



RESEARCH ARTICLE

LEARNING STYLES ASSESSMENT: PREFERENCES IN MEDICAL AND DENTAL STUDENTS USING FLEMING'S VARK QUESTIONNAIRE

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ABSTRACT

**Introduction:** The term, 'learning style' describes an individual's preferred method of gathering, processing, interpreting, organizing and analyzing the information. Learning style is the way in which students begin to focus on the topic, understand and apply new information in real life. Many students have different preference in learning styles and it is a major factor on their learning process. Researchers have defined four sensory modalities of learning: Visual (V), Aural (A), Reading/Writing(R) and Kinesthetic(K), which is called as VARK. Some learners have a preference for one of these learning modalities, whereas multimodal learners do not have a strong preference for any single method. Based on these facts the study was conducted using Fleming's VARK questionnaire for students in year 1<sup>st</sup>, 2<sup>nd</sup> of MBBS and BDS.

**Materials and Methods:** After we obtained the permission from stakeholder of VARK questionnaire, a VARK questionnaire that was used to assess the preferred study mode of the students was downloaded from website of the developers. The institutional ethical clearance from the university was obtained. This cross sectional study was conducted in Kasturba Medical College, Manipal University. The first, second year MBBS and first year BDS students took part in our study with their consent. The student questionnaires were scored and tabulated to determine the distribution of learning styles.

**Results:** The results of the study showed majority in the groups were single mode learners 54.69%, 51.89% and 68.81% respectively in 1<sup>st</sup>, 2<sup>nd</sup> MBBS and BDS students. The analysis of individuals learning styles in groups, we found that auditory and read style learners were statistically significant in BDS students when compared to 1<sup>st</sup> mbbs students.

**Discussion and Conclusion:** The students learn when proper environment is provided to them and it depends on the teacher who inculcates various methods to cater the learning styles of students. In our study we observed that in all groups majority were visual learners followed by bimodal style. This may be attributed to the teaching style in the sessions which will be lectures in traditional curriculum, where lot of emphasis is given on black board teaching and question answering in the class hours. Many studies have shown that students learn better by active learning strategies because active learning strategies help all type of learners. Knowing the learning style will have major impact on the delivery of the course. These studies will identify the learning preference of students and thereby helps teachers to have their proper learning strategies in terms of teaching the subjects.

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INTRODUCTION

The term, 'learning style' describes an individual's preferred method of gathering, processing, interpreting, organizing and analyzing the information. Different people use various learning styles in order to acquire knowledge, skills and attitudes. Learning style is one of the way in which students begin to focus on the topic, understand and apply new information in real life situations irrespective of their fields. One of the study has stated learning style is "the composite of cognitive, affective and physiological characteristics that serve as relatively stable indicators of how a learner perceives,

interacts and responds to the learning environment" (Keefe, 1987). Many students have different preference in learning styles and it is a major factor on their learning process. The medical students are taught their subjects mostly in lecture mode, where student listen to lectures without active involvement and is essentially a passive learning method that encourages memorization and note-taking as the means of assimilating the knowledge (Endorf and McNeff, 1991). Thus, Facilitators themselves may need guidance and training in how to identify feedback and adapt learning to individual's habits (Smith, 2001). The study done by Keefe also noted that a better understanding of learning habits by the faculty and based on them improve instructional delivery methods. Instructors should attempt to give students with different learning habits which provides an opportunity to learn more and grasp the knowledge in conducive to their preferences (Keefe, 1987).

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Many studies showed that method of teaching largely influences the learning styles in the students. In most professional colleges, students come from different states, culture, environment and background knowledge (Kolb, 1985; Biggs, 1992; Dryden, Vos, 2001). Fleming and Miles (1992) defined four sensory modalities of learning: Visual (V), Aural (A), Reading/ Writing (R) and Kinesthetic (K), which is called as VARK (Fleming and Vark, 2007; Fleming, 1995). Visual learners prefer the use of diagrams and symbolic devices such as graphs, flow charts, hierarchies, models, and arrows that represent printed information. Read-write learners prefer printed words and texts as a means of information intake; they also prefer lists, glossaries, textbooks, lecture notes, or handouts. Auditory learners prefer "heard" information and thus enjoy discussions, lectures, and tutorials when acquiring new information. Kinesthetic learning is a multimodal measurement employing a combination of sensory functions. Kinesthetic learners have to feel or live the experience to learn; they prefer simulations of real practices and experiences, field trips, exhibits, samples, photographs, case studies, "real-life examples," role-plays, and applications to help them understand principles and advanced concepts. Some learners have a preference for one of these learning modalities, whereas multimodal learners do not have a strong preference for any single method. They rather learn via two or more of the modalities (Fleming and Mills, 1992; Zhang, 2002). Various instructional methods which are used for teaching the first year medical students include lectures, dissections, practical's, tutorials, etc.

The learning style information can also benefit the students as it would help them in formulating the appropriate learning strategies for enhancing their learning.<sup>12</sup> Disparity between learning habit and instructional strategy may account for course dropouts, failures, and examination phobia of learners and faculty may misinterpret it as lack of motivation, disinterest of students and sometimes simply an IQ problem (Sadler-Smith *et al.*, 2000). Facilitators and supporters themselves may need guidance and training in how to identify feedback and adapt learning to individual's habits (Smith, 2001). Based on these facts the study was conducted using Fleming's VARK questionnaire for students in year 1<sup>st</sup>, 2<sup>nd</sup> of MBBS and BDS.

## MATERIALS AND METHODS

After we obtained the permission from stakeholder of VARK questionnaire, a VARK questionnaire that was used to assess the preferred study mode of the students was downloaded from website of the developers. The institutional ethical clearance from the university was obtained. This cross sectional study was conducted in Kasturba Medical College, Manipal University. The first, second year MBBS and first year BDS students took part in our study with their consent. Self-Response VARK questionnaires were administered to these students. The data was collected on the same day and analysed. The questionnaire measures four perceptual preferences (V-visual, A-Auditory, R-Read/Write, K-Kinesthetic). It consists of 16 questions with four options each. The purpose of each question was to categorize the learning style preference of the respondents. Respondents could leave questions blank as well as choose more than one option for identifying preferences for multiple learning styles. Student questionnaires were scored and tabulated to determine the distribution of learning styles.

## Statistical Analysis

Data entry and analysis were performed with Microsoft Excel. Number of observations and Percentages were obtained for each study group in all groups. The values were expressed in percentage. The different learning styles are analyzed with the groups using SPSS version 18 and data represented as Mean  $\pm$  SD. The student's t-test was used to know the significance among the groups.

## RESULTS

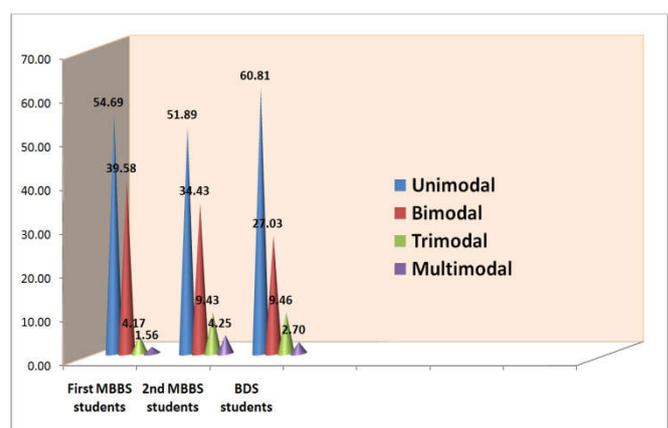
The results of the study showed majority in the groups were single mode learners 54.69%, 51.89% and 68.81% respectively in 1<sup>st</sup>, 2<sup>nd</sup> MBBS and BDS students (Diagram 1). The analysis of individuals learning styles in groups, we found that auditory and read style learners were statistically significant in BDS students when compared to 1<sup>st</sup> mbbs students. Also 2<sup>nd</sup> MBBS students were more kinetic learners compared to BDS students ( $p < 0.05$ ). (Table 2)

**Table 1. Medical and dental student's responses to questionnaire**

Group	1st MBBS (Mean $\pm$ SD)	2 <sup>nd</sup> MBBS (Mean $\pm$ SD)	BDS (Mean $\pm$ SD)
Visual	4.68 $\pm$ 2.79	4.30 $\pm$ 2.43	4.62 $\pm$ 2.37
Auditory	5.85 $\pm$ 3.04	6.22 $\pm$ 2.57	6.17 $\pm$ 2.58
Read	4.55 $\pm$ 2.47	4.53 $\pm$ 2.44	4.5 $\pm$ 2.24
Kinesthetic	6.23 $\pm$ 2.92	6.33 $\pm$ 2.48	5.97 $\pm$ 2.66

**Table 2. The comparison of different learning styles among the groups**

Groups	P value	
visual		
1 <sup>ST</sup> MBBS-2 <sup>ND</sup> MBBS	0.15	NS
1 <sup>ST</sup> MBBS-1 <sup>ST</sup> BDS	0.42	NS
2 <sup>ND</sup> MBBS-1 <sup>ST</sup> BDS	0.21	NS
Auditory		
1 <sup>ST</sup> MBBS-2 <sup>ND</sup> MBBS	0.19	NS
1 <sup>ST</sup> MBBS-1 <sup>ST</sup> BDS	0.01	S*
2 <sup>ND</sup> MBBS-1 <sup>ST</sup> BDS	0.81	NS
Read		
1 <sup>ST</sup> MBBS-2 <sup>ND</sup> MBBS	0.93	NS
1 <sup>ST</sup> MBBS-1 <sup>ST</sup> BDS	0.03	S*
2 <sup>ND</sup> MBBS-1 <sup>ST</sup> BDS	0.32	NS
Kinesthetic		
1 <sup>ST</sup> MBBS-2 <sup>ND</sup> MBBS	0.71	NS
1 <sup>ST</sup> MBBS-1 <sup>ST</sup> BDS	0.78	NS
2 <sup>ND</sup> MBBS-1 <sup>ST</sup> BDS	0.04	S*



**Diagram 1. Different modes of response in students**

## DISCUSSION

The students learn when proper environment is provided to them and it depends on the teacher who inculcates various methods to cater the learning styles of students. Knowing the learning style of students is a valuable skill in education, which may help teachers to identify and solve learning problems of students using different method of teaching. In our study we observed that in all groups majority were visual learners followed by bimodal style. This may be attributed to the teaching style in the sessions which will be lectures in traditional curriculum, where lot of emphasis is given on black board teaching and question answering in the class hours. But when students are exposed to various learning methods like problem solving, interactive sessions, interaction and examination of patients, it stimulates two or more modalities of learning and hence the learning style shifts from unimodal to multimodal (Usha G Shenoy *et al.*, 2012). Many studies have shown that students learn better by active learning strategies because active learning strategies help all type of learners (Bonwell and Eison, 1991; DiCarlo, 2006; Lujan and Dicarlo, 2006). Discussion in class, cooperative learning exercises, role-plays, simulations, debates, and games are active learning strategies that can be used which promotes enthusiasm and motivation (Bonwell and Eison, 1991). It involves thinking through reasoning and improves problem solving and decision making skills which can be improved from the beginning of the course itself. Teaching methods should include combinations of audio visual aids to help them shift from unimodal to multimodal learning style. Baykan and Naçar (2007) have reported that 23.3% of 155 first year medical students were kinesthetic learners. However, our study was in accordance with the study that kinesthetic was the most preferred and clearly indicated that visual learning was least preferred in all the groups (Baykan and Naçar, 2007). Since our students had the preference for kinesthetic learning they can be made multimodal learners by depicting the information in charts, graphs, flowcharts and all the symbolic arrows, circles and other devices (Rao and DiCarlo, 2000).

### Limitations

Sample size from the same institution and gender differentiation was not done is a major limitation, and further larger multicentric studies required to arrive at conclusions so that it helps individuals as well as policy makers to plan effective teaching learning methods that can ultimately benefit the students. It is also required to study learning styles with the performance of students in examination. Also studies need to be done on the comparison between basic sciences and clinical years students who are more in to case based learning.

### Conclusion

Knowing the learning style will have major impact on the delivery of the course. These studies will identify the learning preference of students and thereby helps teachers to have their proper learning strategies in terms of teaching the subjects. Self-directed learning will have multimodal effect on the subject and makes the student lifelong learners. Apart from knowing the learning styles, it creates learning environment and motivates the students do well in academics such as examinations.

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