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## RESEARCH ARTICLE

### LEARNING PATTERNS AMONG MEDICAL STUDENTS

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#### ABSTRACT

The aim of the present study was to evaluate the common learning pattern among the different styles namely visual, auditory, reading and kinesthetic in students of first year MBBS students. A cross sectional study of first year medical students (n= 100) was performed. The validated VARK questionnaire was used to categorize the learning styles of students. The questionnaire consists of 16 items which identify four different learning styles: visual, aural, reading/writing and kinesthetic. Descriptive statistics were used to identify the learning styles of students. The response rate was 100%. The results showed that the vast majority of students (95%) preferred to learn by multiple sensory modalities. Among the multimodal learning styles the most preferred was trimodal (5%) and quad modal (95%) respectively. The results of this study can provide useful information for improving the quality of the teaching and learning experiences of students. However, more research on this topic needs to be undertaken before the association between learning style preferences and teaching and learning strategies is more clearly understood.

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#### INTRODUCTION

Students' approach to learning has been a topic of interest for medical educators for many decades. In medical colleges, students from various parts of the country take admission. There are also lots of students who come from abroad to seek education here. Hence with a lot of diversity among students we find a lot of variations in their learning patterns. Many factors can influence student learning styles. These factors are: gender, age, academic achievement, brain processing, culture and creative thinking (Honigsfeld, 2001). There are many ways and methods by means of which a student can find out the pattern which will help him or her perform best. There are a large number of learning styles, strategies and approaches based on different psychological constructs (Claxton and Murrell, 1987) there is a great deal of interest amongst educators in identifying whether learners are predominantly visual, auditory, reading/writing or kinesthetic learners. There are many ways and methods by means of which a student can find out the pattern which will help him or her perform best. The most established and widely used ones are the Kolbe's test and VARK learning. VARK method was developed by Neil Fleming.

In this method, on a general basis, we can categorize the learning patterns into four types Visual, Auditory, Reading - writing and Kinesthetic.

Visual learners should be stimulated with depictions of information in charts, graphs, flow charts, and all the symbolic arrows, circles and other devices that instructors use to represent what could have been presented in words (Lujan H and DiCarlo S, 2006). Auditory learning is achieved through listening during peer instruction (Cortright *et al.*, 2005; Rao *et al.*, 2000) collaborative testing (Cortright *et al.*, 2003; Rao *et al.*, 2002), debate (Scannapieco, 1997) games (GGreeblaw and Wyman, 1997) and answering questions (DiCarlo and Collins, 2001). Manipulating models (Chan *et al.*, 1996) and role playing (Kuipers and Clemens, 1998) satisfies kinesthetic and tactile learners. Reading /writing learners can be approached with information depicted in words. Few studies have reported an increase in student achievement by using simulation and games. To achieve effective learning it has been reported that students must read, write and talk about their tasks, relate them to prior experience and knowledge and engage in application (Lujan and DiCarlo, 2006). The implication of this kind of study is not for faculty members to change their teaching style, but for students to understand their own mental process in relation to the changing learning scenarios. Learning pattern followed by majority of the students, the teachers will be able to deliver

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better and get better results. This in turn boosts up the students confidence and encourages the students to learn and enjoy the process. The aim of the present study was to evaluate the common learning pattern among the different styles namely visual, auditory, reading and kinesthetic in students of first year MBBS students of KMC, Mangalore.

**MATERIALS AND METHODS**

**Setting and participants**

The present study was conducted in Kasturba Medical College Bejai Mangalore after getting approval by Institutional Ethical Committee (IEC). Version 7.1 of the VARK questionnaire was used in this study (Lujan and DiCarlo, 2006). The copyright permission was taken from the authors. The questionnaire measures four perceptual preferences (V, A, R and K). It consists of 16 questions with four options each. The purpose of each question is to categorize the learning style preferences of respondents. Respondents can choose more than one option for identifying the preferences for multiple learning styles. VARK questionnaire was distributed to 100 MBBS students of first year as a hard copy, after taking their informed consent. The required pre-test instructions were given to the students. Each question aims to place the participant in a ‘learning’ situation and the answers represent the preferred learning style. Respondents can choose more than one option for identifying the preferences for multiple learning styles. Questionnaires were evaluated on the basis of previously validated scoring instructions (Fleming, 2012). Scores of VARK components were tabulated to determine distribution of learning style preferences.

**Statistical analyses**

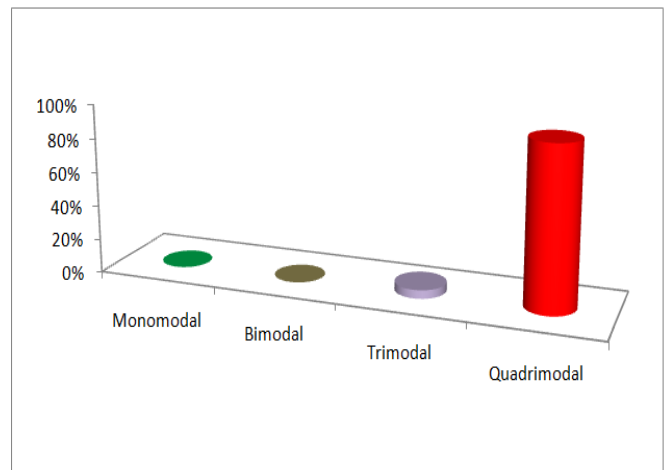
The distributions of the VARK preferences were calculated in accordance with the guidelines given in the VARK website. Descriptive statistics were used for each VARK component (Fleming ND, 2012). To calculate the percentage of students for each VARK component the number of students who preferred each learning style modality was divided by the total number of students (n=100).

**RESULTS**

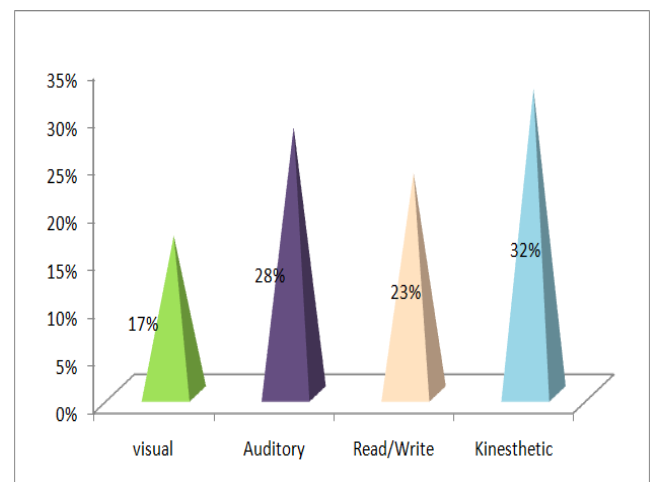
According to the VARK model, the students’ learning styles are dependent on how they prefer to perceive/receive information. They may prefer a single mode (unimodal), two modes (bimodal), three modes (trimodal) or all four modes (quadrmodal) of the information presentation. In our study the response rate was 100%. The Mean VARK scores for aural (4.85) and kinesthetic learners (4.9) were more than that for reading/writing (3.75) and visual (2.67) learners (Table 1)

**Table 1. Responses and scores for the individual VARK components**

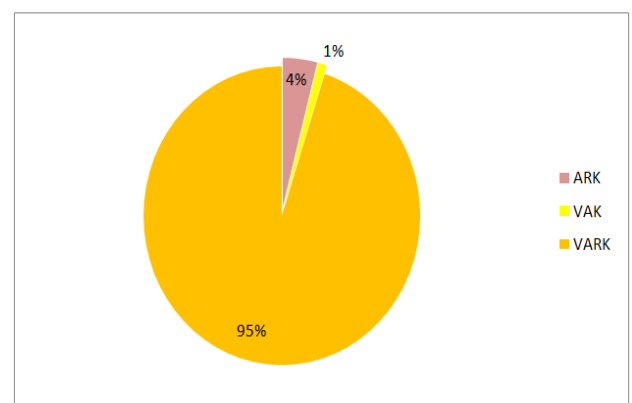
Mode	Absolute number of Responses (%)	Mean score ±SD
Visual	270 (16.58%)	2.67 ±1.5
Auditory	470 (28.8%)	4.85 ±2.0
Read/write	378 (23.2%)	3.75 ±1.82
Kinesthetic	510 (32%)	4.94 ±2.11
Total	1628 (100%)	-----



**Figure 1. Distribution of preferred learning styles**



**Figure 2. Distribution of students opting for a modality in multimodal combination**



**Figure 3. Percentage of students with a preferred combination of learning styles (n=100)**

However, a further analysis showed that the vast majority of students (95%) preferred to learn by multiple sensory modalities. Among the multimodal learning styles the most preferred was trimodal (5%) and quad modal (95%) respectively.

## DISCUSSION

The present study was carried out to gain an understanding of the learning preferences of first medical students. In general, the findings of this study provide insight into the ways that our medical students learn in relation to the subject of study. Learning preference of students in VARK questionnaire is widely used by researchers to identify the learning preference of students ((Kumar *et al.*, 2009; Murphy *et al.*, 2004). In the present study, the Mean VARK scores for aural (4.85) and kinesthetic learners (4.9) were more than that for reading/writing (3.75) and visual (2.67) learners. This could be due to the heavily involved new technology. Our results reflected that all the medical students included in this study preferred multimodal approach i.e. they preferred to acquire and understand information using more than one sensory modality. Our results are in accordance with a few other studies (Nuzhat *et al.*, 2011; Baykan and Nacar, 2007; Shah C *et al.*, 2012). These multimodal students will benefit more from active learning strategies than the didactic lecture format. We found that many students preferred to learn by more than one mode of information presentation. In the unimodal learning style category, we found that the most preferred mode was the kinaesthetic one, followed by the visual, auditory and the read-write ones. Therefore, the active learning strategies such as role playing, simulations, use of models, debates, etc which are preferred by the kinaesthetic learners would be more beneficial to the students than the didactic lecture formats. Active learning strategies not only encourage the critical thinking (evaluation, analysis, and interpretation of the information) but they also improve the problem solving and the decision making skills. The variations in the learning preferences of the medical students in the present study could be due to the differences in the teaching methodologies which are being used at the premedical level in their respective countries. The present results provide an insight on providing training opportunities to the medical educators understanding of the students' learning style preferences. This results in a greater comprehension and consideration of the unique learning needs of each of their students. Correlating the students' learning style preferences and instructional needs can assist the teachers in using appropriate teaching-learning instructional practices and it can also provide personalized interventions for enhancing the learning.

## Conclusion

The results of this study can provide useful information for improving the quality of the teaching and learning experiences of students. The knowledge on the learning styles has tremendous impact on both medical teachers and the students. Identify the learning preferences in students can help them in using the appropriate learning strategies to become good doctors. The teachers become aware of the student's learning styles and they can therefore incorporate teaching-learning strategies which are tailored to meet the student's learning preferences. This would not only create an efficient learning environment, but it would also motivate the students to achieve academic success. However, more research on this topic needs to be undertaken before the association between learning style

preferences and teaching and learning strategies is more clearly understood.

## Limitations of the study

sample of students from a single institute was used. Therefore the sample may have been biased and might not represent the population of medical students across Mangalore. Further studies using multiple centers with a large sample size on the current topic are therefore recommended. In future, further studies need to be conducted to study the correlation between the performances and the learning styles of students.

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