

## Understanding your student: Using the VARK model

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### ABSTRACT

**Background:** Students have different preferences in the assimilation and processing of information. The VARK learning style model introduced by Fleming includes a questionnaire that identifies a person's sensory modality preference in learning. This model classifies students into four different learning modes; visual (V), aural (A), read/write (R), and kinesthetic (K). **Materials and Methods:** The 16-point multiple choice VARK questionnaire version 7.1 was distributed to first year undergraduate medical students after obtaining permission for use. **Results:** Seventy-nine students (86.8%) were multimodal in their learning preference, and 12 students (13.8%) were unimodal. The highest unimodal preference was K-7.7%. Surprisingly, there were no visual unimodal learners. The commonest learning preference was the bimodal category, of which the highest percentage was seen in the AK (33%) and AR (16.5%) category. The most common trimodal preference was ARK (8.9%). The total individual scores in each category were V-371, A-588, R/W-432, and K-581; auditory and kinesthetic being the highest preference. Visual mode had the lowest overall score. There was no significant difference in preference between the sexes. **Conclusion:** Students possess a wide diversity in learning preferences. This necessitates teachers to effectively deliver according to the needs of the student. Multiple modalities of information presentation are necessary to keep the attention and motivation of our students requiring a shift from the traditional large-group teacher-centric lecture method to an interactive, student-centric multimodal approach.

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**KEY WORDS:** Learning preferences, learning styles, VARK

### Introduction

The background of the student population in any university is very diverse. This includes varied socio-economic background, wide ranging ages of students, varied cultural background, prior educational experiences, levels of competency and preparedness, and preferred learning strategies.<sup>[1]</sup> Effective teaching in such a set up can be difficult and challenging. Teaching is a process of knowledge presentation while learning is often multifactorial and depends on the mindset of each student.<sup>[2]</sup> The multiple factors that play an effective role in the learning process include:<sup>[3]</sup>

- Student's interest in the topic being taught,
  - Student's motivation to the subject: One of the roles of a teacher is to establish and maintain motivation in a student.
- Two types of motivation have been described, namely

intrinsic and extrinsic motivation. Intrinsic motivation is a stimulation born from within oneself without inducement or coercion from others, while extrinsic motivation is a stimulation often influenced externally by others.

- Individual principle: Every student has different levels of competency and mastery, each of them having their own diverse ways of understanding and remembering the subject.<sup>[2]</sup>
- Active student participation and involvement in the teaching-learning process is crucial to effective learning.
- Affective domain of the student: Learning also depends on one's personality and includes factors such as curiosity, prior awareness of the subject, emotional status of the individual, boredom, motivation, concern, and an incentive to study, if any,<sup>[2]</sup> and
- Preferred learning styles: Students have different learning styles and these affect how they learn. An 'Individual learning style' refers to a 'style or learning preference or preferred strategy' used by the student in the process of learning and assimilation of information.

Learning style inventories are information-processing models that aim to identify a student's preferred intellectual approach in assimilating and processing information.<sup>[4]</sup> These include models described by various educationists such as Dunn and

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Dunn, Felder-Silverman, Salmes, Honey and Murnford, Kolb and VARK.<sup>[3]</sup> The VARK learning style model was introduced by Neil Fleming in 2006.<sup>[5]</sup> VARK is an acronym, which stands for visual, aural, read/write, and kinesthetic preference modalities. This learning style classifies students into four different learning modes, each mode based on different preferred senses used in information gathering namely visual (V), aural (A), read/write (R), and kinesthetic (K). The VARK© inventory includes a questionnaire that identifies a person's sensory modality preference. The VARK model has been validated by Dr. Walter Leite from the Research and Evaluation Methodology program at the University of Florida.<sup>[6]</sup> Visual learners (V) learn by looking at image intense figures, graphics, and videos. They like to use symbolic tools such as arrows, flowcharts, graphs, models, and hierarchies, which represent printed information. They teach concepts to others by drawing an image or picture.<sup>[7]</sup> Aural learners (A) give particular attention to words delivered by teachers.<sup>[2]</sup> They prefer to listen than taking down detailed lecture notes; they like discussions and seminars and like listening to mp3 recordings of lecturers.<sup>[3]</sup> Aural learners can remember information through loud reading or even low volume mouthing when reading.<sup>[8]</sup> Read/Write learners (R) read printed texts to gain information. They like lecture notes, handouts, and text books. Besides, they are keen note-takers.<sup>[2]</sup> Kinesthetic learners (K) prefer hands on experience, practical application, use of models, and real life experience. They like experiential learning and prefer to apply touch, movement, and interaction to their learning environment.<sup>[2]</sup> They dislike merely listening even in an image intense environment; typically kinesthetic students are passive in the classroom setting. The present study was carried out with the objectives of determining the preferred learning style of first year undergraduate medical students using the VARK questionnaire and to compare learning preferences between sexes.

### Materials and Methods

**Ethics:** The study protocol was approved by the Institutional Review Board and written, informed consent was obtained from all participants. Complete anonymity was maintained during data collection; only the sex of the student had to be indicated

**Instrument:** The 16 multiple choice VARK questionnaire version 7.1 [Copyright (2006) held by Neil D. Fleming, Christchurch, New Zealand and Charles C. Bonwell, Green Mountain Falls, Colorado 80819, USA] was used after requisite permissions were obtained from the developer. It was downloaded from the VARK home page <http://www.vark-learn.com/english/page.asp?p=questionnaire>.

**Study procedure:** During regular working hours, the first year undergraduate medical students were briefed about the study. The questionnaire was then distributed in the form of hard copies to those who consented.

**Variables and their evaluation:** Students were distributed into one of the following categories: Unimodal-Having only of the V, A, R, or K preferences; Multimodal-Having more than one preference. Multimodal was further classified into

Bimodal-Having two preferences; Trimodal-Having three preferences; and Quadrimodal-having 4 preferences. Scores were given accordingly.

**Statistical analysis:** The data was entered into a Microsoft excel sheet and the score statistically analyzed to determine the percentage of students in each category. Difference between the sexes was analyzed using the Fishers or Chi-square test. All tests were done at 5% significance.

### Results

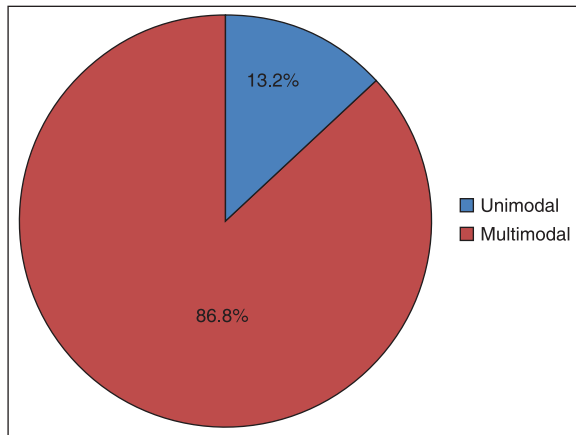
**Demographic data:** A total of 91/100 students consented and completed the questionnaire.

**Learning preferences:** A total of 79 (86.8%) were multimodal in their learning preference and only 12 students (13.8%) were unimodal [Figure 1]. The highest unimodal preference was K-7.7%, A-3.3%, and R-2.2%. Surprisingly, there were no visual unimodal learners [Figure 2]. Figure 3 shows the overall distribution of scores of all modalities of learning styles. The commonest learning preference was the bimodal category, of which the highest percentage was seen in the AK (33%) and AR (16.5%) category. The most common trimodal preference was ARK (8.9%). Figure 4 shows the total individual scores in each category. These are V-371, A-588, R/W-432, and K-581. Auditory and Kinesthetic was the highest preference. Surprisingly, Visual mode had the lowest overall score. Figure 5 shows the different modalities grouped under unimodal, bimodal, trimodal, and quadrimodal categories. There was no quadrimodal group observed. The commonest learning preference was the bimodal category, among which the commonest being AK, AR, and VK category. There was no difference between the sexes ( $P > 0.05$ ) [Figure 6].

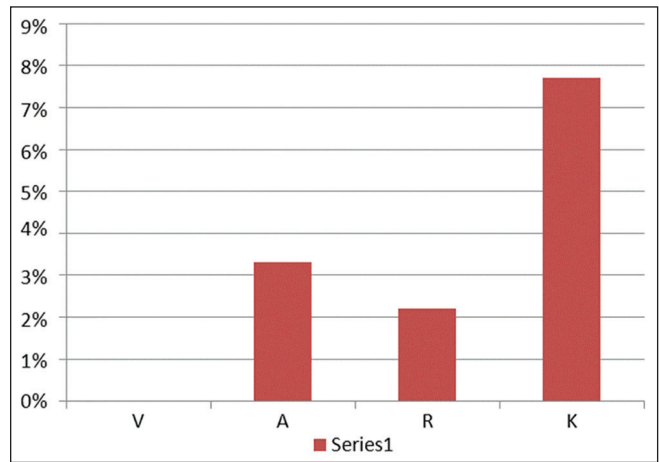
### Discussion

Neil Fleming in his landmark article 'I'm different; not dumb: Modes of presentation (V.A.R.K.) in the tertiary classroom' says that people learn in different ways using variety of strategies to convert the educational message into their long term memories. There is no single best way to teach, but teachers can diversify their teaching styles to cater to the learning styles of each distinctive student.<sup>[9,10]</sup> Awareness of learning styles will help educators identify and solve learning problems among students.<sup>[11]</sup>

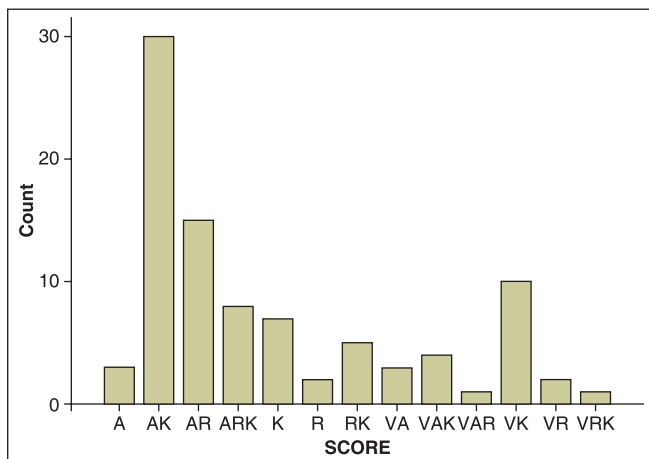
In our present study, 86.8% of students were multimodal in their learning style. A similar study done in the medical University of Colombo by Samarakoon *et al.* showed that the majority (69.9%) of first year medical students had multimodal learning styles, unimodal being only in 30.1%; among the unimodal learners, the clear majority were auditory learners (50%); among the multimodal learners, 30.1% were bimodal learners with AR(50%) and AK (31.8%) types predominating.<sup>[12]</sup> As observed by Samarakoon *et al.*, the similarities observed in our students may be attributable to the traditional didactic lecture method in the pre-university education system, where pre-university education is often supplemented with coaching centers and



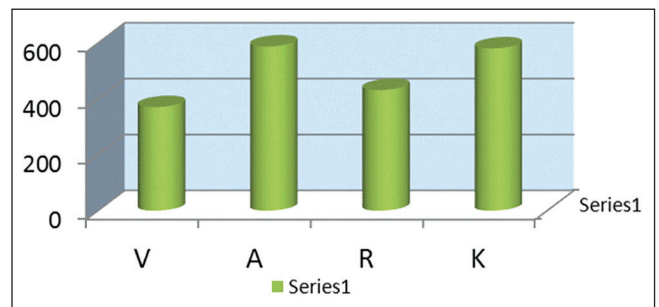
**Figure 1:** Shows the preference for unimodal and multimodal learning. Seventy-nine students (86.8%) were multimodal, and only 12 students (13.8%) were unimodal



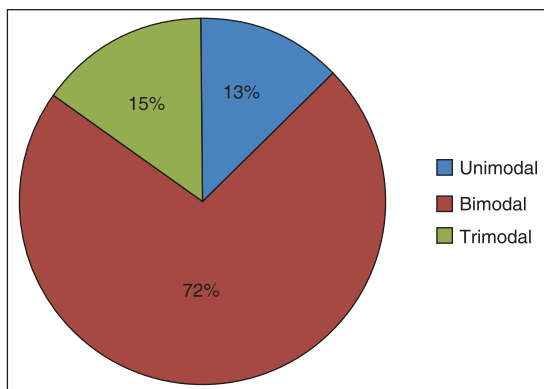
**Figure 2:** Shows the different individual unimodal preferences; K-7.7%, A-3.3%, and R-2.2%



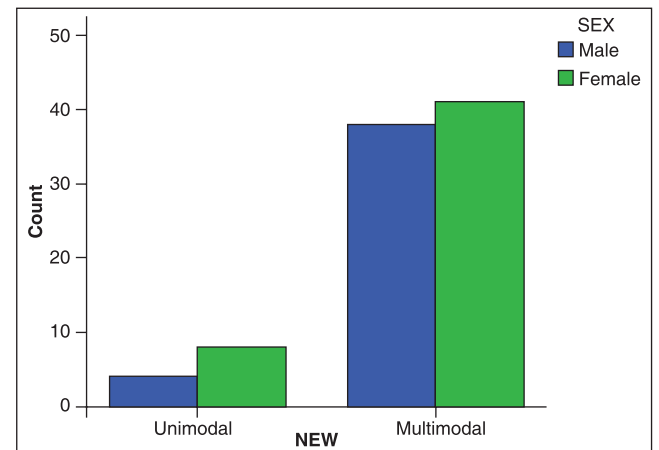
**Figure 3:** Shows the overall distribution of scores of all modalities of learning. The commonest learning preference is AK (33%)



**Figure 4:** Shows the total individual scores in each category; V-371, A-588, R/W-432, and K-581



**Figure 5:** Shows the percentage of unimodal, bimodal, trimodal, and quadrimodal categories; the commonest being the bimodal



**Figure 6:** Shows no significant difference in preference between the sexes

private tuition classes that are often large lecture-based modules with a strong emphasis on the read/write and aural mode of information presentation.

A VARK study by Lujan *et al.* on medical students in Wayne State University School of Medicine, Michigan showed that

majority (63.8%) had multimodal learning preference with only 36.1% having a unimodal preference.<sup>[13]</sup> Among those with unimodal preferences, 5.4% preferred visual, 4.8% preferred auditory, 7.8% preferred printed words, and 18.1% preferred kinesthetic mode; auditory learners were only a small minority (4.8%). Of the 63.8% of students who preferred multiple modes of information presentation, 24.5% were bimodal, 32.1% were trimodal, and the majority preferred all four modes (quadrimodal, 43.4%). Another study done on

medical students by the Department of Medical Education of Erciyes, Turkey showed multimodal preference in 63.9% and unimodal in 36.1% of students.<sup>[11]</sup> Among the unimodal, preferences were V-3.2%, A-7.7%, R-1.9%, and K-23.3%; only 1.9% being auditory learners. Preferred multiple modes were: Bimodal (30.3%), trimodal (20.7%), and quadrimodal (12.9%). Both these above studies demonstrate a clear predominance of kinesthetic learners (18.1% and 23.3% respectively) among unimodal learners. A similar study among first year nursing students in Australia demonstrated a predominance of kinesthetic style of learning.<sup>[14]</sup> The fundamental difference between learning preferences in our study and other studies in USA, Turkey, and Australia may be the pattern of pre-university education ingrained in our system with a strong emphasis on the A and R/W mode with little emphasis on the visual (V) and kinesthetic (K) mode.

A study done among clinical students in a Malaysian Medical College comprising of a mixed population of Indians, Chinese, and Malay showed that 44% were mono-modal and 56% were multimodal.<sup>[15]</sup> The latter comprised of all three subgroups, i.e., quadrimodal, trimodal, and bimodal. In the mono-modal category, all the four preferences were represented with the highest preference for kinesthetic. A study in another Malaysian medical college indicated that 48.6% of undergraduate medical students were multimodal; kinesthetic preference being the highest among the mono-modal group (35%).<sup>[16]</sup> In contrast, pre-clinical medical students in Saudi Arabia showed multimodal learning preference in 72.6% with a strong aural preference in the mono-modal category.<sup>[17]</sup> Interestingly, a study among musical students of Thailand showed 66.1% were multimodal, with aural preference being the overall highest (62.7%).<sup>[18]</sup>

Samarakoon *et al.* on studying the learning preferences of postgraduate medical doctors found a dramatic shift where 'Kinesthetic (K)' learning predominates among postgraduates. They attribute this to the increased exposure to 'clinical teaching' where the focus changes from didactic lecture presentations to patient-oriented bedside clinics where one hones his or her practical kinesthetic clinical examination skills. There may also be decreased amount of didactic lecture hours and increased amount of patient-oriented teaching resulting in development of self-learned skills.<sup>[12]</sup>

All of the above studies show that multiple modalities of information presentation are necessary to effectively cater to student learning preferences. A learning preference is defined as the most 'effective and efficient modality,' in which a learner has a natural preference to 'perceive, process, store, and recall new information.'<sup>[19]</sup> Awareness of these learning preferences amongst students necessitates a shift from the traditional large-group teacher-centric lecture method to an interactive, small-group student-centric approach incorporating various teaching-learning strategies. Students at our medical school have benefitted tremendously with the use of the e-learning platform, early clinical exposure to patients in wards and surgical theaters during the first year itself, integrated learning program of basic sciences, and increased availability of models and plastinates. Other teaching strategies that could be

meaningfully employed include mp3 recordings of lectures, audio recordings of power-point presentations, increased frequency of discussions and seminars, and issuing of lecture handouts. Since students possess a wide diversity in learning styles, teachers should combine different educational strategies to meet the varied learning preferences of students.

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