

## Effects of Learning Style Preferences Among Undergraduate Medical Students in Tamilnadu

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### ABSTRACT

**Introduction:** Among various learning styles, strategies and approaches in learning methods of medical students, educators are more enthusiastic in finding the type of learning style students adopt during education. Knowledge of learning styles facilitates the educators to categorize students and impart teaching in a more effective way.

**Aim and objective:** The aim of the present study is to evaluate, categorize various learning styles and analyse the learning style distribution among the medical students using VARK instrument of learning style.

**Materials and Methods:** Four hundred thirty medical students of two medical colleges from Tamilnadu were included in the study after obtaining the Institutional Ethics Committee permission. The study was done using VARK as learning style measuring instrument. Various modes of measurement included in VARK were visual (V), aural (A), read/write(R), kinaesthetic (K). The VARK questionnaire with completed response by students was collected and analysed. The students were categorized according to their responses in to different learning styles as per VARK questionnaire guidelines.

**Results:** The results revealed majority of the students as multimodal 68.4% and the unimodal learners 31.6% were of different learning styles visual (6.3%), aural(11%), read/write (4%), kinesthetic (10.3%).

**Conclusion:** VARK has effectively categorized the medical students into various groups based upon their learning styles and could be a constructive learning style instrument for measuring learning styles and improving the medical education.

**Key Words:** VARK, Learning styles, Medical student learning, Teaching enhancement techniques.

### INTRODUCTION:

There are a large number of learning styles, strategies and approaches based on different psychological makeup. There is quite a lot of interest amongst educators in identifying whether learners are predominantly visual, auditory, reading, writing or kinaesthetic learners. Students' approaches to learning can be influenced by the perception that they gain from their learning environment. In preclinical years, medical students experience different learning

environments like didactic lectures, group discussions, practical's, and tutorials etc. To achieve the best, teachers need to understand the learning strategies of students in order to facilitate their learning. It has always been argued that medical teachers should not only possess subject knowledge they should also be familiar with learners problems and their learning style. The factors influencing student learning styles, are gender, age, schooling, academic achievement, brain processing, culture, family environment and creative thinking. Students use different sensory

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modalities for assimilating knowledge and information.

Knowledge of learning styles facilitate to understand various ways how a student group interprets and retains the information provided in a given time. This would help teachers to categorize students according to their learning style and impart teaching in a more effective way. Among various learning style measuring tools, VARK was considered as an effective learning style instrument. Various tools for measuring the learning styles include Gregorc learning style model, Dunn & Dunn learning style model, Kolb experiential learning model, Feider-Silverman teaching style model. Perceptual or sensory model including all modes of measurements designed in the above said various other models was credited to VARK1. Fleming, who designed VARK, defined learning style as "an individual's characteristics and preferred ways of gathering, organizing, and thinking about information". VARK is focussed on perception and delivering the information. Various modes of measurement included in VARK was visual(V), aural(A), read/write(R), kinesthetic(K). The measuring scale for various modes in VARK is depicted in Figure 1. The activities included in the VARK modes were diagrams, graphs, colours, charts, written texts, different fonts, spatial arrangement, designs for visual mode. Debates, conversations, arguments, discussions, audio tapes, video audio, music, drama in aural mode. Books, texts, handouts, note taking, multiple choice, reading, essays, bibliographies in read/write mode. Examples, demonstrations, constructing, working models, role play, guest lectures in kinesthetic mode. Briefly, a visual student prefers to learn visually and an aural student uses listening techniques to learn. Some students use reading and writing as their first preferences for assimilating and accommodating to information. A kinaesthetic student experiences learning by all sensory

channels, including somato sensory, auditory, olfactory, gustative and visual<sup>1,2</sup>.

Indian students and Indian Medical colleges still follow the traditional way of learning from the standard text books and teaching methods like didactic lectures to cover majority of the curriculum as it is easy and convenient to accommodate large numbers of students in a classroom. If the learning preferences of the majority of the students are known, it will enable the health profession educationists to design newer teaching and learning methods that can accommodate the learning preferences of the all the students in an effective way.

Therefore, the purpose of the study was to categorize learning preferences of medical students using the latest English version 7.0 of the VARK questionnaire. To analyse the learning style distribution among the medical students of XXX Medical College, we hypothesised that VARK as an effective and constructive tool for categorizing the medical students of multimodal and unimodal learning styles. And it will also add some data to which modality users are achieving best standards in their career. This study also might give the difference in learning methods preferred between highly meritorious students who achieved medical seat through state selection and students achieved medical seat through other selection methods. This might give a discussion point for learning methods preferred between achievers and less achievers.

The further scope of this study includes learning methods of various age group students. It provides a chance to do multiple comparisons among various parameters in students like age, sex, socioeconomic background, schooling systems, language of learning, various schooling types, etc with student's learning styles.

Our study may prove VARK as a diagnostic tool for learning styles and help in improving the students learning style by inculcating new learning styles in to them for better achievements. These type of studies can also bring a change in teacher and their teaching methods enabling to reach students of all types of learning styles<sup>3-14</sup>.

**MATERIALS AND METHODS:**

**Participants:**

This study included 430 First year medical students (male-164, female-266) in two medical colleges in Tamilnadu. The study was done after obtaining the approval from the Institutional Ethics Committee and written informed consent was obtained from the students.

**Instrumentation :**

The VARK learning style instrument which was developed by Fleming was used in the study. It consisted newest version of questionnaire with 16 questions which can be freely accessed at <http://www.vark-learn.com/>. This can identify the learning styles of the students and modality they use for taking in the information.

The VARK questionnaire, developed by Fleming, was used in our study. VARK questionnaire was administered in hard copy to students. The total number of students who participated in the study was obtained. The students were first briefed about the purpose of the study and methodology in which it is going to be conducted. Instruction regarding how to fill up the form was also delivered. Those who are willing to participate in the study were administered the questionnaire.

Those who were unwilling were free to opt out of the study. Students filled their demographic and personal data in short followed by the questions.

They were allowed to choose more than one option. No time limit was established. If in case of doubts about any question in understanding or interpreting they were asked not to attempt that question. The students were not allowed to discuss with each other during the filling of the questionnaire.

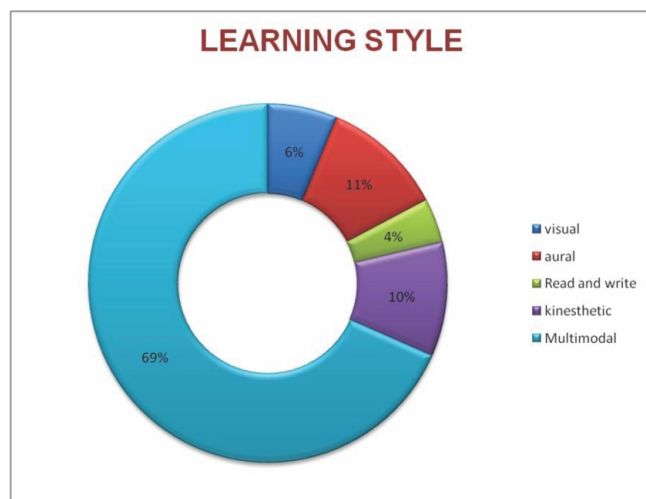
The questionnaire forms were collected back and assessed with the help of VARK scoring sheet downloaded along with the questionnaire. After the completion of the questionnaire it was collected. The responses provided by students for each modality were tabulated and analysed as per the guidelines given by VARK questionnaire to identify each student's learning modality. Students were informed about their preferred learning style at the end.

**RESULTS:**

Our study results showed 68.4% of the students in the study as multimodal learners and 31.6% were of unimodal learning style which included 6.3% for visual, 11% for aural, 4% for read/write, 10.3% for kinesthetic mode of learning [Figure 1].

**TABLE 1: DISTRIBUTION OF LEARNING STYLES AMONG MEDICAL STUDENTS OF TAMILNADU**

Learning Style	Percentage (n=430)
Visual	6.3% (n=27)
Aural	11% (n=47)
Read / Write	4% (n=17)
Kinesthetic	10.3%(n=44)
Multimodal	68.4 %(n=295)
Total	430

**FIG 1: THE PERCENTAGES OF STUDENTS WITH DIFFERENT LEARNING STYLES****DISCUSSION:**

This study enumerated and categorized the learning styles among the medical students in Tamil Nadu.

The distribution of learning styles were tabulated [Table 1]. VARK was used for this study which was shown to be reliable and a valid tool for measuring learning styles<sup>15</sup>. This study also provides information about the ways of learning in medical students.

The result of our study showed majority of the students (68.4%) were practising multimodal learning styles which revealed that they show interest in a range of learning methods other than reading from text books and 31.6% of students in the study were practising unimodal ways of learning methods. A similar study conducted in USA revealed that 63.8% of the student in the study exhibited multimodal learning styles and 36.1% unimodal learning styles which included 4.8% for aural, 18.1% of kinesthetic learners<sup>16</sup>. A study conducted in nursing students at Australia revealed a high proportion of kinesthetic learners<sup>17</sup>. A study in Turkey reported 63.9% of multimodal approach and 3.2% of aural learners and 23.3% of kinesthetic learners<sup>18</sup>. Our study also showed similar patterns

of distribution of learning styles among the medical students with variations in aural and kinesthetic proportions. The majority among unimodal learners in our study were aural and kinesthetic which counted for 11% and 10.3% respectively to total medical students in the study. These unimodal learners should be taken specially as per their mode of learning to overcome the subject tasks. This can be made easy with use of multisensory teaching and active learning strategies<sup>19</sup>. In active learning strategies, various unimodal learners are aimed differently like, auditory learners with peer instructions intervened by discussions<sup>20,21</sup>, debate<sup>22</sup>, answering questions<sup>23</sup>, collaborative testing<sup>24,25</sup>, games<sup>26-31</sup>; visual learners with demonstrations and models<sup>32-34</sup>; kinesthetic learners by role playing<sup>35</sup> and manipulating models<sup>36,37</sup>. Learning can be made easy if provided with real-life examples, suitable analogies<sup>38,39</sup>.

**CONCLUSION:**

With this study, we conclude that majority of the medical students were of multimodal learning styles who can take in and give out the information provided in the given time with less effort. The other students of unimodal learning styles have to be concentrated to achieve good scores based on their learning style and taking the multimodal achievers as role players. This may also help educators and institutions in dealing with the selection, tutoring of the students in to the medical course. Finally, implementing these kind of approaches and interventions in teaching can bring forward an evidence based education or teaching techniques.

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**CONFLICTS OF INTEREST: Nil**

**REFERENCES:**

1. Hawk, T. F. and Shah, A. J. Using Learning Style Instruments to Enhance Student Learning. *Decision Sciences Journal of Innovative Education*. 2007; 5: 1-19.
2. Fleming, Neil & Developer, Educational & Baume, David. Learning Styles Again: VARKing up the right tree. *Educ Dev*. 2006; 7:4-7.
3. Armstrong E and Parsa-Parsi R. How can physicians' learning styles drive educational planning? *Acad Med*. 2005; 80: 680–684.
4. Bergman LG and Fors UG. Computer-aided DSM-IV-diagnostics—acceptance, use and perceived usefulness in relation to users' learning styles. *BMC Med Inform Decis Mak*. 2005; 5: 1.
5. Collins J. Education techniques for lifelong learning: principles of adult learning. *Radiographics*. 2004; 24: 1483–1489.
6. Forrest S. Learning and teaching: the reciprocal link. *J Contin Educ Nurs*. 2004; 35: 74–79.
7. Gordon HRD. Identifying learning styles. Educational Resources Information Center. 1998; ED 424 287.
8. Laight DW. Attitudes to concept maps as a teaching/learning activity in undergraduate health professional education: influence of preferred learning style. *Med Teach*. 2004; 26: 229–233.
9. Lang H, Stinson M, Kavanagh F, Liu Y, and Basile M. Learning styles of deaf college students and instructors' teaching emphases. *J Deaf Stud Deaf Educ*. 1999; 4: 16–27.
10. Lewthwaite BJ and Dunham HP. Enriching Teaching Scholarship through Learning Styles. Educational Resources Information Center (ERIC). 1999; ED 428057.
11. Miller P. Learning styles: the multimedia of the mind. Educational Resources Information Center. 2001; ED 451 140.
12. Pillemer DB, Wink P, DiDonato TE, and Sanborn RL. Gender differences in autobiographical memory styles of older adults. *Memory*. 2003; 11: 525–532.
13. Sandmire DA and Boyce PF. Pairing of opposite learning styles among allied health students: effects on collaborative performance. *J Allied Health*. 2004; 33: 156–163.
14. Veenman MV, Prins FJ, and Verheij J. Learning styles: self reports versus thinking-aloud measures. *Br J Educ Psychol*. 2003; 73: 357–372.
15. Walter L. Leite, Marilla Svinicki, and Yuying Shi. Attempted Validation of the Scores of the VARK: Learning Styles Inventory With Multitrait–Multimethod Confirmatory Factor Analysis Models. *Educational and Psychological Measurement*. 2010; 70(2):323 -339.
16. Lujan HL, DiCarlo SE: First-year medical students prefer multiple learning styles. *Adv Physiol Educ*. 2006, 30(1):13–16.

17. D'Amore A, James S, Mitchell EK: Learning styles of first-year undergraduate nursing and midwifery students: A cross-sectional survey utilising the Kolb Learning Style Inventory. *Nurse Educ Today*. 2012; 32(5):506–515.
18. Baykan Z, Nacar M: Learning styles of first-year medical students attending Erciyes University in Kayseri Turkey. *Adv Physiol Educ*. 2007;31(2):158–160.
19. Rao SP and DiCarlo SE. Active learning of respiratory physiology improves performance on respiratory physiology examinations. *Adv Physiol Educ*. 2001; 25: 55–61.
20. Cortright RN, Collins HL, and DiCarlo SE. Peer instruction enhanced meaningful learning: ability to solve novel problems. *Adv Physiol Educ*. 2005; 29: 107–111.
21. Rao SP and DiCarlo SE. Peer instruction improves performance on quizzes. *Adv Physiol Educ*. 2000; 24: 51–55.
22. Scannapieco FA. Formal debate: an active learning strategy. *J Dent Educ*. 1997; 61: 955–961.
23. DiCarlo SE and Collins HL. Colored letters: a tool to increase class participation in a large classroom. *Adv Physiol Educ*. 2001; 25: 143.
24. Cortright RN, Collins HL, Rodenbaugh DW, and DiCarlo SE. Student retention of course content is improved by collaborative-group testing. *Adv Physiol Educ*. 2003; 27: 102–108.
25. Rao SP, Collins HL, and DiCarlo SE. Collaborative testing enhances student learning. *Adv Physiol Educ*. 2002; 26: 37–41.
26. Bailey CM, Hsu CT, and DiCarlo SE. Educational puzzles for understanding gastrointestinal physiology. *Adv Physiol Educ*. 1999; 21: 1–18.
27. Collins HL, Rodenbaugh DW, Murphy TP, Kullics JM, Bailey CM, and DiCarlo SE. An inquiry-based teaching tool for understanding arterial blood pressure regulation and cardiovascular function. *Adv Physiol Educ*. 1999; 27: 15–28.
28. Howard MG, Collins HL, and DiCarlo SE. “Survivor” torches “Who Wants to be a Physician?” in the educational games ratings war. *Adv Physiol Educ*. 2002; 26: 30–37.
29. Mierson S. Skits and games to enhance students' learning of physiology. *Am J Physiol Adv Physiol Edu* (could not determine journal name). 1999; 27: S283–4.
30. Moy JR, Rodenbaugh DW, Collins HL, and DiCarlo SE. Who wants to be a physician? An educational tool for reviewing pulmonary physiology. *Adv Physiol Educ*. 2000; 24: 30–37.
31. Odenweller CM, Hsu CT, and DiCarlo SE. Educational card games for understanding gastrointestinal physiology. *Adv Physiol Educ*. 1998; 20: 78–84.
32. Laczko J, Latash ML, editors. *Progress in Motor Control: Theories and Translations*. Springer; 2016.
33. DiCarlo SE, Sipe E, Layshock JP, and Rosian RL. *Experiments and Demonstrations in Physiology*. Upper Saddle River, NJ: Prentice Hall. 1998.

34. Rodenbaugh DW, Collins HL, and DiCarlo SE. Construction of a model demonstrating cardiovascular principles. *Adv Physiol Educ.* 1999; 277: 67–83.
35. Kuipers JC and Clemens DL. Do I dare? Using role-play as a teaching strategy. *J Psychosoc Nurs Ment Health Serv.* 1998; 36: 12–17.
36. Chan V, Pisegna JM, Rosian RR, and DiCarlo SE. Construction of a model demonstrating neural pathways and reflex arcs. *Adv Physiol Educ.* 1991; 271: 14–42.
37. Silverthorn DU. Using demonstrations to uncover student misconceptions: the law of LaPlace. *Adv Physiol Edu.* 1999; 277: 281–282.
38. Fleming, N. D. (1995), I'm different; not dumb. Modes of presentation (VARK) in the tertiary classroom. In Zelmer, A., (Ed.) *Research and Development in Higher Education.*
39. Klement M. How do my students study? An analysis of students' of educational disciplines favorite learning styles according to VARK classification. *Procedia-Social and Behavioral Sciences.* 2014; 132: 384-90.

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