



## DO WE NEED TO TEACH EVERY BATCH OF STUDENTS DIFFERENTLY? A VARK PROFILE STUDY.

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### ABSTRACT

Among the various instructional preference tools available the VARK (an acronym for visual-aural-read/write-kinesthetic) questionnaire happens to be simple, easy to administer, freely available tool that aids the students to understand their learning preferences in a manner they can identify with and accept. The aim of this study was to

assess the differences in learning preferences among medical students studying in different terms. Three hundred and twenty eight undergraduate students undergoing training at our medical college were approached to participate in the exercise. 273 (83.2%) consenting students were administered a printed form of version 7.8 of the VARK questionnaire. In addition, we also collected demographic data. The majority of students in our study preferred more than one sensory modality (64.3%) for learning. There was significant difference in learning preferences among students studying in various terms. The study demonstrates the diversity that exists in learning preferences in each batch of students and the need to do away with teaching every batch of students and every student the same way. Teachers have to recognise the need to enhance their teaching methods depending on learning preferences of students. We hope these results will help us reach out to students better and improve the teaching learning experience.

**KEYWORDS:** learning preference; learning style; VARK; visual-aural-read/write-kinesthetic.

## INTRODUCTION

The trend in medical teaching is to instruct all students in a class and every batch of students in the same way. A long history of Didactic lecturing, ease of information transfer, focus on covering content and possibly one's own preferences in learning are probably the reasons why educators still continue to use Lecture sessions as the primary mode of education. Adult learning however is a self-directed process and is learner centric. Learning tools can be provided to help students become better learners and encourage them to be self-directed in their learning endeavours. One such tool that can be used to encourage this is a learning style inventory.<sup>[1]</sup> Learning style is a term used to refer to the methods of gathering, processing, interpreting, organizing and thinking about information. Students have differing learning styles, And that is the reason for the diversity seen in classrooms with regards to how students acquire knowledge.<sup>[2]</sup> The utilization of this insight in a formal manner to enhance the teaching methods and learning environment has been almost absent until in recent past. There are about 53 different theories of learning and more than 80 models of learning styles have been proposed.<sup>[3]</sup> VAK model, Kolb's Learning Inventory, Gardner's Multiple Intelligence Theory and various other models were developed to explain different learning styles.<sup>[4,5]</sup> The VARK (an acronym for visual, aural, read/write, and kinaesthetic) questionnaire is an instructional preference tool that is simple and easy to administer, it encourages students to recognise their learning behaviour in a way they can relate with and accept.<sup>[6]</sup> The aim of the study was to assess if there are any differences among learning preferences of students in various terms/semesters.

The VARK questionnaire identifies the preferences of students for particular modes of information presentation namely visual, aural, read/write, and kinesthetic.<sup>[7]</sup> Teachers can use this knowledge to further student learning and improve their approach to teaching based on learning preferences of students. Students can use this awareness to change their learning patterns according to their preferences.

Newer teaching learning methods are being tried with a progressive shift of priority away from passive to active learning. Hence, a systematic attempt was made to study the learning style preferences of undergraduate medical students in our college. Other studies that have focussed on students belonging to a single class/term have shown great diversity with regards to learning preferences.<sup>[8,9,10,11,12]</sup> Studies that compare students at various stages of their undergraduate or postgraduate training have shown varying results.<sup>[13,14,15]</sup>

The study of learning style preferences among our students employing the VARK questionnaire and ascertaining the differences in learning patterns of students at various stages of their training may help teachers to improve their approach towards teaching.

## METHODS

This study was undertaken following approval of Institutional Ethics Committee. It was performed at the Department of Pathology at Subbaiah Medical College. Three hundred and twenty eight undergraduate students undergoing medical training in first, third, fourth and fifth terms/semesters at our medical college were invited to participate in the exercise. Students did not receive any incentive for participation.

Informed consent in writing was obtained from students before the VARK questionnaire could be administered. After explaining the purpose of the study, Version 7.8 of the VARK questionnaire in a printed form was provided to students.<sup>[7]</sup> the questionnaire consists of 16 questions with 4 choices for each, corresponding to a specific sensory modality preference. Students were free to select more than one option, thus multiple modalities of varying combinations could be obtained. The modality that received the highest marks was the preferred sensory modality. The questions describe circumstances of everyday occurrence; thereby connecting to a person's learning experience. Students were instructed to choose the option that best explained their preference and circle the letter(s) next to it. They could choose more than one choice or leave vacant any question that they perceived as being not pertinent to them. Questionnaires were assessed based on previously validated scoring instructions and a chart.<sup>[7]</sup> as each of the options exemplifies a sensory modality preference; the same was calculated for every individual by summing up the responses for all sixteen questions. The entire exercise was completed in 30 min, after which the students returned the completed questionnaire with demographic data.

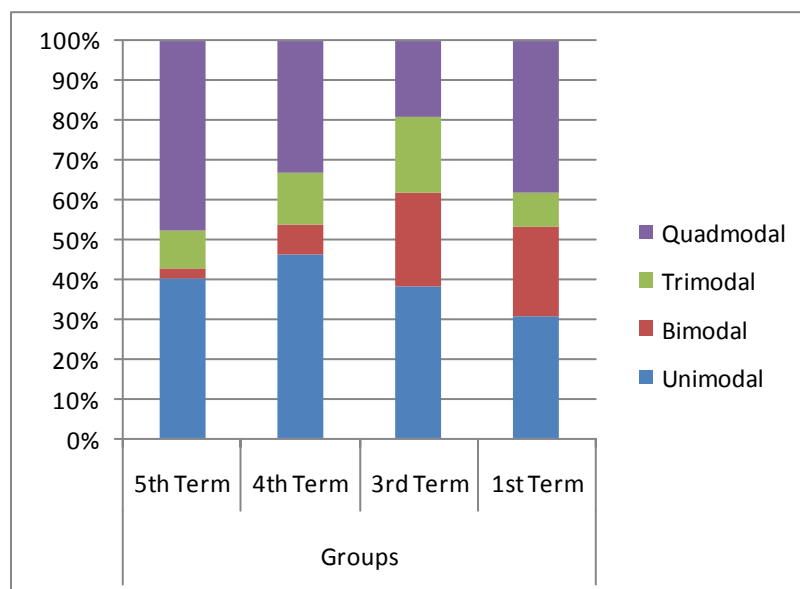
Statistical analyses: Learning modality preferences/VARK mode distributions are expressed as percentages of students in each category. Comparison of learning style preferences among the batches was done using Chi square test. Scores of individual VARK components are expressed as means  $\pm$  Standard Deviation. Comparison of VARK scores between different terms was done using one way ANOVA with Tukey's post hoc test. SPSS (version 19.2) was used for statistical analyses. Statistical significance was set at  $P < 0.05$ .

## RESULTS

Of the three hundred and twenty eight undergraduate students invited to participate in the exercise, 273 students (83.2%) agreed to provide demographic details and answer the VARK questionnaire. Respondents were from 5<sup>th</sup>(40), 4<sup>th</sup>(45), 3<sup>rd</sup>(93) and 1<sup>st</sup>(150)semesters ( numbers in parenthesis are the total number of students in each class). 40(100%), 39(86.67%), 89(95.7%) and 105(70%) students from each of these terms respectively, consented and completed the questionnaire.

The distribution of unimodal, bimodal, trimodal and quadmodal learners in each group is shown in table1. While in every group majority of students preferred more than one modality for learning, the percentages varied from 53.83% to 71% (Figure 1 shows percentage distribution of learning preferences in detail). There was significant difference amongst learning modality preferences for each group of students ( $\chi^2 = 25.97$ ,  $df=9$ ,  $P<0.002$ ).

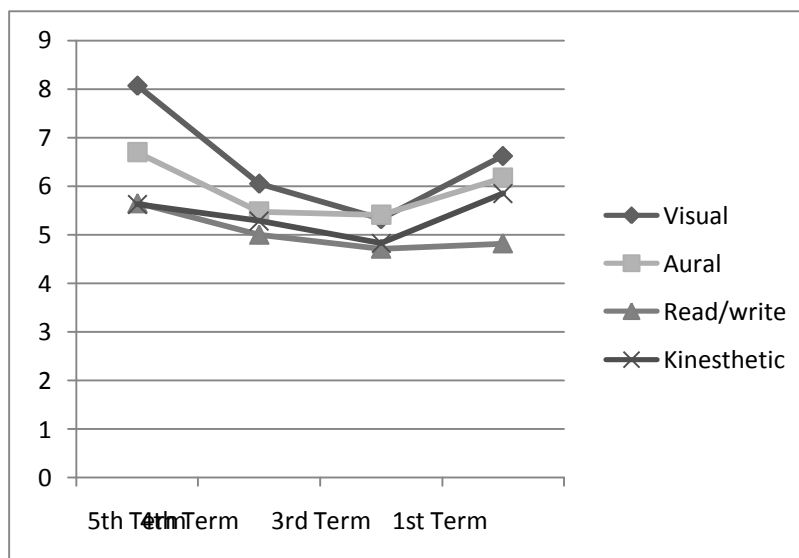
Comparison of Mean scores of individual VARK components and their standard deviation using a one way ANOVA showed significant difference in learning modality preferences across student groups in the study sample (Table2). Tukey's post hoc test further confirmed the findings.



**Figure1: Percentage distribution of learning modality preferences across four groups of students.**

**Table1: Distribution of learning modality preferences across four groups of undergraduate students.**

| Learning preferences | Groups   |          |          |          | Total |
|----------------------|----------|----------|----------|----------|-------|
|                      | 5th Term | 4th Term | 3rd Term | 1st Term |       |
| Unimodal             | 16       | 18       | 34       | 32       | 100   |
| Bimodal              | 1        | 3        | 21       | 24       | 49    |
| Trimodal             | 4        | 5        | 17       | 9        | 35    |
| Quadmodal            | 19       | 13       | 17       | 40       | 89    |
| Total                | 40       | 39       | 89       | 105      |       |



**Figure 2: Mean scores of individual sensory modalities compared as a line diagram.**

**Table 2: Mean VARK component scores and their standard deviations compared using one way ANOVA**

| Variables        | 5 <sup>th</sup> Term<br>N=40 | 4 <sup>th</sup> Term<br>N=39 | 3 <sup>rd</sup> Term<br>N=89 | 1 <sup>st</sup> Term<br>N=105 | Statistical<br>Analysis ANOVA |
|------------------|------------------------------|------------------------------|------------------------------|-------------------------------|-------------------------------|
| Visual           | 8.07 ± 2.14*                 | 6.05 ± 2.87                  | 5.32 ± 2.3                   | 6.62 ± 2.80                   | F=11.32, P<0.000              |
| Aural            | 6.7 ± 2.28                   | 5.48 ± 2.54                  | 5.41 ± 2.3                   | 6.17 ± 2.61                   | F=3.36, P<0.01                |
| Read/write       | 5.65 ± 2.21                  | 5.00 ± 2.71                  | 4.71 ± 2.67                  | 4.82 ± 2.52                   | F=3.11, P<0.02                |
| Kinaesthetic     | 5.62 ± 2.10                  | 5.28 ± 2.15                  | 4.82 ± 1.97                  | 5.85 ± 2.56                   | F=3.49, P<0.01                |
| Total VARK Score | 26.0 ± 5.76                  | 21.82 ± 6.75                 | 20.27 ± 5.41                 | 24.39 ± 6.37                  | F=11.79, P<0.000              |

\*mean±Standard deviation

## DISCUSSION

Our study used the VARK questionnaire to ascertain the differences in learning preferences among students in different terms. Most of the students in our study had multimodal learning preferences (64.3%). Similar results have been reported by researchers from different

geographic areas.<sup>[10,11,12,17]</sup> When split into their respective terms, the majority still preferred more than one sensory modality for learning, however there was significant difference in the modal preferences among different terms of students on statistical analysis. These findings point to a fact that not every batch of students learns the same way and the teachers would have to alter their approach after assessing the learning preferences of students in every batch.

Learning expectations from medical students vary according to their level or stage of medical education. First year students are expected to prefer auditory and read write learning modes, while final years are expected to have a multimodal approach, being able to learn using visual, aural, read write and kinaesthetic sensory modalities as observed by Samarkoon *et al.*<sup>[13]</sup> Their study comparing VARK preferences among first year, final year and post graduate medical students found that first year and final year medical students preferred multimodal learning predominantly. Majority of the postgraduates preferred unimodal learning. This view of a medical graduate needing all sensory modalities to learn is supported by other researchers as well.<sup>[17]</sup>

Multiple studies done among medical students to study their VARK profiles have found that classes are largely diverse and there is no recognisable trend that is specific to this demographic group.<sup>[1,10,12-18]</sup> Our study found similar diversity even among students at varying levels of education within the same institution.

Teaching in Pathology in our institution mainly consists of didactic lecture sessions using PowerPoint slide presentations and blackboard teaching. Practical classes consist of small-group teaching/demonstrations, clinical pathology exercises and review of glass slides. Power point presentations tend to be heavy in text and favour read-write modality, while students have shown a preference towards visual learning. In order to enhance learning experience of students more visual learning tools like line diagrams, cycles, flow charts and mind maps would have to be included. The same applies to other sensory modalities as well; hence a teacher would have to make an effort to broaden his or her teaching methods to benefit as many students as possible in the class. Additionally, students can be assigned tasks and assignments that allow them utilise their learning modalities in best possible manner. Multimodal learning might help to some extent to better some of the deficiencies in teaching.<sup>[1,18]</sup>

The VARK questionnaire was not intended for complete assessment of learning style. It only points to preferred learning modality(modalities).A multitude of elements, such as psychological, social, physical, and environmental aspects affect learning and contribute to an individual's learning style.<sup>[19]</sup> The lack of a definition for learning and methods to quantify it imply that there is difficulty in proving that an enhanced teaching method betters learning or not.<sup>[1]</sup>

Limitations of our study are that it does not address whether altering teaching methods with every batch improves learning. We have not assessed relationship of VARK scores to academic performance. We have not explored if and how an individual's sensory modality score is related to the mean scores.

In conclusion, it is clear that there is significant diversity in every class and one size fits all approach might not be the right way to go. Teachers must vary and broaden their presentations and teaching methods to improve student learning. There is need for more research using different tools to enhance teaching methodologies that adequately address the all types of learners. We hope these data will help us improve teaching learning activities and make learning a more fruitful endeavour for our students.

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