Learning Style Preferences of Physiotherapy Students in the Kenya Medical Training College

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Abstract: **- Educating future health care practitioners is an important role for universities. Optimal learning environments consider how students learn and utilize various teaching methods to tailor curriculum delivery to match specified student learning preferences. Individualshave a preferential focus on different types of information, the different ways of perceiving the information, and the understanding of information. The grouping of students according to a number of scales and questionnaires pertaining to the ways they receive and process information is defined as a learning style model. Learning Styles is chiefly associated with Honey and Mumford who spent a considerable amount of time on the topic and coming up with the Learning Styles questionnaire in 1982. The study was a descriptive cross-sectional design. Purposive sampling was used. The study site was in the Kenya Medical Training College-Nairobi campus during the 2015/2016 year of study. A questionnaire composed of two questionnaires by Honey and Mumford (1982) and Neil Fleming (1987) was used. Statistical Program for Social Scientists (SPSS) v.25 was used to analyze the data collected. 124 responses were acquired majority being male 58.06%. First years were the majority 37.1%. Reflectors were the bulk of the population 66.1% and pragmatists the least 7.3%. First years were majorly 73.9% Reflectors with high significance relationship between the year of study and the learning philosophy (χ^2= 4.987, df=6 P=0.002). Reflectors stood out as the majority in all the learning styles, 47% of the respondents were Reflectors and Kinesthetic learners. On VARK majority of the students applied Kinesthetic as moe of learning. A significant association between the year of study and the learning philosophies (χ^2=6.56, p<0.0001 df=6). Similarly, there was a significant association between the gender of the participants and the learning styles (χ^2=3.56, p<0.001 df=6). It can be recommended that the learning preferences of physiotherapy students should be verified prior to the start of their academic tasks by using the VARK questionnaire and the categorization of learning into the philosophical classes. The preferred learning styles of medical students in the present study were aural and reading/writing styles. I would like to extend my gratitude to the students who participated in this study and completed the questionnaires.**

I. INTRODUCTION

Every individual has an inherent way of acquiring knowledge, retaining and retrieving information. The retrieval of knowledge is important as it plays a key role in problem-solving. (Sywelem, Mohammed; Al-Harbi, Qassem; Fathema, Nafsaniath; Witte, 2012).In the health profession, problem-solving pertains to treating patients. For this process to be effective and efficient the health professional, needs to have undergone learning that enables them to complete this task. The terms learning styles has different connotations. In this study the definitions used were: Learning styles or preferences are multifaceted ways in which learners perceive, process, store and recall what they are trying to learn (Lujan & Dicarlo, 2019). Also an individual's preferential focus on different types of information, the different ways of perceiving the information, and the understanding of information (Li, Chen, Tsai, 2008).

The contribution of learning styles for educational quality is evident and have important implications to develop effective curricula(Samarakoon, Fernando, Rodrigo, & Rajapakse, 2013). A persons learning style may be understood by answering the following five questions. What type of information do you preferentially perceive? Through which modality is sensory information most effectively perceived? With what organization of information are you most comfortable? And how do you progress towards understanding? (Academic Resource Center, 2008). Through answering and understanding these questions educators can then be able to have insight into how they may fashion their instructional delivery to the learner's benefit.That instead of fixed learning styles strategies, adapting content to the learner, management educators should rather implement flexible learning strategies(Penger, 2009).

Several cognitive and learning style studies, theories and models have been proposed over the course of many years, identifying and categorizing students' individual differences like Hill's Cognitive Style Mapping (1976), Dunn and Dunn Learning Styles (1978), Howard Gardner's Multiple Intelligence Theory (1983), Kolb's Learning Styles (1984), Gregorc Learning Styles (1985), Felder-Silverman Learning Model (1988), Grasha-Reichmann Learning Style Scales (1996), and Hermann Brain Dominance Models (1996) (Gulbahar and Alper, 2011). In Africa, (Hess & Frantz, 2014), undertook a study to determine the understanding of learning styles of undergraduate students, it was based in South Africa. But little is known about the learning styles of students in Kenya especially related to health sciences

II. BACKGROUND INFORMATION

The grouping of students according to a number of scales and questionnaires pertaining to the ways they receive and process information is defined as a learning style model (Gulbahar & Alper, 2014).The term Learning Styles is chiefly associated with Honey and Mumford who spent aconsiderable amount oftime on the topic and coming up with the Learning Styles questionnaire in 1982.They suggested that each of us has a predisposition to use a particular part of the learning cycle as our prime approach to learning. This gives four types of learners, activists, reflectors,pragmatist, and theorists (Honey & Mumford, 1982).

Table 1. Honey and Mumford's learning style questionnaire (LSQ*)*

Learning Style	Description of Honey and Mumford's learning Styles theory	Characteristics
Reflectors	Reflectors like to stand back to ponder experiences and observe them from many different perspectives. They collect data, both first hand and from others, and prefer to think about it thoroughly before coming to any conclusion. The thorough collection and analysis of data about experiences and events are what counts so they tend to postpone reaching definitive conclusions for as long as possible. Their philosophy is to be cautious. They are thoughtful people who like to consider all possible angles and implications before making a move	• Careful • Good listener • Holds back from participation • Methodical • Does not jump to conclusions • Slow to decide • Thorough and thoughtful
Theorists	Theorists adapt and integrate observations into complex but logically sound theories. They think problems through in a vertical, step-by-step logical way. They assimilate disparate facts into coherent theories. They tend to be perfectionists who won't rest easy until things are tidy and fit into a rational scheme. They like to analyze and synthesize. They are keen on basic assumptions, principles, theories models and systems thinking. Their philosophy poses rationality and logic. "If it's logical, it's good". Questions they frequently ask are: "Does it make sense?" "How does this fit with that?" "What are the basic assumptions?" They tend to be analytical.	• Disciplined • Intolerant of subjective, intuitive ideas • Logical • Low tolerance of uncertainty, ambiguity • Objective • Parental in approach • Rational
Activists	Activists involve themselves fully and without bias in new experiences. They are open-minded, not skeptical, and this tends to make them enthusiastic about anything new. Their philosophy is "I'll try anything once". They tend to act first and consider the consequences afterward. Their days are filled with activity. They tackle problems by brainstorming. As soon as the excitement from one activity has died down, they are busy looking for the next. They tend to thrive on the challenge of new experiences but are bored with implementation and longer-term consolidation.	• Flexible • Gets bored with consolidation • Happy to give things a try • Open-minded • Optimistic about change • Rushes into action without preparation • Takes immediate obvious action • Takes unnecessary risks
Pragmatists	Pragmatists are keen on trying out ideas, theories, and techniques to see if they work in practice. They positively search out new ideas and take the first opportunity to experiment with applications. They are the sort of people who return from management courses brimming with new ideas that they want to try out in practice. They like to get on with things and act quickly and confidently on ideas that attract them. They are essentially practical, down-to-earth people who like making practical decisions and solving problems	• Business-like – gets to the point • Does not like the theory • Impatient with waffle • Keen to test things out in practice • Practical, down to earth, realistic • Rejects ideas without clear application • Task and technique focused

Source: Authors. Adapted from Honey & Mumford, 1992; Coffield, Mosley, Hall, Ecclestone, 2004.

Neil Fleming (1987) devised a learning model based on the principal sensory modalities namely visual, auditory, read/write and kinesthetic. He subsequently approved the development of the VARK questionnaire. The acronym VARK stands for Visual, Aural, read/write and Kinesthetic sensory modalities. They refer to the physical, perceptual learning channels with which the student is most comfortable using(Oxford, 2003).This learning style can be divided into two unimodal and multimodal(Zhu et al., 2018). Unimodal learners have only one dominant learning preference and can be classified into four styles, V, A, R/W, and K.According to(Fleming, Fleming, & Mills, 1992)Visual learners best utilize material that is either pictures or written texts. They want the teacher to provide demonstrations and descriptions. They utilize lists to keep up and organize thoughts, they remember faces but not names have very good imaginations. Auditory learners prefer spoken word, like dialogues, discussions, and plays. Preferring to listen hence seek verbal instructions. Kinesthetic learners think and learn in terms of actions and bodily movements. They do well when they are involved or active due to high energy levels. Read/write preference in learners is when they take notes during lectures or when encountering new concepts. To enhance memory, they draw or doodle to remember (Fleming, 2001).Multimodal learners have a balanced set of learning preferences, including the bimodal, trimodal and quadomal(Allen, Swidler, & Keiser, 2013)

A significant number of theorists and researchers, for instance, have argued that learning styles are not determined by inherited characteristics, but develop through experience. Styles are therefore not necessarily fixed but can change over time, even from one situation to the next(Dunn, Ed, & Burke, 2005). Theorists such as Entwistle, on the other hand, are

more interested in how students tackle a specific learning task (learning *strategy*) than any habitual preference (learning *style*). What these authors have in common is an emphasis not simply on the learner but on the interaction between the learner, the context and the nature of the task. Indeed, (Education et al., 2000) argue that learning styles are among manyfactors that determine how learners react to learning opportunities. The effects of other factors including contextual, cultural and relational issues also influence the learning preferences (Kolb, Kolb, & Kolb, 2013).I, therefore, postulated that the gender and year of study would impact the learning styles among Kenya Medical training (KMTC) physiotherapy students.

If, therefore, learning styles are not fixed personality traits, the emphasis shifts from accommodating learning styles to encouraging a balanced approach to learning and – perhaps more importantly – an explicit awareness of the range of approaches available to the learner. Even among authors who question the validity of learning styles as a concept, most agree that there is a benefit in enabling learners to reflect on how they learn. Encouraging metacognition (being aware of one's own thought and learning processes) is therefore perhaps among the most important advantage that can be claimed for applying learning styles theory to learning and teaching. According to Sadler-Smith (2001), it may be that a knowledge of learning styles makes students better able to adapt to different situations. For the content developer, then, the challenge is to provide metacognitive support for learners, enabling them to reflect not just on what they learn but also how and why.

III. METHOD

A descriptive cross-sectional design was used to collect quantitative data from the respondents. Purposive sampling was used to acquire the desired physiotherapy students from the rest of the population. The research was conducted in the Kenya Medical Training College-Nairobi campus during the 2015/2016 academic year. Allstudents studying the physiotherapy programme, the total number being 150 were included in the study. Participants were classified as either Year One, Year Two and Year Three.

The data were collected using a questionnaire composed of two questionnaires by Honey and Mumford (1982) and Neil Fleming (YEAR). The Honey and Mumford (1982) Learning style questionnaire (LSQ) is composed of 80 questions that a learner then marks and is scored to the corresponding subscales. They suggest that each of us has a predisposition to either or of thefour types of styles - Activists, Reflectors, Theorists and Pragmatists. The Fleming's (YEAR)Visual Audio Reading Kinesthetic-VARK- is a model of learning based on the principal sensory mode of learning.Classified as visual, auditory, read/write and kinesthetic. It consists of 13 questions, participants choose from four responses what best represents their preferred mode of learning. The response scored depending on which mode they correspond to.

Statistical Program for Social Scientists (SPSS) v.25 was used to analyze the data collected. Demographics from the LSQ questionnaire were used to obtain and analyze the descriptive statistics of the population. The Sills on VARK were coded to give an outcome of the learning styles of the students. Chi-square test of goodness was used to find the relationship between the gender and the years of study with the four styles in the VARK and the LSQ questionnaires to find out if there were any associations across them. And if there was any correlation between the four LSQ styles and the four VARK styles. Linear regression would be used to determine the LSQ relationship with VARK. The data was presented in the following Graphs and Tables.

IV. RESULTS

The responses were received from 124 respondents from the Kenya Medical Training College- Nairobi. All respondents were from the Physiotherapy department. Majority of the respondents were male students 58.06 (75) while the rest were Female 39.52(49). On the year of study, the majority of the respondents were first years 37.1% (46), Third years 33.9% (42) and second years 28.2% (35) the mean class of the respondents was 1.97, Std= 0.849.

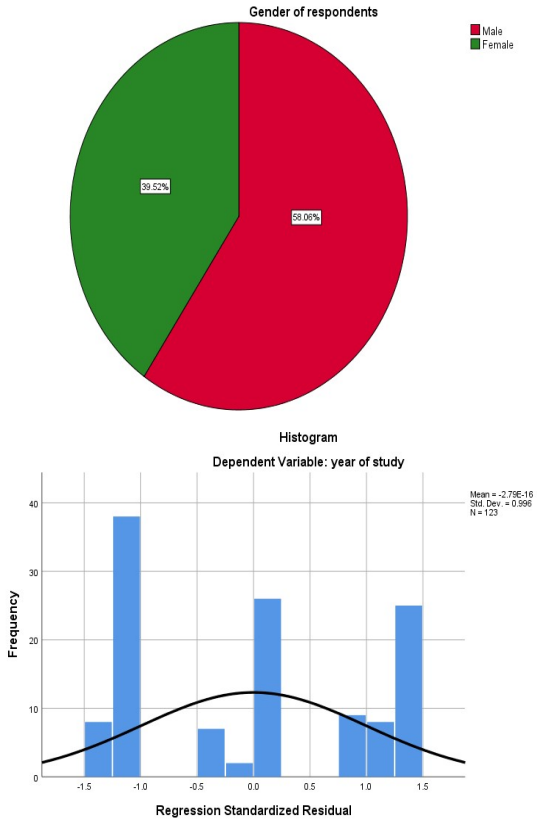


Figure 1: Gender and Year of study regression

Learning philosophies were interrogated from the respondents. Majority of the respondents 66.1% (82) were Reflectors, 16.9% (21) were Pragmatists, while 8.9% (11) and 7.3% (9) were Theorists and Activists Respectively.

Figure 2. Learning Philosophies of the respondents

A further comparison was done between the year of study and the learning philosophy of the students. Majority of the First Years 73,9% (34) were Reflectors 10.9% (5) were Pragmatists while 8.4% (4) and 6.5% (3) were Activists and Theorists respectively. The second years were majorly 65.7% (23) Reflectors, 20.0% (7) Pragmatist, 8.6% (3) and 5.7% (2) were Activists and Theorists respectively. The third years 59.5% (25) Reflectors, 21.4% (9) Pragmatists, 14.3 (6) Theorists and 4.8% (2) activists. There was a significant association between the year of study and the learning philosophy (χ^2= 4.987, df=6 P=0.002)

Table 2. Crosstabulation of the year of study and learning Philosophies

		Reflectors	Activist	Theorists	Pragmatists
		% N	Row N %	Row N %	Row N %
year of study	1st year	73.9% (34)	8.7% (4)	6.5% (3)	10.9% (5)
	2nd year	65.7% (23)	8.6% (3)	5.7% (2)	20.0% (7)
	3rd year	59.5% (25)	4.8% (2)	14.3% (6)	21.4% (9)

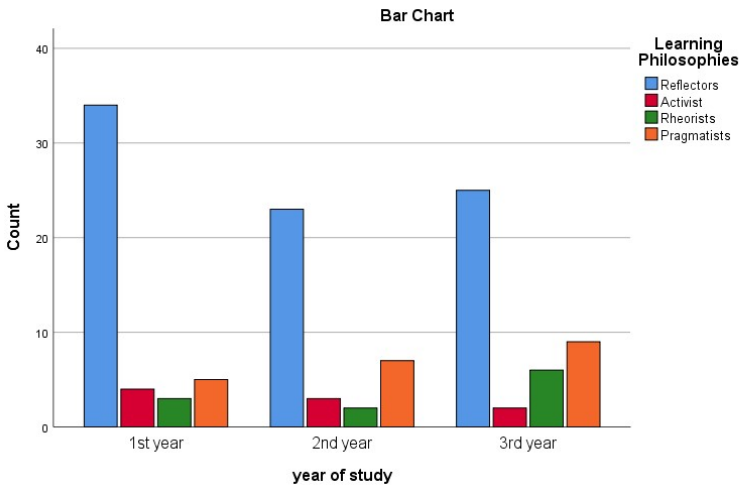


Figure 3; Year of study and Learning Philosophies

To affirm the learning styles a VARK scale was also used to find out the learning style of the students according to Neil Fleming (1987). 54.8% (68) were Kinesthetic, 21.8% (27) were Read/Write while 22.6% (28) Aural.

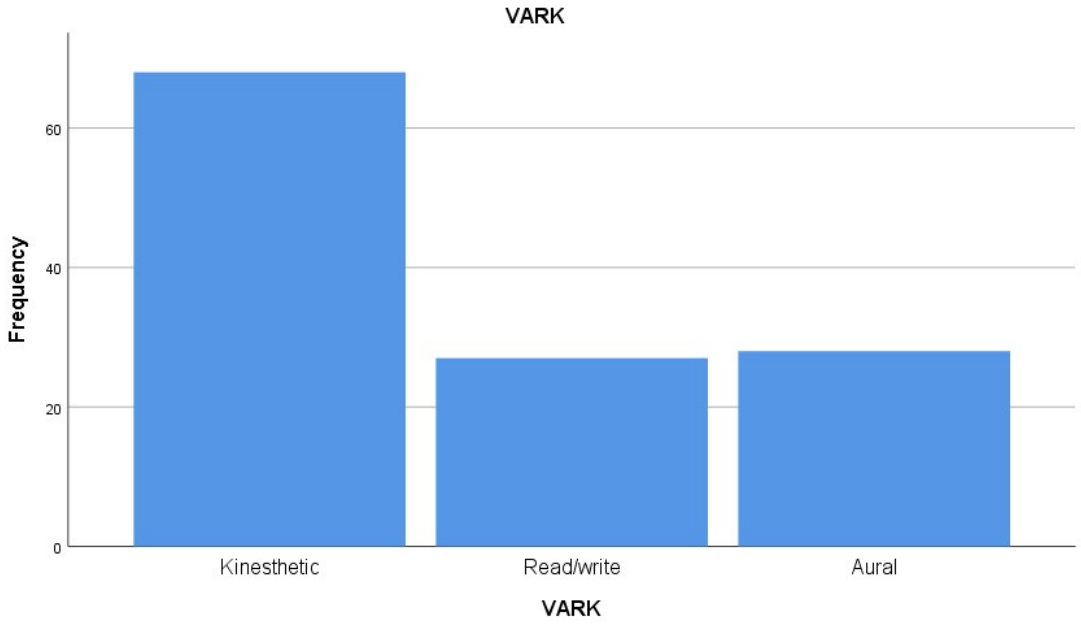
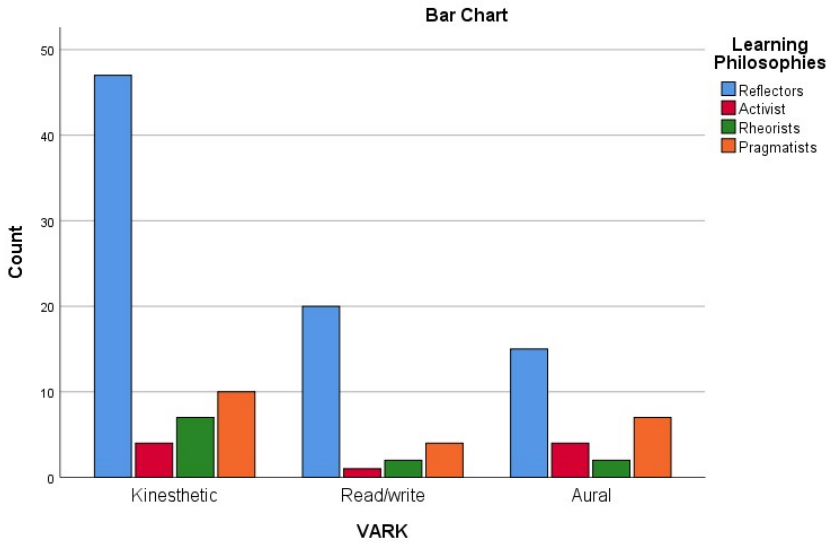


Figure 4; VARK outcome of the respondents

Crosstabulation of the learning styles was done between the philosophies and the VARK. The figure below shows the comparison. Reflectors stood out as the majority in all the learning styles, 47% of the respondents were Reflectors and Kinesthetic learners, 5% were Activists and Kinesthetic, 7% were Theorists and Kinesthetic while 10% were Pragmatists and Kinesthetic. On read/Write 20% were Reflectors, 2% Activists, 4% Theorists and 5% Pragmatists. On Aural 25% of the respondents were Reflectors, 5% were Activists, 3% were Theorists while 7% were Pragmatists.



The correlation was computed on the year of study and the learning philosophies, there was a significant association between the year of study and the learning philosophies (χ^2=6.56, p<0.0001 df=6). Similarly, there was a significant association between the gender of the participants and the learning styles (χ^2=3.56, p<0.001 df=6).

V. DISCUSSIONS

Using the VARK questionnaire to distinguishfavored learning styles of scholars is a key method which can be used to increase the quality of teaching and learning process.Self-awareness of distinctions and own learning styles lead each learner to individually choose appropriate study

techniques(Peyman, Sadeghifar, Khajavikhan, Yasemi, & Rasool, 2014). The response rate was at 52.67% which was 124 of 150 expected. Most of the respondents were male 58.06% while the female 39.52. While there are no studies focusing on Physiotherapists students alone, learners from various other professions and at different levels support the presence of these learning styles across cultures and educational standards(Shukr, Zainab, & Rana, 2013). Our results reported that most of the students preferred Reflection as a mode of learning philosophy66.1%, 16.9% were Pragmatists, while 8.9% and 7.3% were Theorists and Activists Respectively(Howles, n.d.).Most 73.9% First years were Reflectors 10.9% were Pragmatists while 8.4% and 6.5% were Activists and Rhetorics respectively. Second years were majorly 65.7% Reflectors, 20.0% Pragmatist, 8.6% and 5.7% were Activists and Theorists Respectively. The third years 59.5% Reflectors, 21.4% Pragmatists, 14.3 Theorist, and 4.8% activists, However, comparing this data with other studies, elsewhere, shows that the most common learning style amongst professional learners is reflector and pragmatist (Barton, 2012). There was a significant association between the year of study and the learning philosophy (χ^2= 4.987, df=6 P=0.002).

The VARK scale which is an instructional preference theory, originally developed by Fleming in 1987, which considers exclusively the instructional preference of individuals using the four categories of visual, aural, read/write, and kinesthetic(Brown, 2008). Majority of the respondents 54.8% were Kinesthetic 21.8% were Read/Write while 22.6% Aural. A comparison of the VARK and Learning Philosophies. 47% of the respondents were Reflectors and Kinesthetic learners, 5% were Activists and Kinesthetic, 7% were Theorists and Kinesthetic while 10% were Pragmatists and Kinesthetic. On read/Write 20% were Reflectors, 2% Activists, 4% Theorists and 5% Pragmatists(Penger, 2009). On Aural 25% of the respondents were Reflectors, 5% were Activists, 3% were Theorists while 7% were Pragmatists(Lesmes-anel, Robinson, & Moody, 2001). There was a high significance correlation between year of study and learning philosophies (χ^2=6.56, p<0.0001 df=6) and gender and participants learning styles (χ^2=3.56, p<0.001 df=6). The correlation between the VARK and LSQ as methods of acquiring knowledge proved to be highly significant (χ^2=9.22, p<0.0001 df=2)

VI. RECOMMENDATIONS

It can be recommended that the learning preferences of physiotherapy students should be verified prior to the start of their academic tasks by using the VARK questionnaire and the categorization of learning into the philosophical classes.This will aim in finding the appropriate teaching methods that aim to achieve maximum delivery of physiotherapy content and enhance educational goals. According to results of present study, regardingdifferent types of learning styles, students need totry different methods to educate themselves and it is better for both lecturers and students to try different methods of Teaching and approaches. This begs to change the approach of teaching between the years of study of physiotherapy students.

VII. LIMITATION

This study had some potential limitations that may have affected the results. It was limited to a single medical training college with limited sample size. There was ahigh unlikeliness that the results of the statistical analysis were due to chance, but this did not necessarily imply that they were valid outside this medical college or that they could be generalized to other settings. Another limitation of this study, and use of the VARK and the learning Philosophy questionnaire as designed by the researcher, was that it did not account for confounding factors such as socioeconomic status, race, culture, etc. The relatively homogenous population which was surveyed in this study may have tended to have less variety in these factors (Slater, Lujan& DiCarlo, 2007).

VIII. CONCLUSIONS

The preferred learning styles of physiotherapy students in the present study were kinesthetic and reading/writing styles. Learning philosophies considered by the learners was Reflectors majorly. According to the results of this study, regarding different types of learning styles, students need different methods to educate themselves and it is better for both lecturers and students to try different methods of educating.

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