

Assessment of Learning Style Preferences of First Year Medical Students at Mahavir Institute of Medical Sciences

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Abstract

Today's classrooms are filled with students of diverse backgrounds cultures and languages. Teaching faculty is expected to use different teaching styles in order to reach each students learning style in the class room. It is every Childs right to ask "If I do not learn the way you teach then teach the way I learn".

The educators' awareness of the various learning styles of the students and their efforts towards matching the teaching and learning styles may help in creating an effective learning environment for all the students.

The aim of the study was to determine the sensory modality learning preferences of first year medical students studying in Mahavir institute of Medical Sciences, Vikarabad , Telangana State, India, using the VARK (Visual, Aural, Read/Write, Kinesthetic) questionnaire version 7.8, and to compare the learning preferences of male and female first year medical students.

Methods: A cross sectional study of first year medical students with 68 male and 79 females was performed. The pre validated VARK questionnaire Version7.8 was used to categorize the preferred mode of learning styles of students. Descriptive statistics were used to identify the learning styles of the students.

Results: 98.00% was the response rate. Results revealed that the majority 118 of first year medical students (80.27%) preferred to use a single (unimodal)

sensory modality while learning, it was found that 47% had a preference for the Kinesthetic (K) modality and 30% had a preference for the visual (V) modality followed by Auditory (A) 14% and Read/write (R) 9%. and 29 students (19.73%) preferred multiple learning styles (multi modal). Among them 26 were bi modal and 3 were tri modal learners. The most preferred combination of learning style among bimodal students were **Visual - Kinesthetic (VK)** 10 students and Trimodal **were equal (VAR, VRK, ARK)** 1 student each.

Gender-wise analysis using Z- test for two proportions, showed no statistical significant difference in unimodal however statistical significant was observed for bimodal for sensory modality learning preferences.

Conclusion: We conclude this study showed most students of this medical college are able to learn effectively as unimodal (kinesthetic) however the faculty should provide a blend of all other learning modalities to cater to the needs of other students.

Keywords: First year medical students, learning style, learning preference, the VARK. Learning style, Instructional method, and Teaching-learning strategies.

INTRODUCTION

The educational world is acknowledging the importance of understanding the students different learning style preferences and their role in attaining academic success [1, 2]. Neuroscience research has also revealed that significant increases in learning can be accomplished when the learning environments cater to their predominant learning styles [3]. This is known as the “meshing hypothesis” [4].

The term, ‘learning style’ describes an individual’s preferred method of gathering, processing, interpreting, organizing and analyzing information.

The Fleming VARK Inventory Tool was primarily developed by Fleming [5] Lincoln University of New Zealand in 1998. . This provides the learners with a profile of their learning styles, based on the sensory modalities which are involved in taking in information. VARK is an acronym for the Visual (V), Auditory (A), Read/Write (R) and the Kinesthetic (K) sensory modalities. The visual learners process the information best if they can see it. The auditory learners like to hear information. The read-write learners prefer to see the written words. The kinesthetic learners like to acquire information through experience and practice.

Anatomy, Biochemistry and Physiology are important component of the medical syllabus during first year, the population of students who take these courses are very

diverse and represents many different age, cultural, language and educational backgrounds. This diversity presents academics with increasing challenges to motivate and promote students understanding.

The knowledge on the learning styles has implications for both the medical teachers and the students. The students identify their learning preferences, which can help them in using the appropriate learning strategies and as a result, they are more likely to become lifelong self directed learners and to maximize their true potential. The teachers become aware of the students' learning styles and they can therefore incorporate teaching-learning strategies which are tailored to meet the students' learning preferences. This would not only create an efficient learning environment, but it would also motivate the students to achieve academic success.

It is also recommended that the learning preferences of medical students should be analyzed prior to the start of their academic tasks by using VARK questionnaire, to find appropriate teaching methods and to achieve educational goals.

Aim: The aim of the study was to determine the sensory modality learning preferences of first year medical students studying in Mahavir institute of Medical Sciences, Vikarabad, Telangana State, India, using the VARK (Visual, Aural, Read/Write, Kinesthetic) questionnaire [5] and to compare the learning preferences of male and female first year medical students.

MATERIALS AND METHODS

This cross-sectional study involving first year medical students of the 2016-17 batch, was done at Mahavir institute of Medical Sciences, Vikarabad , Telangana State, India, after obtaining clearance from the Institutional Ethical Committee.

A convenient sampling technique was adopted, the purpose of doing the study was explained and 148 of the 150 first year medical students of the 2016-17 batch, consisting of 62 males and 88 females, gave their written informed consent and participated in the study.

The researchers, approached the participants in their classes during their free periods, who handed them the prevalidated VARK standard questionnaire version 7.8 developed by Fleming, which could determine learning styles of students.

The learning preference assessment tool, composed 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 were instructed to select one or more choices, based on the sensory modalities which are preferred by them, and to leave out a question if they felt that it did not apply to them.

Scoring was done according to the instructions of the VARK questionnaire and the learning preferences of the first year medical students were obtained. .

Statistical Analysis

The response from the students was entered in a Microsoft Excel sheet. The distributions of the VARK preferences were calculated in accordance with the guidelines given in the VARK scoring chart. Descriptive statistics were used for each VARK component.

The data was analyzed using the Statistical Package for the Social Sciences (SPSS) software, version 24 and the confidence level of 95% and Margin of error 5% power of study will be 80%.Response distribution 50%. Acceptable level of significance was set at P value < 0.05.

Percentages of students in each category of learning style preference along with Z-test for two proportions was used to analyze the difference in learning preferences of male and female medical students.

Inclusion criteria: All first year medical students from the academic year 2016-17 and who are willing to participate in the study.

Exclusion criteria: Students suffering from acute/chronic illness/ taking medication will be excluded from the present study

RESULTS:

Table -1 showing the demographics of the respondents with their sensory modality learning preferences.

Total Number of students	150
Number of students participated	147
Response Rate	98.00%
Total Number of Male students	68 (46.26%)
Total Number of Female students	79 (53.74%)
Unimodal	118 (80.27%)
Multimodal	29 (19.73%)

Results revealed that the majority 118 of first year medical students (80.27%) preferred to use a single sensory modality while learning i.e., they had unimodal learning preferences (**TABLE-1**).

Table 2: Shows the mean and Standard deviation (SD) of V, A, R, K scores individually for both male and female respondents.

Sensory modality learning preference		Number of students	Mean \pm SD
Unimodal	Visual (V)	35	8.74 \pm 1.55
	Auditory (A)	17	7.76 \pm 1.35
	Read/write (R)	11	9.45 \pm 1.82
	Kinesthetic (K)	55	8.81 \pm 1.67

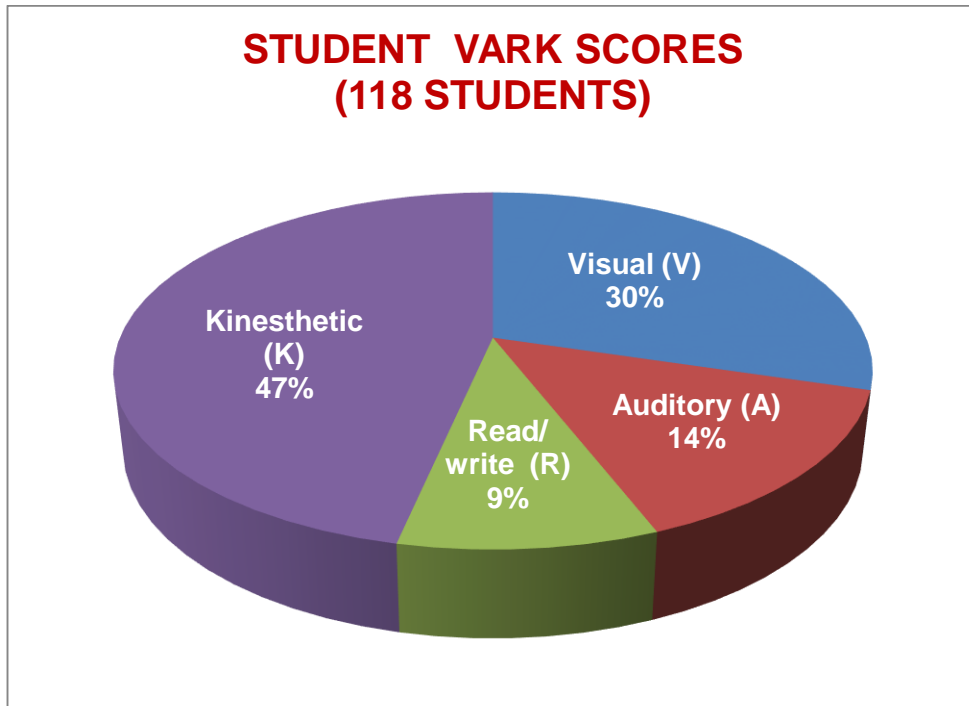


Fig 1: Shows the Percentage of Unimodal Sensory modality learning preferences of first year medical students for both male and female respondents.

Among multi modal learners, bimodal learners were 25 and tri modal were 3 learners. The most preferred combination of learning style among bimodal students were **Visual -Kinesthetic (VK)** 10 students followed by Trimodal, **VAR, VRK, ARK** 1 student in each category. (TABLE-3)

Table 3: Sensory modality learning preferences of Multimodal first year Medical students.

Sensory modality learning preference			Number of students and percentage Male: 13, Female: 16 (n=29)
Multimodal	Bimodal	VR	4
		VK	10
		AR	3
		VA	3
		RK	2
		AK	4
	Tri-modal	VRK	1
		VAR	1
		ARK	1
	Quad-modal		Nil

Sensory modality learning preferences of Multimodal first year Medical students.

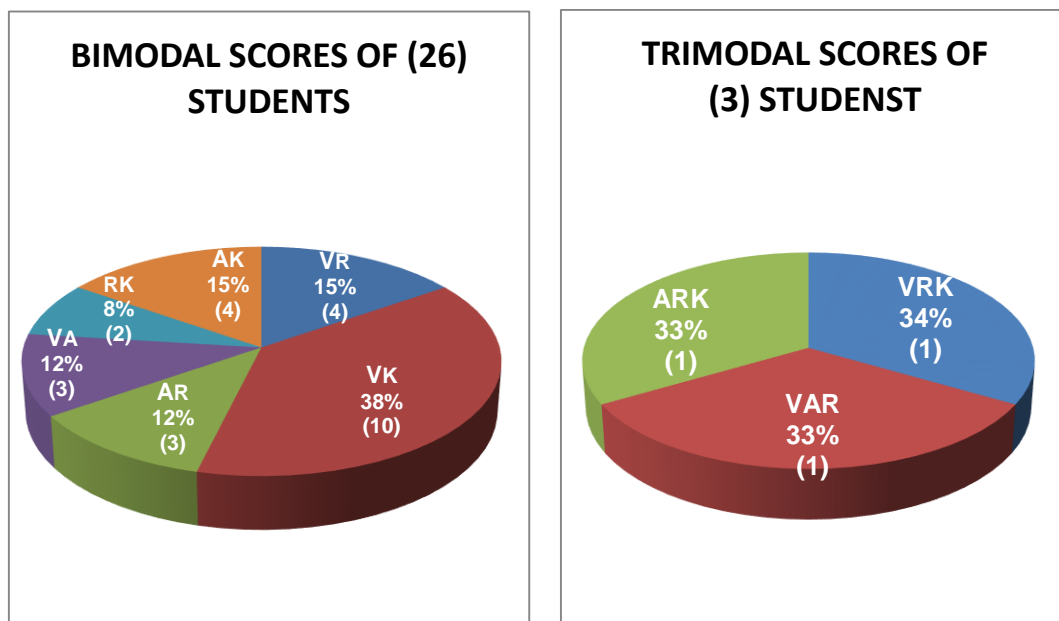


Fig 2: Shows the Percentage of Bimodal and Trimodal Sensory modality learning preferences of first year medical students for both male and female respondents.

Gender-wise analysis of the sensory modality learning preferences of the 147 first year medical students consisting of 68 male and 79 female students was calculated using Z- test for two proportions, p value of <0.05 being taken as significant. **(Table 4).**

On comparing single mode of Sensory modality learning information the following showed a significant variation between genders ($p < 0.05$).

Bimodal (VK) 1 male prefers to 9 females. So as compared to males, the females preferred information to be presented in a bimodal mode. This revealed there was significant difference in VK modality with Z-score **-3.5777** and **p-0.00034**

Bimodal (RK) 2 males prefers to 0 females. So as compared to females, the males preferred information to be presented in a bimodal mode. This revealed there was significant difference in VK modality with Z-score **2** and **p-0.0455**

Bimodal (VA) 3 males prefers to 0 females. So as compared to females, the males preferred information to be presented in a bimodal mode. This revealed there was significant difference in VK modality with Z-score **-2.4495** and **p-0.01428**

No significant difference in unimodal and other sensory modality learning preferences among genders was observed.

Table 4: Comparison of the sensory modality learning preferences of male and female first year medical students.

Sensory modality learning	Males (n=66)	Females (n=82)	Z Score	p value	Significance
V	18	17	0.81034	0.239	not significant at p <0.05.
A	8	9	-0.343	0.72786	not significant at p <0.05.
R	5	6	-0.4264	0.6672	not significant at p <0.05.
K	24	31	-1.3348	0.18352	not significant at p <0.05
VK	1	9	-3.5777	0.00034	Is significant at p <0.05.
VR	2	2	0	1	not significant at p <0.05.
VA	3	0	-2.4495	0.01428	Is significant at p <0.05.
RK	2	0	2	0.0455	Is significant at p <0.05.
AK	1	3	-1.4142	0.0455	not significant at p <0.05
AR	2	1	-1.4142	0.15854	not significant at p <0.05.
VRK	1	0	0.8165	0.41222	not significant at p <0.05
VAR	1	0	1.4142	0.15854	not significant at p <0.05
ARK	0	1	1.4142	0.15854	not significant at p <0.05

DISCUSSION

In this study, we administered the VARK questionnaire (version 7.8) to our first year medical students (Batch 2016-17) to determine their preferred mode of learning style. 147 of the 150 students (98.00%) returned the completed questionnaires.

In our study the Mean and SD VARK scores were kinesthetic (**8.81 ± 1.67**) visual learners (**8.74 ± 1.55**) auditory (**7.76 ± 1.35**) and reading/writing (**9.45 ± 1.82**) learners.

Our study revealed that the majority of first year medical students preferred using kinesthetic a single sensory modality while learning (unimodal).

Probably the students during their schooling and collage studies (11 and 12th standards) get exposed predominantly to lecture based teaching, they go home and read their text books to further understand what was taught. Thus, their teaching methods are supportive of visual and auditory learners.

Once they enter the medical school they get fascinated with hands on cadaver dissection, biochemistry and physiology practical's and also enjoy different teaching learning methods like projects based learning in terms of assignments, virtual role-plays in the form of videos and game based like cross word puzzles.

Scientific research proved students remember 20% when they read, 30% when they hear, 40% what they see and 50% what they say and 60% what they do, the retention of information increases when they hear, see, say and perform. [17]

To achieve effective learning, student must read, write and talk and actively involved in task while learning. All this can be possible in active learning sessions which will generate motivation and enthusiasm. Active learning strategies not only encourage the critical thinking but also improve problem solving, co operative learning with exchange of knowledge with peers and also become lifelong learner which is essential for medical profession.

The findings of this study were similar to results of the study conducted by:

Baykan and Kharb showed kinaesthetic was most preferred uni-modal learning style among medical students, in our study no one preferred uni-modal approach [6,7].

In a study by Lujan and DiCarlo from a US medical school observed that first year medical students prefer multimodal way of learning and kinesthetic was the most preferred modality [8]. Similar reports from medical school were also reported from Malaysiya [9] Saudi Arabia [10] Turkey [11] China [12] Similar observation is also made in a recent study from India by Shenoy et al. [13] which showed that 70% of the respondents preferred multimodal way of learning and they opted for kinesthetic.

Dissanayaka T. [14] who found 73% unimodal and only 24 % students preferred were multimodal learning style where as Shah C et all [15] found 43.30% unimodal learning style students in their study. In the present study among the four sensory modalities the most preferred mode was kinesthetic and this finding is similar to that of Baykan and Nacar. [16]

When instruction in undergraduate courses matched student's learning style preferences, students achieved higher scores than when mismatched.

In most of the medical colleges, lectures are in the form of Power Point presentation or over head projectors and to some extent using black board are used to instruct all

students in the same way (i.e., a straight lecture format) classes are taught. Demonstrations and bed side clinics are mainly done for clinical subjects.

Teaching faculty use this lecture format because of ease in passing information, the need to cover large content, and perhaps due to their own preferences in teaching. The results of the VARK questionnaire should convince teachers to use multiple modes of information presentation. By using a variety of teaching approaches, teachers will reach more students because of the better match between teacher and learner styles

However, our finding is in agreement with the finding of another study by Meechan-Andrews in which students studying Physiology were found to have unimodal preferences [18], and the study on first, second and third year dental students which also found that the majority of dental students had unimodal preferences, while only a minority (30.7%) had multimodal learning preferences [19].

What is to be noted however is that the unimodal preference found in our study (80.27% unimodal vs 19.73% multimodal) had a preference for the kinesthetic modality followed by visual modality. Among multimodal, bimodal preference was VK and Trimodal VRK, VAR and ARK were equally observed.

Students with visual preference learn best by seeing or observing diagrams, pictures, graphs, power point presentations and flowcharts. Auditory learners gather information best by hearing or recording lectures enjoy discussions and tutorials. Read/ Write learners prefer printed material like Assignments, Books, essays and lists to gain knowledge. Kinesthetic learners learn by using Projects, role play, real life experiences, trial and error and hands on approaches OSPE AND OSCE. Students learners are capable of using all of these sensory modes input for learning, however, each individual has a unique preference, or set of preferences, in which one mode is dominant.

CONCLUSION

We conclude that our medical students distinguished themselves from other populations by their strong learning preference for the kinesthetic modality.

This finding should alert the faculty who teach first year MBBS who rely predominantly on Power Point presentations with diagrams and written matter in the text. Such material would be preferred only by one section of their medical students with visual and read/write preferences.

Recommendations: Present teaching styles do not support the student study, hence various workshops must be conducted by the medical education team to train and equip the faculty with various innovative teaching techniques to deliver knowledge and information to the students to improve their acceptance. Faculty should adopt

multi modal teaching-learning strategies to create effective teaching and learning environment, to enjoy learning and to cater to the needs of other students.

It is also recommended that the learning preferences of medical students should be analyzed prior to the start of their academic tasks by using VARK questionnaire, to find appropriate teaching methods and to achieve educational goals.

Thus, we can conclude that we need to flip the class room from teacher to student centered and also to incorporate various different teaching styles to teach our different learners.

LIMITATION

This study has few limitations, firstly was done only on one batch of first year students of one institution, faculty preferences also should have been considered , larger sample size needed to increase the overall strength of our findings.

ACKNOWLEDGMENT

The authors would like express our gratitude to management for their continuous support, encouragement and motivation for conducting this study. We also wish to thank Neil D. Fleming for the VARK questionnaire copyright version 7.8. Our sincere thanks to all the 1st year MBBS students, tutors and colleagues of MIMS for their co - operation and support throughout the study. We are thankful to, Mr. Waseem Abdul Khadeer for his statistical support.

CONFLICT OF INTEREST: Authors have declared that no competing interest exists.

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