3.56	0.63					
	Total	3.73	0.51					
Kinaesthetic	≤ 20	2.65	0.51	2.289	5	0.458	1.750	0.121
	20-24	2.69	0.49	160.953	615	0.262		
	25-29	2.78	0.54	163.242	620			
	30-34	2.53	0.48					
	35-39	2.64	0.33					
	≥40	2.60	0.52					
	Total	2.71	0.51					
Overall	≤ 20	3.04	0.44	0.871	5	0.174	1.342	0.245
	20-24	3.14	0.35	79.849	615	0.130		
	25-29	3.19	0.37	80.720	620			
	30-34	3.06	0.35					
	35-39	3.07	0.31					
	≥40	3.04	0.47					
	Total	3.15	0.36					

Note: p≤0.01

The results implied there were differences in the means obtained for the different age ranges in terms of auditory, visual, kinaesthetic, and overall learning style preferences. A critical look at the mean values portray that auditory learning style was mostly preferred by students in the age range of 25-29 years (M=3.11; SD=0.50) and 35-39 years (M=3.11; SD=0.45). However, auditory learning style was least preferred by students who were 40 years or more (M=2.96; SD=0.29). More so, visual learning style was mostly preferred by students in the age range of 25-29 years (M=3.75; SD=0.50), while it was least preferred by students who were in the age range of 35-39 years (M=3.50; SD=0.47).

It is also realised that kinaesthetic learning style was mostly preferred by students in the age range of 25-29 years (M=2.78; SD=0.54) while it was least preferred by students

in the age range of 30-34 years (M=2.53; SD=0.48). The ANOVA results in Table 3 also indicate that there was no statistically significant difference in the auditory [F (5, 615) = 0.460, p=0.806], visual [F (5, 615) = 1.118, p=0.349], and kinaesthetic [F (5, 615) = 1.750, p=0.121] learning styles, as well as overall learning style preference [F (5, 615) = 1.342, p=0.245] at 0.01 based on age. The results suggest that the differences in the means of the various learning style preferences of the students were not as a result of their age. Hence, we failed to reject the null hypothesis that there is no statistically significant difference in the learning style preferences of full-time undergraduate students in the Department of Basic Education, UEW, based on age.

The third hypothesis investigated whether or not there was a statistically significant difference in the learning style preference of full-time undergraduate students' learning style preference based on level of study. The results are displayed in Table 4.

Table 4: *ANOVA Results for Level of Study and Learning Style Preferences*

Learning Style Preference	Level of Study	Mean	Std. Dev.	Sum of Squares	df	Mean Square	F	Sig.
Auditory	100	3.08	0.52	0.065	3	0.022	0.087	0.967
	200	3.07	0.50	152.247	617	0.247		
	300	3.10	0.44	152.312	620			
	400	3.08	0.51					
	Total	3.08	0.50					
Visual	100	3.74	0.53	2.832	3	0.944	3.677	0.012
	200	3.81	0.53	158.391	617	0.257		
	300	3.63	0.49	161.223	620			
	400	3.71	0.46					
	Total	3.73	0.51					
Kinaesthetic	100	2.70	0.49	5.116	3	1.705	6.654	0.000
	200	2.66	0.50	158.126	617	0.256		
	300	2.63	0.46	163.242	620			
	400	2.88	0.57					
	Total	2.71	0.51					
Overall Learning Style	100	3.16	0.36	0.870	3	0.290	2.240	0.032
	200	3.15	0.37	79.850	617	0.129		
	300	3.09	0.33	80.720	620			
	400	3.20	0.37					
	Total	3.15	0.36					

Note: p≤0.01

The results show that there were differences in the means obtained for the different levels of study considering auditory, visual, and kinaesthetic learning style preferences. The mean scores show that auditory learning style was mostly preferred by Level 300 students (M=3.10; SD=0.44) but least preferred by Level 200 students (M=3.07; SD=0.50). Again, the mean scores suggest that visual learning style was mostly preferred by Level 200 students (M=3.81; SD=0.53) but least preferred by Level 300 students.

It is also deduced from the mean scores that kinaesthetic learning style was mostly preferred by Level 400 students (M=2.88; SD=0.57), while it was least preferred by Level 300 students (M=2.63; SD=0.46). The ANOVA results indicate that apart from auditory learning style where there was no statistically significant difference [F (3, 617) = 0.087, p=0.967], there were statistically significant differences in visual learning style [F (3, 617) = 3.677, p=0.012], and kinaesthetic learning style [F (3, 617) = 6.654, p=0.000] at 0.01 based on level of study. However, there was no statistically significant difference in the means scores for overall learning style preference [F (3, 617) = 2.240, p=0.032] at 0.01 based on level of study. We therefore failed to reject the null hypothesis that there is no statistically significant difference in the learning style preferences of full-time undergraduate students in the Department of Basic Education, UEW, based on the level of study.

The fourth hypothesis was to investigate whether or not there was statistically significant difference in full-time undergraduate students' learning style preference based on their residential status. The t-test results are displayed in Table 5.

Table 5: *T-Test Results for Residential Status and Learning Style Preferences*

Learning Style Preferences	Residential Status	Mean	Std. Dev.	t	df	Sig. (2-tailed)
Auditory	Resident	3.12	0.53	1.117	619	0.265
	Non-resident	3.07	0.48			
Visual	Resident	3.71	0.49	-0.383	619	0.702
	Non-resident	3.73	0.52			
Kinaesthetic	Resident	2.84	0.53	3.373	619	0.001
	Non-resident	2.68	0.50			
Overall Learning Style	Resident	3.20	0.38	2.099	619	0.036
	Non-resident	3.13	0.35			

Note: $p \leq 0.01$

The results in Table 5 reveal that resident students (students residing in university halls) recorded higher means than the non-resident students (students residing in private hostels outside the university campuses) for auditory learning style, visual learning style, and kinaesthetic learning style. This implies that resident students preferred auditory, visual, and kinaesthetic learning styles as compared to the non-resident students.

The t-Test results established that there were no statistically significant differences in auditory learning style [t (619) = 1.117, p=0.265, 2-tailed], and visual learning style [t (619) = -0.383, p=0.702, 2-tailed] at 0.01 based on residential status. However, a statistically significant difference in kinaesthetic learning style [t (619) = 3.373, p=0.001, 2-tailed], at 0.01 in terms of residential status was observed. Again, no statistically significant difference was established in the mean score for the overall learning style [t (619) = 2.099, p=0.036, 2-tailed], at 0.01 in relation to residential status. Thus, we failed to reject the null hypothesis that there is no statistically significant difference in the learning style preferences of full-time undergraduate students in the Department of Basic Education, UEW, considering level of study.

DISCUSSION

The study investigated the learning style preferences of full-time undergraduate students of the Department of Basic Education, UEW, Ghana, in relation to their sex, age, level of study, and residential status. The findings revealed that the students employed all the three learning styles at a time even though they predominantly preferred and utilised visual learning style. This finding substantiates that of earlier researchers including Appiah (2018), Elkalmi et al., (2015), Escarlos Jr. and Escarlos (2018), and Magulod (2019) whose studies established that generally, majority of the students preferred and dominantly utilised visual learning style to obtain, process, understand, and retain information.

Perhaps, this explains the argument that generally, visual learners are perceived to be the largest group of students in the classroom (Nel & Nel, 2013), and that majority (65.0%) of the world's population are visual learners while auditory and kinaesthetic learners form 30.0% and 5.0% respectively (Abante et al., 2014). The finding, however, contradicts that of Adeniji (2015), and Alkooheji and Al-Hattami (2018) that kinaesthetic learning style was the most preferred and used by students. It is suggested from the finding that successful students are likely to apply various learning styles. It is therefore essential for lecturers to be aware and understand the preferred learning approaches of students in order to enhance their (students') learning through the adoption of relevant learning strategies. With this, appropriate and varied learner-centred pedagogies may be employed by the lecturers. The possible reason for this finding could be that contextual differences such as personal characteristics, technological resources, and socio-economic backgrounds at macro (e.g. national) and micro (e.g. household and university) levels influence the preferences for specific learning styles of students (Bronfenbrenner, 2005).

Consistent with prior studies (e.g. Alkooheji & Al-Hattami, 2018); Almigbal, 2015; Corbin, 2017; Mohammadi et al., 2015), our results established statistically significant differences in learning style preferences of male and female students as opposed to the finding of other studies such as Bhat and Govil (2014), Elkalmi et al. (2015), Garner-O'Neale and Harrison (2013), and Lai and Lee (2019). Even though the reason for the statistical significance may be as a result of chance because level of significant difference was found to be small, it does not discount the possibility of the impact of biological, developmental, environmental, and social traits of male and female students on how they perceive, process, understand and utilise information. The difference may also be based on the argument by Amir, Jelas and Rahman (2011) that at the university level, female students often adopt learning styles which match with classroom approaches to learning tasks, while male students mainly prefer independent work.

It was realised that there were no statistically significant differences in the learning style preferences of full-time undergraduate students in the Department based on age, level of study and residential status of students. This supports the findings of Appiah (2018) and Garner-O'Neale and Harrison (2013) that differences in learning style preferences of students are not dependent on age, but contradicts findings of Alkooheji and Al-Hattami (2018), Corbin (2017), and Mohammadi et al. (2015) who found otherwise. While our result confirms Appiah's (2018) finding that generally, there is no statistically significantly difference in the learning style preferences of students based

on level or form of study, it deviates from the finding that differences in learning style preferences of students are dependent on level of study (Almigbal, 2015; Obiefuna & Oruwari, 2015).

Again, our finding that there is no statistically significant difference in learning style preferences of students based on residential status concurs with those of Elkalmi et al. (2015), Mohammadi et al. (2015) even though it disagrees with the observation by Almigbal (2015) that there is a statistically significant difference in learning style preferences of students in different teaching curriculum (level of study). The foregoing imply that there are no age, level of study, and residential status dependent preferences in learning styles of full-time undergraduate students of the Department of Basic Education, UEW. This may be understood because irrespective of age, level of study, and residential status, the students are generally taught by their lecturers using the same or similar techniques. This makes the students to have limited choices in their learning style preferences.

It is envisaged that the findings of this study will create an awareness among students in the Department of Basic Education, UEW, of their different learning style preferences to enhance effective learning experiences. This awareness will enhance the students' learning and strengthen their self-actualisation. Hence, lecturers in the Department will be in the position to pay critical attention to the varying unique features of the students and their learning style preferences to ensure that the expected level of learning is achieved during instructional processes. The findings of the study will provide a positive feedback to both lecturers and students about their strengths and challenges in the teaching and learning processes. Furthermore, the findings may contribute to the discussions on learning style preferences and serve as a reference point to encourage other researchers to conduct similar studies in other Departments in UEW to have a wider picture of the learning style preferences of students in the university.

CONCLUSIONS AND RECOMMENDATIONS

This study investigated the learning style preferences of full-time (regular) undergraduate students in the Department of Basic Education, UEW, Ghana, and how their learning style preferences differ based on sex, age, level of study, and residential status. From the findings, it could be concluded that the students are different and unique from diverse backgrounds, possess and exhibit different personality traits, and as a result, do not prefer the same approaches to learning. It could therefore be deduced that individual differences exist during instructional processes resulting in different modes of learning preferred by the students in the Department. This probably accounts for the finding that visual learning style was mostly preferred by the students followed by auditory and kinaesthetic learning styles.

The success of higher education students in the pursuit of their academic and professional goals is greatly dependent on their learning styles and teaching styles of their lecturers. Students in the Department of Basic Education, UEW, Ghana, need to be aware of their preferred learning style so that they could be assisted to develop their learning capabilities to meaningfully select the most suitable learning styles for different specific tasks. Fareo's (2015) deduction that "knowledge of one's own

learning is essential in learning to learn" (p. 2637) is therefore relevant. There is also the need for lecturers in the Department to be aware of the learning styles preferred and exhibited by the students. In doing so, it is important that the sex, level of study and residential status are considered. This will enable the lecturers to design teaching techniques that will assist the students to become responsible for their own learning. Thus, it is concluded that during instruction, lecturers should consider the VAK Learning Style Model as a practical way of making use of varied learning approaches for instruction, irrespective of its criticism as not having a scientific basis.

It is therefore recommended that lecturers in the Department of Basic Education, UEW, should teach skills such as mind mapping or concept cartooning, note taking, and effective power point presentations. Again, lecturers may upload relevant short videos from YouTube and other online resource sites, use images and graphs during instructional activities. Pictures related to topics being discussed should also be used by lecturers to ensure that students focus on what is being done. The lecturers should see to it that their instructional activities are undertaken using both visual and verbal approaches, and reinforced using different motivation strategies to enhance personalised self-reflection tasks, c-operative learning, and team work among the students to encourage self-direction in their learning.

Furthermore, the lecturers in the Department should assist students to identify their learning style preferences, and offer feedback on the merits and demerits of various learning styles. The lecturers should understand, respect, and encourage the development of students' learning style preferences, and at the same time provide opportunities for the students to make use of other modes of learning. The Department should organise workshops or in-service training programmes for the lecturers on the use of effective visual presentations, performance-based learning and assessment, as well as the use of innovative teaching strategies such as games, songs, rhymes, simulation, and role play. More so, the Department should ensure that lecture rooms allocated for lectures are conducive and spacious environments for the students to achieve their learning opportunities. Other similar study should be conducted among all full-time undergraduate students of UEW in order to obtain a general picture of learning style preferences of the students.

REFERENCES

Abante, M. E. R., Almendral, B. C., Manansala, J. E., & Mañibo, J. (2014). Learning styles and factors affecting the learning of general engineering students. *International Journal of Academic Research in Progressive Education and Development, 3*(1), 16-27.

Abidin,M., Rezaee, A., Abdullah, H., & Singh, K. (2011). Learning styles and overall academic achievement in a specific educational system. *IJHSS, 1*, 143-152.

Adeniji, K. A. (2015). Comparative analysis of students' learning styles and Mathematics performance at tertiary level in Katsina state, Nigeria. *Journal of Educational Foundations and Development, 1*(1), 1-12.

Akbulut, Y., & Cardak, C. S. (2012). Adaptive educational hypermedia accommodating learning styles: A content analysis of publications from 2000 to 2011. *Computers and Education, 58*(2), 835-842.

Alavi, S., & Toozandehjani, H. (2017). The relationship between learning styles and students' identity styles. *Open Journal of Psychiatry, 7*, 90-102.

Alharbi, A., Paul, D., Heskens, F., & Hannaford, M. (2011). An investigation into learning styles and self-regulated strategies for computer science students. In G. Williams, P. Statham, N. Brown & B. Cleland (Eds.). Changing Demands, Changing Directions. Proceedings ascilite Hobart 2011 (pp. 36-46). Retrieved from *http://www.ascilite.org.au/conference/hobart11/procs/Alharbi-full.pdf.*

Alkooheji, L., & Al-Hattami, A. (2018). Learning style preferences among college students. *International Education Studies, 11*(10), 50-63.

Almigbal, T. H. (2015). Relationship between the learning style preferences of medical students and academic achievement. *Saudi Medical Journal, 36*(3), 349-355.

Amir, R., Jelas, Z. M., & Rahman, S. (2011). Learning style of university students: Implications for teaching and learning. *World Applied Sciences Journal, 14* (Special Issue of Innovation and Pedagogy for Diverse Students), 22-26.

Amran, N., Bahry, E. D. S., Yusop, Z. M., & Abdullah, S. (2011). Learning styles of non-science and non-technology students on technical courses in an information management program. *Education for Information, 28*(2-4), 325-339. Doi: https://doi.org/10.3233/EFI-2010-0915

Appiah, F. (2018). *Learning style preferences and study habits as determinants of academic achievement among public junior high school students in the Effutu municipality*. Unpublished MPhil Thesis, University of Education, Winneba.

Bennett, T. (2013). *Teacher proof*. Oxon, England: Routledge.

Bhat, M. A., & Govil, P. (2014). Understanding learning styles of secondary school students in relation to certain variables. *Asian Journal of Multidisciplinary Studies, 2*(11), 1-8.

Boström, L. (2011). Students' learning styles compared with their teachers' learning styles in secondary schools. *Institute for Learning Styles Research Journal, 1*, 17-38.

Boström, L., & Hallin, K. (2013). Learning styles and differences between nursing and teaching students in Sweden: A comparative study. *International Journal of Higher Education, 2*(1), 22-34.

Byrnes, S. (2010). Assimilative domain proficiency and performance in chemistry coursework. Retrieved on July 16, 2018 from *https://www.bookdepository.com/Assimilative-Domain-Proficiency Performance-Che...*

Caetano, C., Luedke, R., & Antonello, I. C. F. (2018). The importance of identifying learning styles in medical education. *Revista Brasileira Educacao Medica, 42*(3), 189-193.

Careers Advisory Service Computer Aid (CASCAID) (2019). Articles: Learning styles. Retrieved on July 4, 2019 from *https://www.careerwales.com>article>pdf.*

Cassidy, S. (2004). Learning styles: An overview of theories, models, and measures. *Educational Psychology, 24*(4), 419-444.

Cekiso, M. P. (2011). Profiling learning styles preferences of first-year university students: Implications for course design and instruction. *South African Journal of Higher Education, 25*(7), 1298-1309.

Coffield, F., Moseley, D., Hall, E., & Ecclestone, K. (2004). *Should we be using*

learning styles? What research has to say in practice. London: Learning and Skills Development Agency.

Contessa, J. I., Ciardiello, K. A., & Perlman, S. (2005). Surgery resident learning styles and academic achievement. *Current Surgery, 3*, 344-347.

Corbin, A. (2017). Assessing differences in learning styles: Age, gender and academic performance at the tertiary level in the Caribbean. *Caribbean Teaching Scholar, 7*(April), 67-91.

Creswell, J. W. & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Los Angeles: SAGE.

Dalmolin, A., Mackeivicz, G., Pochapski, M., Pilatti, G., & Santos, F. (2018). Learning styles preferences and e-learning experience of undergraduate dental students. *Rev Odontol UNESP, 47*(3), 175-182. https://doi.org/10.1590/1807-2577.05118

Damavandi, A. J., Mahyuddin, R., Elias, H., Daud, S. M., & Shabani, J. (2011). Academic achievement of students with different learning styles. *International Journal of Psychological Studies, 3*(2), 186-192.

Dreeben, O. (2010). *Patient education in rehabilitation*. Sudbury, Mass: Jones and Bartlett Publishers.

Dunn, R., & Grigg, S. (2010). *The Dunn and Dunn learning style model and its theoretical cornerstone*. New York: St. John's University Centre for the Study of Learning and Teaching Styles.

Elkalmi, R. M., Alshami, A. K. M., Ahmad, A., Khan, M. U., Rahman, N. S. A., & Alkoudmani, R. M. (2015). Assessment of learning style preferences of pharmacy students: Findings from public university of Malaysia. *Indian Journal of Pharmaceutical Education and Research, 49*(4), 266-271.

Ellis, G., & Ibrahim, N. (2015). *Teaching children how to learn*. London: Delta Publishing.

Escarlos Jr., J. A., & Escarlos, G. S. (2018). Gender differences in learning style preferences among veterinary medicine students. *International Journal of Students and Technology Research, 7*(6), 50-53.

Esia-Donkoh, K. (2019). Students' personal characteristics and differences in their learning style preferences in public colleges of education in the central-western zone of Ghana. PEOPLE: *International Journal of Social Sciences, 5*(1), 592-602. Doi: https://dx.doi.org/10.20319/pijss.2019.51.592608.

Esia-Donkoh, K., Eshun, E. S., & Acquaye, V. N. A. (2015). Learning styles and factors affecting learning: Perceptions of 2013/2014 final year post-diploma sandwich students of the department of basic education, university of education, Winneba (UEW), Ghana. *Advances in Social Sciences Research Journal, 2 (5)*, 34-46. DOI: 10.14738/assrj.25.1099.

Fareo, D. O. (2015). Learning styles among college students. *International Journal for Cross-Disciplinary Subjects in Education, 5*(4), 2631-2639.

Farooq, M. S., & Regnier, J. C. (2011). Role of learning styles in the quality of learning at different levels. *Informatica Economică, 15*(3), 28-45.

Federal Aviation Administration. (2009). *Aviation instructor's handbook (FAA-H-8083-9A)*. New York: Skyhorse Publishing, Inc.

Felder, R. M., & Spurlin, J. (2005). Applications, reliability and validity of the index of learning styles. *International Journal of Engineering Education, 21*(1), 103-112.

Fleming, N. (2015). The VARK modalities. Retrieved May 12, 2019 from *http://www.vark-learn.com*.

Garner-O'Neale, L. D., & Harrison, S. (2013). An investigation of the learning styles and study habits of chemistry undergraduates in Barbados and their effect as predictors of academic achievement in chemical group theory. *Journal of Educational and Social Research, 3*(2), 107.

Ghanney, R. A., Appiah, F., & Esia-Donkoh, K. (2019). Learning style preferences as determinants of academic achievement among public junior high school pupils in the Effutu municipality. *International Journal of Education, Learning and Development, 7*(12), 54-67.

Gilakjani, A. P. (2012). Visual, auditory, kinaesthetic learning styles and their impact on English language teaching. *Journal of Studies in Education, 2*(1), 104-113. http://dx.doi.org/10.5296/jse.v2il.1007.

Gokalp, M. (2013). The effects of students' learning styles to their academic success. *Creative Education, 4*(10), 627-632. http://doi.org/10.4236/ce.2013.410090.

Gordon, D., & Bull, G. (2004). The nexus explored: A generalised model of learning styles. Retrieved March 4, 2015 from *https://arrow.dit.ie/cgi/viewcontent.cgi?article=1149&context=scschcomcon*.

Gould, T. E. & Caswell, S. Y. (2006). Stylistic learning differences between undergraduate athletic training students and educators: Gregorc mind styles. *Journal of Athletic Training, 41*(1), 109-116.

Hall, E., & Moseley, D. (2005). Is there a role for learning styles in personalised education and training? *International Journal of Lifelong Education, 24*(3), 243-255.

Hamidon, N. A. (2015). Study on students learning style according to gender factor. *Journal of Culture, Society and Development, 8*, 20-22.

Harwell, M. R. (2011). *Research design: Qualitative, quantitative, and mixed methods*. Thousand Oaks, California: Sage.

Hattie, J. (2011). *Visible learning for teachers: Maximising impact on learning*. London: Routledge.

Howie, D. (2011). *Teaching students teaching skills and strategies: A framework for cognitive education in inclusive settings*. London and Philadelphia: Jessica Kingsley Publishers.

Hsieh, S.-W., Jang, Y.-R., Hwang, G.-J., & Chen, N.-S. (2011). Effects of teaching and learning styles on students' reflection levels for ubiquitous learning. *Computers and Education, 57*, 1194-1201. https://doi.org/10.1016/j.compedu.2011.01.004.

John, A., Shahzadi, G., & Khan, K. I. (2016). Students' preferred learning styles and academic performance. *Science International (Lahore), 28*(4), 337-341.

Lai, Y. L., & Lee, J. (2019). Learning style variation of digital natives. *PEOPLE: International Journal of Social Sciences, 4*(3), 1265-1276.

Leopold, L. (2012). Prewriting tasks for auditory, visual, and kinaesthetic students. *TESL Canada Journal, 29*(2), 96-102.

Li, Y., Medwell, J., Wray, D., Wang, L., & Liu, W. (2016). Learning styles: A review of validity and usefulness. *Journal of Education and Training Studies, 4*(10), 90-94.

Magulod, G. C. Jr. (2019). Learning styles, study habits and academic performance of

Filipino university students in applied science courses: Implications for instruction. *Journal of Technology and Science Education, 9*(2), 184-198. https://doi.org/10.3926/jotse.504.

Marek, G. I. (2013). Impact of learning style assessment on self-reported skills of students in an associate degree nursing programme. *Teaching and Learning in Nursing, 8*, 39-43.

May, C. (2018). The problem with learning styles. Retrieved on November 17, 2019 From *https://www.scientificamerican.com/article/the-problem-with-learning-styles/*.

McMillan, J. H., & Schumacher, S. (2010). *Research in education: Evidence-based inquiry (*7th ed.). Boston, MA: Pearson.

Metin, M., Yilmaz, K. G., & Coskun, K. (2011). The investigating high school students' learning styles with respect to the different variables: A sample from Turkey Energy Education Science and Technology Part B. *Social and Educational Studies, 3*(4), 589-604.

Mkonto, N. (2015). Students' learning preferences. *Journal of Studies in Education, 5*(3), 212-235.

Mlambo, V. (2011). An analysis of some factors affecting student academic performance in an introductory biochemistry course at the University of the West Indies. *Caribbean Teaching Scholar, 1 (2),* 79-92.

Mohammadi, S., Mobarhan, M. G., Mohammadi, M., & Ferns, G. A. A. (2015). Age and gender as determinants of learning style among medical students. *British Journal of Medicine and Medical Research, 7*(4), 292-298.

Nel, N., & Nel, M. (2013). Learning. In N. Nel, M. Nel & A. Hugo (Eds.). *Learner support in a diverse classroom: A guide for foundation, intermediate and senior phase teachers of Language and Mathematics*. Pretoria: Van Schaik.

Nuzhat, A., Salem, R., Quadri, M., & Al-Hamdan, N. (2011). Learning style preferences of medical students: A single-institute experience from Saudi Arabia. *International Journal of Medical Education, 2*, 70-73.

Obiefuna, C. A., & Oruwar, J. N. (2015). Students' learning styles and their performance in English language in senior secondary schools in Imo state, Nigeria. *African Educational Research Journal, 3*(4), 230-237.

O'Donnell, V. L., & Tobell, J. (2007). The transition of adult students to higher education: Legitimate peripheral participation in a community of practice? *Adult Education Quarterly, 57*(4), 312-328.

Pallant, J. (2016). *SPSS survival manual. A step by step guide to data analysis using SPSS (6th ed.). New South Wales: Allen & Unwin*.

Planning Unit (2019). *24th congregation basic statistics*. Winneba: University of Education, Winneba.

Ramayah, M., Nasrijal, N. H., Leong, L. C., Sivanandan, P., &Letchumanan, T. (2011). Factors influencing the learning style preferences among business school students. *Journal of Advanced Social Research, 1* (2011), 229-243.

Rau, H. (2012). Student reflective practices. *China-USA Business Review, 11*, 564-580.

Saadi, I. A. (2012). An examination of the learning styles of Saudi preparatory school students who are high or low in reading achievement (PhD Thesis, Victoria University, Australia). Retrieved on June 2, 2019 from *http://www.vuir.edu.au/19421*.

Shaaidi, W. R. W. (2012). A study of preferred learning styles of students taking English 1119 paper in smk tengku. Retrieved May 3, 2017 from *https:www.researchgate.net/publication/274780335.*

Sharp, J. G., Bowker, B., & Byrne, J. (2008). VAK or VAK-uous? Towards the trivialisation of learning and the death of scholarship. *Research Papers in Education, 23*(3), 293-314.

Shenoy, N., Shenoy, K. A. (2013). The perceptual preferences in learning among dental students in clinical subjects. *Journal of Clinical Diagnostic Research, 7*(8), 1683-1685.

Teevan, C. J., Michael, L. I., & Schlesselman, L. S. (2011). Index of learning styles in a U.S. school of pharmacy. *Pharmacy Practice, 9*(2), 82-87.

Tulbure, C. (2012). Learning styles, teaching strategies and academic achievement in higher education: A cross-sectional investigation. *Procedia-Social and Behavioural Sciences, 33*, 398-402.

UNESCO (2015). Rethinking education towards a global common good? Retrieved on July 3, 2019 from *http://unesdoc.unesco.org/images/0023/002325/232555e.pdf*.

Woolfolk, A. (2010). *Educational psychology* (11th ed.). New Jersey: Pearson.

Yanardöner, E., Kiziltepe, Z., Seggie, F. N., & Sekerler, S. A. (2014). The learning style and personality traits of undergraduates: A case at a state university in Istanbul. *Anthropologist, 18*(2), 591-600.