

## Do Learning Styles Influence Learning Outcome in Pathology

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### Abstract

Identifying and employing appropriate learning styles could play an important role in selecting teaching styles, which can improve education ultimately. The present study aimed to assess the diversity of learning styles amongst medical students of a Basaveshwara Medical College, Chitradurga, Karnataka in 2014. A cross-sectional study which employed VARK learning style's questionnaire was done on 89 Second year medical sciences students. Data was collected with use of VARK questionnaire. The validity of the questionnaire was assessed on basis of experts' views and its reliability was calculated by using Cronbach's alpha coefficients. Data were analysed by using SPSS software and Chi-square test. The preferred learning styles of medical students in the present study were aural and reading/ writing. It is suggested that all medical students must be tested to determine their desired learning styles by using VARK questionnaire, also to choose appropriate teaching methods and to improve educational goals.

**Keywords:** Visual; Aural; Kinesthetic; Reading; Writing; Quad Modal.

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### Introduction

Learning is an endless gain of knowledge, skills and attitudes. This is achieved by using different learning styles [1]. A learning style refers to a person's chosen ways of gathering, organizing, and thinking about information [2]. Students are known to have preferences for the modes in which they collect information. The VARK model [3] provides the learners with a profile of their learning styles, based on the sensory modalities which are involved in taking in information. VARK is an short form for the Visual (V), Auditory (A), Read/Write (R) and the Kinesthetic (K) sensory modalities. The visual learners process the information best if they can see it like depiction of information in charts, graphs, flow charts, and all the symbolic arrows, circles etc. The auditory learners like to hear information in form of discussion, oral presentations, classes, email, cell phone chat, texting. The read-write learners prefer to see the written words

like quotes, lists, texts, books and manuals. The kinaesthetic learners like to acquire information through experience and performance.

Lectures using chalk and board and discussions are the instructional methods used for teaching the students. However there are colleges in Karnataka which use other modes of instructions. Few studies which have been done in the medical students on the learning styles have been conducted in other countries and the results have shown variations, may be due to the use of different teaching methodologies at the premedical level [4]. The students' preference for different teaching- learning methods had been attributed in the past to a number of reasons such as familiarity with the method, a positive outcome, etc [5]. A less explored but perhaps a more significant factor could be the students' learning styles at the adolescent's stage. Having knowledge on the learners' learning styles is a vastly underutilized approach towards an improvement in the classroom instructions.

The learning style information can also benefit the students as it would help them in formulating the appropriate learning strategies for enhancing their learning. Developing knowledge of different learning

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styles among the student population, it still is important in designing curricula, and adopting teaching methods to promote student learning and develop the deep learning skills needed for lifelong. The VARK model was used in the present study because it addresses a part of the learning styles that was open to self modification and it is accompanied by study strategies for each style

The aim of the present study was therefore, to gain an understanding of the learning style preferences of dental students, to find out the most preferred instructional methods which could be helpful in formulating teaching learning strategies for improving the learning experience.

### Materials & Methods

This study was conducted on medical students who were studying in Basaveshwara Medical College and Hospital, Chitradurga, Karnataka, India. 89 Batch 2014 students who consented participated in the study. The students were explained about the use of this questionnaire based study. General demographic information i.e. names, ages and genders of the students, were collected along with the 15 VARK questionnaires to assess their the learning style preferences [3]. Each of the 15 questions consist of four options each and the respondents could choose one or more than one option if they found them suitable. Hard copies of the questionnaires were distributed to the students who volunteered to take

the study. The completed questionnaires were collected after 15-20 minutes and they were evaluated by using previously validated scoring instructions which were available on the VARK website.

Descriptive statistics was used to analyze the students' preferences of the various VARK components. 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- V(visual), A (auditory), R(read/write) & K (kinesthetic)), two modes (bimodal-VA, VK, VR, AK AR, KR ), three modes (trimodal- VAK, VAR, AKR and VRK ) or all four modes (quadrimodal- VARK) of the information presentation. The learning style preferences were reported in percentage. The Students' t-test was utilized to compare the VARK scores for the male and female students

### Results

All the 89 students participated and answered the 15 questions. The overall response rate was 100%. The average age of participants was 22 years. Equal representation of girls & boys was seen. In the current study, we observed majority of the students showed a single mode of learning styles, 15% preferred the visual mode (V), 16% preferred the auditory mode (A) and only 25% preferred the read-write (R) and 17% preferred the kinaesthetic mode (K) (Figure 1). The read/ write mode was the most preferred mode and

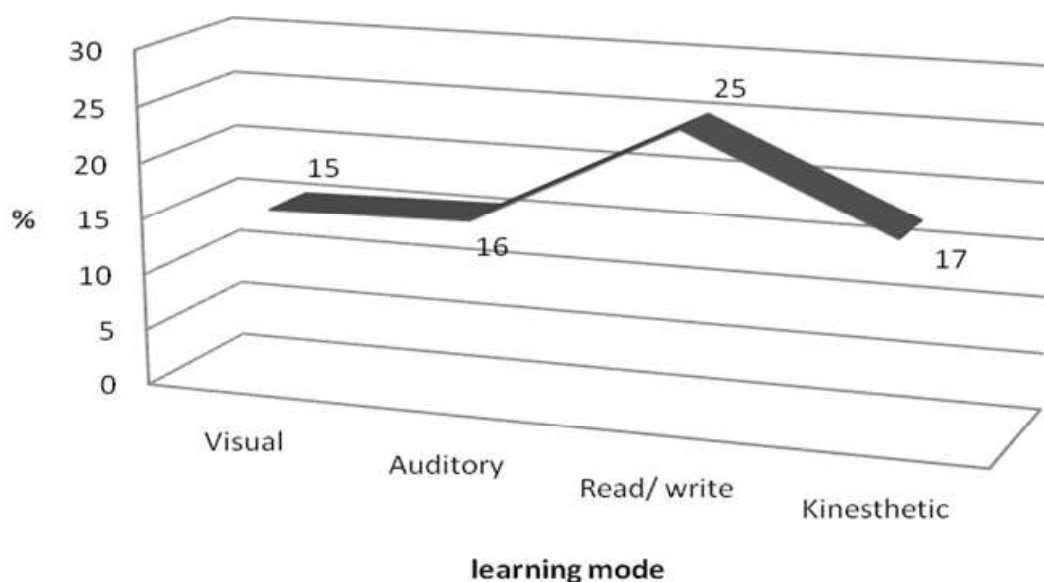


Fig. 1: Percentage of VARK scores for

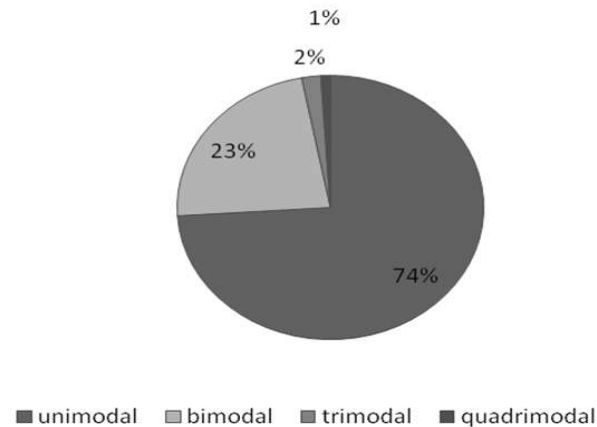


Fig. 2: Percentages of students who preferred one (unimodal), two (bimodal), three (trimodal), or four (quadrimodal) modes of information

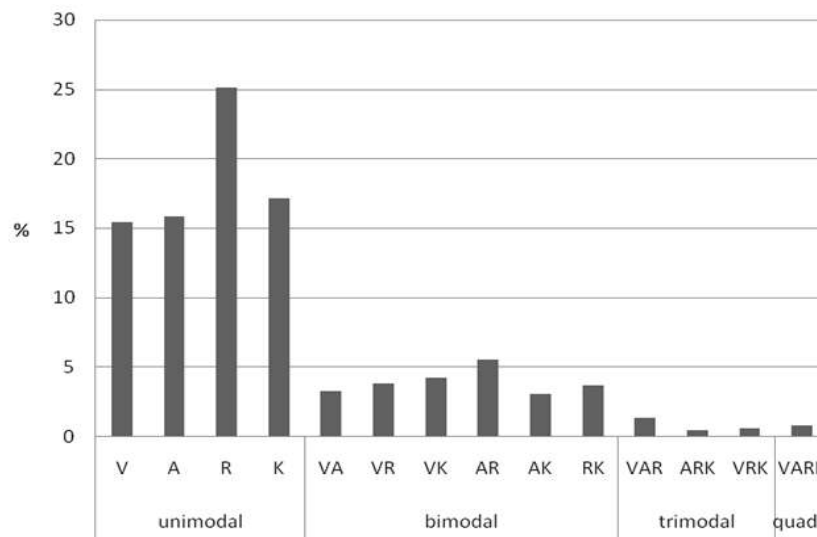


Fig. 3: Breakdown of percentage of students preferring a unimodal (V, A, R, or K), bimodal (VA, VR, VK, AR, AK, RK), trimodal (VAR, ARK, VRK) or quadrimodal (VARK) of information presentation

the visual mode was the least preferred mode of the information presentation.

Student preferences for how they receive information can be singular, two modes, three modes or all four modes of presentation. It was found that 26% students had multimodal learning style preferences and that only 74% students had unimodal preferences. Amongst the multimodal learning styles, the most preferred mode was bimodal, followed by trimodal and quadrimodal respectively (Figure 2).

Of the 26% students who had multimodal learning styles, bimodal learners was the highest preferred. Amongst them 6% of students preferred the most with audio with read/write (AR) presentation, least was i.e 3% preferred both visual & audio (VA) and audio and kinesthetic (AK). For those students that preferred three modes of information presentation, 1% preferred

the combination of visual, read/write and kinesthetic (VRK) & visual, aural and read/write (VAR) equally. While there was only 1% of the student population which preferred quadri modal (VARK) type of presentation (Figure 3).

### Discussion

The study recognized that the majority of medical students studying at this college prefer read/write modes of information presentation. Read/write learners prefer to see the written words, or learn by writing. Our findings were comparable to the results of the study which was conducted by Lujan and Di Carlo [6], the most preferred learning style of the adolescents was read/write among the students from

Indiana, USA. According to Nuzhat et al [7] reported that the auditory mode was the most preferred learning style among the medical students from Saudi Arabia. Poonam Kharb et al [8] showed that the most preferred mode was the kinesthetic one, followed by the visual, auditory and the read-write ones. The variations in the learning preferences of the medical students from different countries could be explained on the basis of the differences in the teaching methodologies which are being used at the premedical level. This explains our findings that most of the examinations are based on written tests and thus with strong Read/write preferences are advantageous.

Around 74% exhibited unimodal learning style preferences, which indicated that our study group dental students preferred single modes of information presentation. The rest 26% students exhibited multimodal learning style. Previous studies which were conducted on adolescents aged between 18-24 years from various other countries reported varied results; the percentage of students with multimodal learning style preferences in these studies varied from 59-85% [9-11]. This is in contrary to our findings. There was a marked difference in the learning preferences. This implies that most of the students after their schooling learn effectively as long as the teaching methods include a blend of activities that stimulate the visual, aural, read-write and the kinaesthetic sensory modalities. The increasing use of multimedia in teaching can provide opportunities for presenting multiple representations of the content (text, video, audio, images and interactive elements) to cater more effectively to the diverse learning styles of the students. However Tierney and Brunton (2005) reported that young students who are into business mode of education were predominantly read/write learners [12].

The study is limited with its small sample size and students from medical are from one single college. For this reason, these findings cannot be generalized to all the students. The results presented here are only pilot findings of the learning approach of respondents.

### Conclusion

The knowledge on the learning styles has suggestions for both the students and the teachers and the health education system. There is no particular way to present material but by providing a variety of different approaches the differing learning styles of students can be accommodated. This study has identified that the majority of medical students prefer read/ write modes of information presentation.

Evaluation of the students the undergraduate level is primarily based on the written examination. However a blend of information presentation is suggested as the examination levels would involve the assessment of kinesthetic skills. Thus early exposure of combination of different modes of presentation prepares the students to perform better.

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