

# Assessment of Learning Style Profiles on Newly Joined MBBS Students during the Foundation Course

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## Abstract:

**Introduction:** Information enters brain by three main ways - Sight, hearing, and touch, which one is used by individual mostly becomes their own learning style. Most of students have a combination of learning styles. One of them is dominant than others.

**AIM of this study:** To identify various learning styles and if possible dominant/also prominent dominant styles which each individual student of 1<sup>st</sup> MBBS fresh students at the foundation course.

**Materials and methods:** The study conducted was a cross sectional study done among 150 students enrolled in MBBS course for the year 2019-2020 at NRIIMS. A pro-forma / questionnaire is prepared by using VARK approach. Data was collected by using that VARK proforma.

**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 the first year M.B.B.S students.

**Variables and their evaluation:** Students were distributed into one of the following categories: Unimodal-Having only of the V, A, R, or K preferences; Bimodal-Having two preferences (VR, VA, VK, AR, AK,RK) ; Scores were given accordingly.

**Statistical analysis:** The data was entered into a Microsoft excel sheet and the score were statistically analyzed to determine the percentage of students in each category

**Results:** Response rate for the study was 75.3% and majority were Females comprising 44.6%. Bimodal learning style is most preferred than Unimodal learning style corresponding to 87.6% and 12.3% respectively. Among the strong Unimodal learners Aural, Visual, Reading/writing, and kinesthetic preferences were documented by 4.4%, 3.5%, 2.6%,1.8% students respectively. In Bimodal style combination of visual and auditory styles are most preferred by 27.4% participants. Least commonly employed learning style was combination of Reading/Writing and kinesthetic style and it was reported by only 8.9% of students.

**Conclusion:** In the present study amongst first year medical students Bi-Modal learning style, with a combination of Visual and Aural presentation is the most preferred learning style. With the help of VARK questionnaire, it is recommended to test all the medical students. This will/ can be used to identify their most desired learning styles. This helps to improve educational goals by choosing most appropriate teaching methods.

**Key words:** Aural, Visual, VARK, learning styles, Students

### Introduction:

Information enters brain by three main ways- Sight, hearing, and touch. Which one is used by individual mostly becomes their learning style. Most of students have a combination of learning styles. One of them is dominant than others. Learning style is individual preference and remembrance and identifying learning style is important to organize teaching methods individually according to the individual characteristics to yield good products from medical college with both skill and knowledge. <sup>[1]</sup>

To identify individuals learning styles there are various models described by various educationists such as Dunn and Dunn, Felder-Silverman, Salme, Honey and Murnford, Kolb and VARK. <sup>[2]</sup> The VARK learning style model was introduced by Neil Fleming in 2006. <sup>[3]</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>[4]</sup> Visual learners (V) learn by looking at image intense figures, diagrams, cartoons, and videos. They like to use symbolic tools such as arrows, flowcharts, graphs, models, and hierarchies, which represent printed information. <sup>[5]</sup> Aural learners (A) give particular attention to words delivered by teachers. <sup>[6]</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>[7]</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>[6]</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>[6]</sup> They dislike merely listening even in an image intense environment; typically, kinesthetic students are passive in the classroom setting.

This study is conducted to identify various learning styles and if possible dominant/also prominent dominant styles which each individual student of 1<sup>st</sup> MBBS fresh students during the foundation course at NRIIMS.

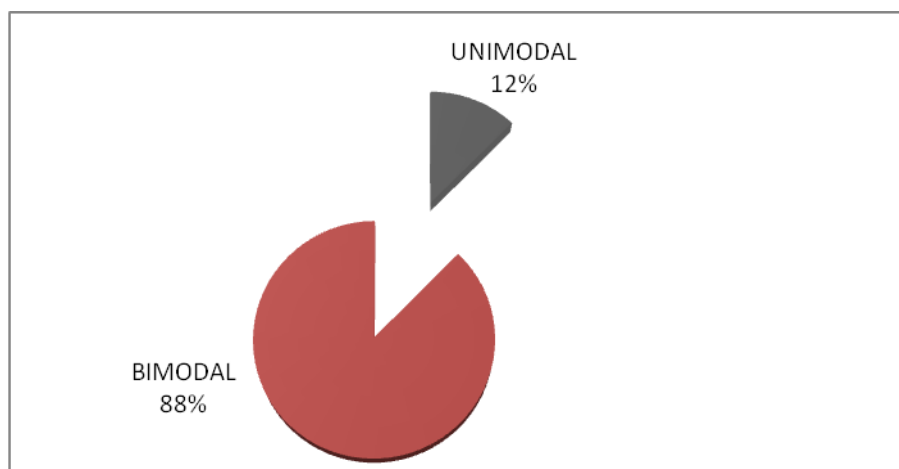
### Results:

Out of 150 students, 113 students filled the questionnaires, and 37 students did not take the survey and so the response rates are 75.3% and 24.6% respectively. Of 113 students, majority are female students 67 (59%) and the rest are male students 46 (41%). Majority of the students 99 (87.6%) preferred to use Bi modal learning style and 14 (12.3%) students preferred single /unimodal/ only one learning styles.

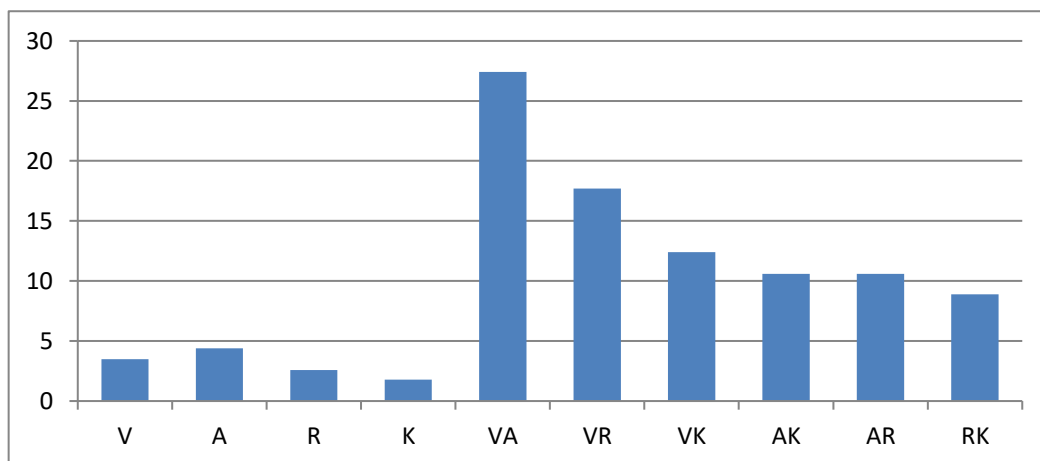
Out of 14(12.3%) students who preferred single modal learning style, 05(4.4%) students preferred Aural or auditory style and 4(3.5%) students preferred visual learning style followed by Reading/ writing style and kinesthetic style corresponding to 3(2.6%), and 2(1.8%) students respectively.

Out of 113 students who opted two modes of presentation, majority of the students 31(27.4%) opted for Visual and auditory styles[VA], 20(17.7%) students preferred Visual and reading/writing styles[VR], 14 (12.4%) students preferred Visual and kinesthetic styles[VK], 12(10.6%) students preferred auditory and kinesthetic styles[AK], 12(10.6%) students preferred auditory styles and reading/writing styles[AR] and only 10 (8.9%) students preferred reading and kinesthetic styles[RK].

**Figure 1:** Chart of Frequency of students who preferred Uni modal and Bimodal learning styles



**Graph 1:** Graph of Frequency of preferred learning styles amongst first year medical students



**Table 2:** Frequency of preferred learning styles amongst first year medical students

Single Modal (n=14) 12.3%	Bi-Modal (n=99) 87.6%
V (n=4) 3.5%	VA (n=31) 27.4%
A	VR

(n=5) 4.4%	(n=20) 17.7%
R (n=3) 2.6%	VK (n=14) 12.4%
K (n=2) 1.8%	AK (n=12) 10.6%
	AR (n=12) 10.6%
	RK (n=10) 8.9%

**The VARK Questionnaire - How Do I Learn Best?**

Please complete the following VARK questionnaire. Choose the answer which best explains your preference and circle the letter(s) next to it.

Please circle more than one if a single answer does not match your perception. Leave blank any question that does not apply.

1. You are helping someone who wants to go to your airport, town center or railway station. You would:

- a. Go with her.
- b. Tell her the directions.
- c. Write down the directions.
- d. Draw, or give her a map.

2. You are not sure whether a word should be spelled `dependent' or `dependant'. You would:

- a. See the words in your mind and choose by the way they look.
- b. Think about how each word sounds and choose one.
- c. Find it in a dictionary.
- d. Write both words on paper and choose one.

3. You are planning a holiday for a group. You want some feedback from them about the plan. You would:

- a. Describe some of the highlights.
- b. Use a map or website to show them the places.
- c. Give them a copy of the printed itinerary.
- d. Phone, text or email them.

4. You are going to cook something as a special treat for your family. You would:

- a. Cook something you know without the need for instructions.
  - b. Ask friends for suggestions.
  - c. Look through the cookbook for ideas from the pictures.
  - d. Use a cookbook where you know there is a good recipe.
5. A group of tourists want to learn about the parks or nature reserves in your area. You would:
- a. Talk about or arrange a talk for them about parks or nature reserves.
  - b. Show them internet pictures, photographs, or picture books.
  - c. Take them to a park or nature reserve and walk with them.
  - d. Give them a book or pamphlets about the parks or nature reserves.
6. You are about to purchase a digital camera or mobile phone. Other than price, what would most influence your decision?
- a. Trying or testing it.
  - b. Reading the details about its features.
  - c. It is a modern design and looks good.
  - d. The salesperson telling me about its features.
7. Remember a time when you learned how to do something new. Try to avoid choosing a physical skill, e.g. riding a bike. You learned best by:
- a. Watching a demonstration.
  - b. Listening to somebody explaining it and asking questions.
  - c. Diagrams and charts - visual clues.
  - d. Written instructions – e.g. a manual or textbook.
8. You have a problem with your knee. You would prefer that the doctor:
- a. Gave you a web address or something to read about it.
  - b. Used a plastic model of a knee to show what was wrong.
  - c. Described what was wrong.
  - d. Showed you a diagram of what was wrong.
9. You want to learn a new programme, skill or game on a computer. You would:
- a. Read the written instructions that came with the programme.
  - b. Talk with people who know about the programmed
  - c. Use the controls or keyboard.
  - d. Follow the diagrams in the book that came with it.

10. I like websites that have:
- Things I can click on, shift or try.
  - Interesting design and visual features.
  - Interesting written descriptions, lists and explanations.
  - Audio channels where I can hear music, radio programmes or interviews.
11. Other than price, what would most influence your decision to buy a new non-fiction book?
- The way it looks is appealing.
  - Quickly reading parts of it.
  - A friend talks about it and recommends it.
  - It has real-life stories, experiences, and examples.
12. You are using a book, DVD, or website to learn how to take photos with your new digital camera. You would like to have:
- A chance to ask questions and talk about the camera and its features.
  - Clear written instructions with lists and bullet points about what to do.
  - Diagrams showing the camera and what each part does.
  - Many examples of good and poor photos and how to improve them.
13. Do you prefer a trainer or a presenter who uses:
- Demonstrations, models or practical sessions.
  - Question and answer, talk, group discussion, or guest speakers.
  - Handouts, books, or readings.
  - Diagrams, charts or graphs.
14. You have finished a competition or test and would like some feedback. You would like to have feedback:
- Using examples from what you have done.
  - Using a written description of your results.
  - From somebody who talks it through with you.
  - Using graphs showing what you had achieved.
15. You are going to choose food at a restaurant or cafe. You would:
- Choose something that you have had there before.
  - Listen to the waiter or ask friends to recommend choices.
  - Choose from the descriptions in the menu.
  - Look at what others are eating or look at pictures of each dish.

16. You have to make an important speech at a conference or special occasion. You would:

- a. Make diagrams or get graphs to help explain things.
- b. Write a few key words and practice saying your speech over and over.
- c. Write out your speech and learn from reading it over several times.
- d. Gather many examples and stories to make the talk real and practical.

**The VARK Questionnaire Scoring Chart:**

Use the following scoring chart to find the VARK category that each of your answers corresponds to. Circle the letters that correspond to your answers e.g. If you answered b and c for question 3, circle V and R in the question 3 row.

Question	A	B	C	D
1	K	A	R	V
2	V	A	R	K
3	K	V	R	A
4	K	A	V	R
5	A	V	K	R
6	K	R	V	A
7	K	A	V	R
8	R	K	A	V
9	R	A	K	V
10	K	V	R	A
11	V	R	A	K
12	A	R	V	K
13	K	A	R	V
14	K	R	A	V
15	K	A	R	V
16	V	A	R	K

**Calculating scores:**

Count the number of each of the VARK letters you have circled to get your score for each VARK category.

	Total Score
V	
A	
R	
K	

## Discussion:

Studying medicine requires multimodal approach. This study presents the VARK, a newly developed inventory for evaluating learning style preferences in first year M.B.B.S students. <sup>[8]</sup> Knowing the learning style of students is a valuable skill in education. Knowledge of learning styles may help educators identify and solve learning problems among students, thus helping their students to become more effective.

In our present study, In total, majority of the participants 87.6% preferred to use Bi modal learning style and 12.3% participants preferred only one learning styles.

The results are compared with the study done by Baykan and Nacar. <sup>[9]</sup> Baykan and Nacar in their study which was done to investigate the preferred learning styles of first year medical student by using VARK questionnaire, found that 36.1% preferred single modal learning styles and that 63.9% preferred Bi modal learning styles. No significant difference was found between gender and mean score obtained in first semester with respect to students' learning styles. This result was consistent with that of the present study.

The results of the present study are also consistent/ same/ similar to the study done by Prithish kumar and Micheal. <sup>[10]</sup> Prithishkumar and Micheal observed 86.8% of students preferred Bimodal learning style and 13.8% were using single modal learning styles.

In our present study among Bimodal preferred participants, majority students 27.4% opted for Visual and auditory styles[VA], 17.7% students preferred Visual and reading/writing styles[VR], 12.4% students preferred Visual and kinesthetic styles[VK] , 10.6% students preferred auditory and kinesthetic styles[AK] , auditory styles and reading/writing styles[AR] and only 8.9% students preferred reading and kinesthetic styles[RK]. <sup>[10]</sup> In the study done by Prithishkumar and Micheal the commonest learning preference among the bimodal category, the highest percentage was seen in the AK (33%) and AR (16.5%) category, which was not consistent with our present study. <sup>[11]</sup> Hadi Peyman in his study done at Ilam University of Medical Sciences in 2010 observed that the most preferred Bimodal learning preference was AR (n=14 ) 9.9% followed by AK (n=4 ) 2.8% and least preferred were VR (n=2 ) 1.4% and VK (n=2 ) 1.4% which are not correlating with our present study.

In our present study among bimodal preferred participants majority of the students preferred learning in combination with visual learning (in common in bimodal it constitutes 1 of the 4 required skills for clinical examinations (inspection, palpation, percussion, and auscultation). This may reflect the fact that the participants were surveyed when they were in their first year of medical school. Visual strategies are used at that stage of learning because the curriculum design of the first year differs from that of lower levels, especially in intermediate colleges where visual ability is not followed/ required for activities but they were used in medical colleges like using a microscope in histology classes, investigating structures in anatomy class, learning how to inspect in physiology classes and so on. This finding may assist curriculum developers in designing a preparatory course for students to enhance their visual strategies in the later years of study as well.

Out of 12.3% students who preferred single modal learning style, 4.4% students preferred Aural or auditory style and 3.5 % students preferred visual learning style followed by Reading/ writing style and



kinesthetic style corresponding to 2.6%, and 1.8% students respectively.<sup>[11]</sup> In a study done by Hadi Peyman et al., the most common preferred mode of learning style was Aural presentation which was similar to our present study. Fleming (1995) in their study discovered that the most commonly preferred mode in learning process is aural mode which was in 100% correlation with our present study.<sup>[12]</sup> Samarakoon *et al.* showed that the majority among the unimodal learners, the clear majority were auditory learners (50%) which is also correlating with the results of our present study.<sup>[12]</sup> Samarakoon *et al.* on studying the learning preferences of postgraduate medical students observed a drastic 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>[13]</sup> Lujan *et al.* on medical students in Wayne State University School of Medicine, Michigan showed that majority 18.1% preferred kinesthetic mode.<sup>[11]</sup> Another study done on medical students by the Department of Medical Education of Erciyes, Turkey showed among the unimodal, preferences were V-3.2%, A-7.7%, R-1.9%, and K-23.3%; only 1.9% being auditory learners. Both these above studies demonstrate a clear predominance of kinesthetic learners (18.1% and 23.3% respectively) among unimodal learners.<sup>[14]</sup> A similar study among first year nursing students in Australia demonstrated a predominance of kinesthetic style of learning. 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 auditory (A) and R/W mode with little emphasis on the visual (V) and kinesthetic(K) mode.

## Conclusion:

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. Since students possess a wide diversity in learning styles, teachers should combine different educational strategies to meet the varied learning preferences of students. Learning style is vital in giving a choice to students to choose their own distinctive learning pattern so that they will not lose interest during lectures/learning process. VARK learning style does not involve intelligence or inherent skill but is closely related to how we acquire or understand information or new knowledge. VARK learning style can create a fascinating learning environment to students and stimulate students' senses in learning. In the present study amongst first year medical students Bi-Modal learning style, with a combination of Visual and Aural presentation is the most preferred learning style. With the help of VARK questionnaire, it is recommended to test all the medical students. This will/ can be used to identify their most desired learning styles. This helps to improve educational goals by choosing most appropriate teaching methods groups of students with predominantly auditory style are encouraged to listen the class and record the lecture for future reference. Students with predominant visual mode are encouraged to take down various links regarding the subject to pictures, watch and learn. However, a combination of visual, auditory modes of teaching followed by periodic tests of reading may provide a combinative way mode of imparting knowledge to the students. A follow up study is required to note down any change in their learning styles during M.B.B.S and each phase.

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**Ethics and consent to participate:** Ethics clearance obtained from ethics committee and obtained consent from all participants

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- Collection of data/ Preparation of manuscript/ editing/ technical support

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- Collection of data/ Preparation of manuscript/ editing/ technical support

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