Learning style preferences of students 2017-2019 batch of diploma in pharmacy of National Institute of Health Sciences (NIHS) – Sri Lanka

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ABSTRACT

The term 'learning style' is defined as different and unique ways used by individuals as they prepare to learn and recall information. The VARK questionnaire is used to study learning styles. VARK model was introduced by Neil Fleming, which classifies the learning preferences based on the sensory pathways into four models. V- Visual, A- Aural, R- Read/Write, K-Kinaesthetic. Data were collected by using a questionnaire. VARK questionnaire is the standard one for analysing learning styles. A total of 92(74.19%) were multi-modal in their learning preference and only 32 students (25.81%) were uni-modal. The uni-modal preferences were K-12.90%, A- 4.84%, R-4.84%, V- 3.23%. The overall distribution of scores of all modalities of learning styles. The commonest learning preference was the multimodel category, of which the highest percentage was seen in the VARK - 43.55%. Other multimodal preferences were VAR-6.45%, VKA-3.22% ARK -7.25% VRK-1.61% RK – 1.61% VK – 2.42% AK-4.03%AR- 4.03% .The total individual scores in each category. This study has revealed a number of important facts. It's a more multi-modal percentage than in previous studies. When teaching pharmacy students, multiple methods should be used.

Keywords— VARK, Learning styles, Education, Learning, Preferences, Pattern

1. INTRODUCTION

Pharmacists through their education and training can consider a drug molecule, together with its formulation and delivery as a medicine. They have an in-depth knowledge of pharmacology and therapeutics, physicochemical properties of drugs and excipients, bio-pharmacy and pharmacokinetics, adverse drug reactions and drug interactions. It is this complex, varied and integrated expert knowledge that qualifies them, and them alone, to make professional judgments relating to medicines.[1]

According to the curriculum of Diploma in Pharmacy course is a broad range of discipline that includes Pharmaceutics, Pharmacognosy, and pharmaceutical chemistry, Pharmacy Law and Ethics, Pharmacy Management, Pharmacology. There are theory lectures, Practical sessions, industrial Visits, Hospital Base training within two years. The challenge of imparting a large amount of knowledge within a limited time period in a way it is retained, remembered and effectively interpreted by a student is considerable[2].

National Institute of Health Sciences (NIHS) is the premier public health training institute of the Ministry of Health, Sri Lanka. Training faculty is consist of training schools, WHO collaborating centre, department of educational science, Department of basic medical sciences. There are five training schools under training faculty. School of Pharmacy, School of MLT, School of Public Health Inspectors and School of Nursing[3].

VARK model was introduced by Neil Fleming, which classifies the learning preferences based on the sensory pathways into four models. V- Visual, A- Aural, R- Read/Write, K-Kinaesthetic. As the VARK interpretation, a visual (V) learner prefers the use of materials that he can look by his eyes, as like as charts, diagrams, illustrative images. An auditory (A) learner prefers lectures, discussions, recording and listening, oral discussions as the mean of learning. The read /write (R) preference is when the acquisition of new information is done through the printed word. A kinetic learner prefers to experience or participate in physical activity in order to learn[4].

The term 'learning style' is defined as different and unique ways used by individuals as they prepare to learn and recall information. Educational theory suggests that clinical experience and success at examinations bears a relationship to learning styles. School performance has been shown to correlate poorly with students' performance in the university[5].

Learning styles preferences should be analysed because there is variability of students and selection criteria and amount of students. So the survey is very important that identify the Learning styles among Pharmacy students of National Institute of Health Sciences (NIHS). This study evaluated the learning styles of students and it will help to improve the teaching-learning performance of the students and lecturers. There are not any published data yet on learning style approaches among Diploma in pharmacy students of NIHS.

2. METHODS

2.1 Sample
Learning style preferences of Pharmacy students of National Institute of Health Sciences (NIHS) –Sri Lanka, evaluated using the VARK questionnaire. This is a descriptive cross-sectional type study in 2018. The target population was the students of 2017-2019 batch of Diploma in Pharmacy of National Institute of Health Sciences (NIHS)-Sri Lanka. All students were invited to participate in the study and 124, (n=124) students participated in the study. The final sample consisted of 87 females (70.16%) and 37 males (29.84%).

2.2 Data Collection
Data were collected by using a questionnaire which was composed of two parts. The first part included questions on age, gender, level of education, language, income. VARK questionnaire is the standard one for analysing learning styles. Neil Fleming and Charles Bonwell are authors of the VARK questionnaire. VARK 7.8 is used as a worldwide tool for educational science researches. Printed English questionnaire was submitted. Questions did not change or modify and original English standard VARK 7.8 questionnaire was submitted. The students participated voluntarily. The VARK questionnaire, as a learning preference assessment tool, consists of 16 multiple choice questions, each having four choices. All choices correspond to the four sensory modalities which are measured by VARK (visual, aural/auditory, read/write, and kinesthetic). The students can select one or more choices, based on the sensory modalities which are preferred by them, to take in new information. The participants were visited by the researchers in their class, who handed to them the questionnaires, and then these questionnaires were collected at the same time. An awareness program was done at the start regarding the study.

2.3 Data Analysis
Data were reported as percentages of students in each category of learning style preference. The number of students who preferred each mode of learning was divided by the total number of responses to determine the percentage.

2.4 Ethics
The study protocol was approved by the Ethics Revive Committee of NIHS, and informed consent was obtained from all participants. The collected data is published only through research thesis and it would not publish another way. Collected data were stored in the office of pharmacy school, under lock. The Written approval to use VARK copyright materials (specifically, paper copies of the VARK questionnaire) in research was taken from VARK Learn Limited,7 Farnswood Place, Redwood, Christchurch 8052, New Zealand. (www.vark-learn.com).

3. RESULTS

Demographic data: A total of 124/140 students consented and completed the questionnaire. The final sample consisted of 87 females (70.16%) and 37 males (29.84%).

Learning preferences: A total of 92(74.19%) were multi-modal in their learning preference and only 32 students (25.81%) were uni-modal (Figure 1 and Table 1).

Table 1: Shows the preference for unimodal and multimodal learning. Ninety-two (74.19%) were multimodal, and only 32 students (25.81) were unimodal

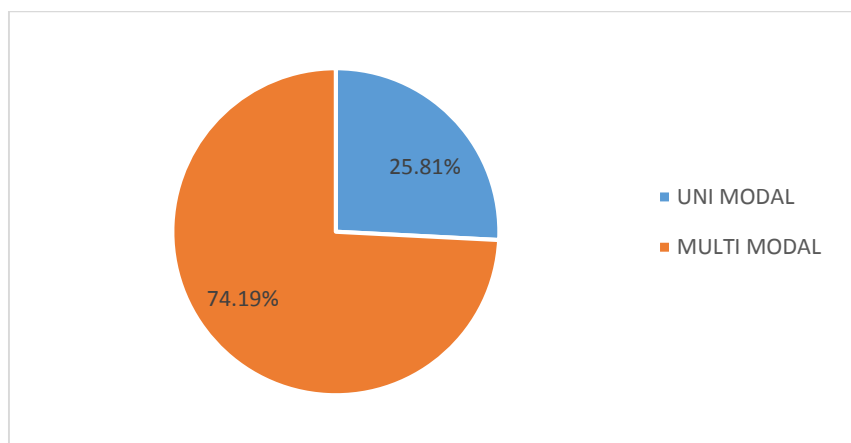| Modal	Numbers	Percentage %
UNI-MODAL	32	25.81
MULTI-MODAL	92	74.19

Fig. 1: Shows the preference for uni-modal and multimodal learning. Ninety-two (74.19%) were multimodal, and only 32 students (25.81) were uni-modal

The uni-modal preferences were K-12.90%, A- 4.84%, R-4.84%, V- 3.23%. (Figure 2 and table 2) shows the overall distribution of scores of all modalities of learning styles.

Table 2: Shows the different individual unimodal preferences; K-12.90%, A- 4.84%, R-4.84%, V- 3.23%

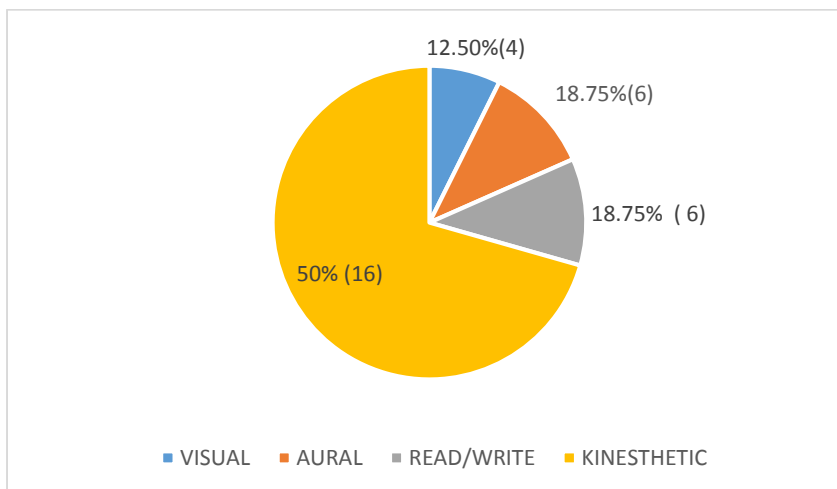| Modal	Number	Percentage of total unimodal	Percentage of total participants
Visual	4	12.50	3.23
Aural	6	18.75	4.84
Read/Write	6	18.75	4.84
Kinesthetic	16	50.00	12.90

Fig. 2: Shows the different individual unimodal preferences; K-12.90%, A- 4.84%, R-4.84%, V- 3.23%

The commonest learning preference was the multimodel category, of which the highest percentage was seen in the VARK - 43.55%. Other multimodal preferences were VAR-6.45%, VKA-3.22% ARK -7.25% VRK-1.61% RK – 1.61% VK – 2.42% AK-4.03%AR-4.03%. (Figure 3 and Table 3) shows the total individual scores in each category.

Table 3: Shows the overall distribution of scores of all multimodalities of learning.

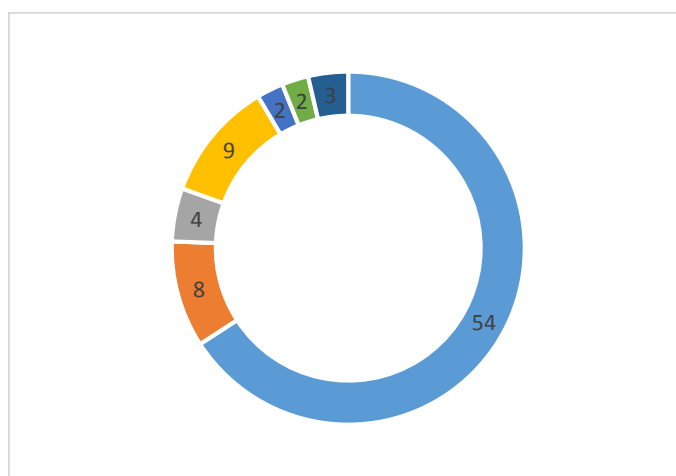| Modal	Number	Percentage of total multimodal	Percentage of total participants
VARK	54	58.69	43.55
VAR	8	8.69	6.45
VKA	4	4.35	3.22
ARK	9	9.78	7.25
VRK	2	2.17	1.61
RK	2	2.17	1.61
VK	3	2.36	2.42
AK	5	5.43	4.03
AR	5	5.43	4.03
Total	92	100	74.19

Fig. 3: Shows the overall distribution of scores of all multimodalities of learning

(Figure 4 and table 4) shows the different modalities grouped under unimodal, bimodal, trimodal, and quadrimodal categories. There were Unimodal 32 (25.80%). Bimodal -15 (12.09%), Trimodal -23 (18.54%) Quadrimodal 54 (43.55%).

Table 4: Shows the percentage of unimodal, bimodal, trimodal, and quadrimodal categories; the commonest being the bimodal

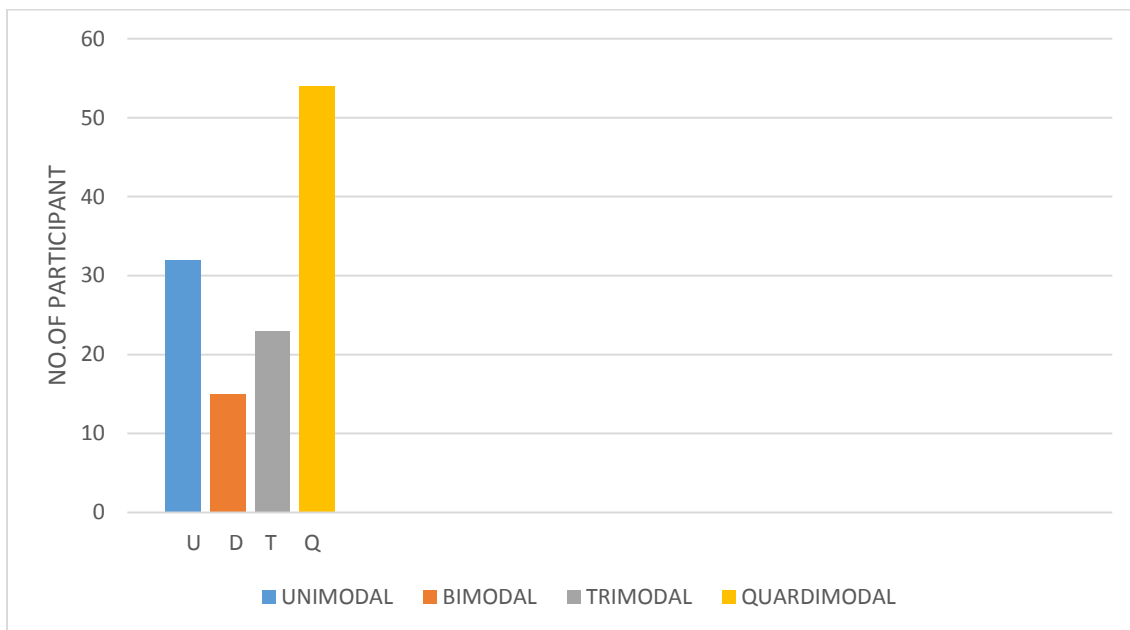| Modal	Numbers	Percentage %
UNI-MODAL	32	25.81
BI-MODAL	15	12.09
TRI-MODAL	23	18.54
QUADR-MODAL	54	43.55

Fig. 4: Shows the percentage of unimodal, bimodal, trimodal, and quadrimodal categories; the commonest being the bimodal

Table 5: Shows the overall distribution of scores of all modalities of learning.

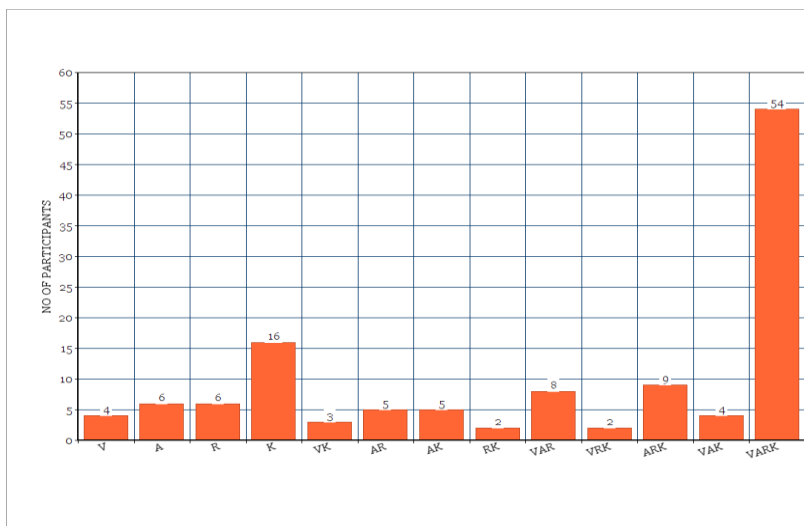| Modal	Number	Percentage of total participants
V	4	3.23
A	6	4.84
R	6	4.84
K	16	12.90
VK	3	2.42
AR	5	4.03
AK	5	4.03
RK	2	1.61
VAR	8	6.45
VRK	2	1.61
ARK	9	7.25
VAK	4	3.22
VARK	54	43.55

Fig. 5: Shows the overall distribution of scores of all modalities of learning

4. DISCUSSION

- Many studies were conducted to describe learning styles. Some studies are focused to assess the diversity of learning styles amongst medical students and allied health students of medical sciences. There are many studies regarding learning styles according to the VARK questionnaire. There is high Percentage of multimodal learning preference of in many studies. The percentage spectrum is 50% to 70%. But most studies had been discovered around 60% of multimodal learning preferences.
- In our present study, 74.19% of students were multimodal in their learning style.
- Alkhasawneh et al. (2007) say Still most of the students represented a multimodal learning preference. In the pre-test, 54% of students had a multimodal preference[6].
- Karim, (2010). Says overall, 41.6% of the samples preferred to use a single learning style (Uni-modal). 58.4% of students had a multimodal learning preferences[7].
- But there was found high percentages of more than 60% in some studies. Urval et al (2014) state the majority of students in our study had multiple learning preferences is 68.7% [8].
- Prithishkumar (2014) State 86.8% were multimodal in their learning preference, and 13.8% were unimodal[9].
- Samarakoon, Frenando, Rodrigo (2013) says, among the final year of Medical students, the majority (67.5%) had multimodal learning styles, and among postgraduates, the majority were unimodal (52.9%) learners[2].
- Paiboonsithiwong (2011) says Quad-modal was found to be the most preferred VARK mode (43.6%). Uni-modal, bimodal, and tri-modal modes were preferred by 35%, 12.9%, and 18.6% of the participants, respectively[10].
- Urval et al (2014) say 31.3% of students showed a unimodal learning style preference[8].
- Some students have only one learning style and there are many kinds of literature that explains most using pattern. It shows high variability in varies research. In our present study, 25.81% of students were unimodal in their learning style. The present study says among the strong unimodal learners, visual, aural, read/write, and kinesthetic preferences were reported by 3.23%, 4.84%, 4.84%, and 12.90% of participants, respectively.
- Paiboonsithiwong et al (2016) say among the strong unimodal learners, visual, aural, read/write, and kinesthetic preferences were reported by 4.3%, 7.1%, 11.4%, and 12.1% of participants, respectively[11].
- Panambur et al (2014) say only 13.8% of students were unimodal. The highest unimodal preference was K-7.7%, A-3.3%, and R-2.2%. Surprisingly, there were no visual unimodal learners[12].
- Urval et al (2014) say 31.3% of students showed a unimodal learning style preference. Among the unimodal group, 45.5% of the students were auditory learners, 33.1% were kinesthetic learners, 16.2% of the students were Read/Write learners and 5.4% were Visual learning style[8].
- Payman et al (2010) say overall, 41.6% of the samples preferred to use a single learning style (Uni-modal). Of these, 17.7% preferred the aural style, 17% preferred Reading and Writing, 6.4% preferred kinesthetic style and 0.7% preferred Visual styles[7].
- VARK questionnaire is very important to understand multimodal analysis. Bimodal are combinations of two styles. There are six combinations of bimodal; VA, VR, VK, AR, AK, RK. Tri-models are a combination of three styles; VAR, VAK, VRK, ARK. Quad modal is consist of all four styles of VARK. In our present study, 74.19% of students were multimodal in their learning style. The commonest learning preference was the multimodel category, of which the highest percentage was seen in the VARK - 43.55%. Other multimodal preferences were VAR-6.45%, VKA-3.22% ARK -7.25% VRK-1.61% RK – 1.61% VK – 2.42% AK-4.03%AR- 4.03%. (Figure 3) and (Table 3) shows the total individual scores in each category.
- According to this study (Figure 4) and (Table 4) shows the different modalities grouped under unimodal, bimodal, trimodal, and quadrimodal categories. There were Unimodal 32 (25.80%), Bimodal -15 (12.09%), Trimodal -23 (18.54%) Quadrimodal 54 (43.55%).
- Karim, H. (2010) says preferred more than one style (multimodal), 17% chose two modes (bimodal), 13.5% chose three modes (tri-modal), and 27.6% chose four modes (quad-modal). There was a significant difference between educational levels and majors on one hand and choice of quad modal of VARK styles on the other hand[7].
- In Sri Lanka Samarakoon, Fernando, Rodrigo (2013) says among the uni-modal learners (30.1%), the clear majority were auditory learners (50%). Among multimodal learners (69.9%), 30.1% were bimodal learners with auditory-reading (50%) and auditory-kinesthetic (31.8%) type predominating[2].
- Urval et al (2014) say the majority of students (68.7%) preferred more than one sensory modality for learning. The most common VARK mode distribution among students was quad modal (36.6%) followed by unimodal (31.3%), bimodal (18.1%), and tri-modal (14%). Among the quad modal group, the commonest VARK style based on the scores obtained for individual sensory modalities was kinesthetic-aural-reading/writing-visual learning (12.5%) [8].
- Asiabar et al (2015) say 20.1% students preferred bi-modal, 15.1% students preferred tri-modal and 16.2% students preferred quad-modal.
- On a Sri Lankan study Samarakoon, Fernando, Rodrigo (2013   ) says among multimodal learners, 30.1% were bimodal learners with auditory-reading (50%) and auditory-kinesthetic (31.8%) types predominating.
- This study has revealed a number of important facts. It's a more multi-modal percentage than in previous studies. When teaching pharmacy students, multiple methods should be used.

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