

LEARNING STYLE PREFERENCES OF MEDICAL AND DENTAL STUDENTS: AN OPEN LABEL, VARK QUESTIONNAIRE BASED STUDY

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ABSTRACT

Background: Learning style preferences vary among individual students. Knowing the learning styles of students will guide the faculty in tailoring their teaching methodologies to their learning styles so that they can acquire maximum knowledge and their performance can be improved. **Materials and Methods:** An open label cross sectional study was conducted among 231 medical students and 168 dental students belonging to Malla Reddy Group of Institutions, Suraram, Hyderabad. Paper copies of validated Visual-Aural-Reading/Writing-Kinesthetic (VARK) questionnaire consisting of 16 questions were administered to the students after taking informed consent. The responses were scored according to VARK scoring chart and were sent to the copyright holder of VARK questionnaire to convert them into VARK categories. Out of two algorithms assigned to each student, scores obtained from research algorithm were used to analyze by using descriptive statistics. **Results:** Majority of the students had unimodal (60.1%) learning styles while multimodal learning styles were only 39.8%. Among the unimodal learning styles, Visual mode of learning style was most preferred (58.27%). **Conclusion:** Since majority of the students are unimodal visual learners who learn best by visualizing the information, faculty should try to incorporate many charts, pictures, and illustrations in their teaching methodologies. Students should also be taught some strategies to learn better which includes concept maps, color coding and flash cards.

Keywords: Learning styles, Medical students, Dental students, Teaching – learning methodologies

INTRODUCTION

Learning style is described as “the cognitive and interaction patterns which affect the ways in which student’s perceive, remember and think. It is the composite of characteristic of cognitive, affective and physiological behaviors that serve as relatively stable indicators of how a learner perceives, interacts with and responds to the learning environment¹. Every individual student has his or her own dominant learning style. For instance, some students prefer visual style, they learn best by visualizing the information in the form of diagrams or charts while some are audible learners, learn best by listening.

They can also be Read/Write learner who learns best when information is displayed in words or a kinesthetic learner who learns best with practice or simulation.² The performance of the students is best when they are instructed according to their learning styles.³ In recent years there is increase in the classroom size in the medical stream to overcome the shortage of physicians in the country. The more the class room size, the more diverse are the students not only in respect to their learning styles but also in their background, culture, ethnics, experience and level of preparedness.⁴ This poses a great challenge to the

medical educator, as his teaching methodologies have to cater to the needs of all the students. Knowing the learning style preferences of the students will guide the faculty in tailoring their teaching methodologies to match the learning style preferences of the students so that the students can acquire maximum knowledge and their performance can be improved.⁵

The medical education system in India is quite different from the rest of the world. During grades 11 and 12, the students will be trained to take an entrance examination to enter the medical college. The curriculum in these two years is limited. Once in the medical college, they are expected to gain vast amount of knowledge in a short span of time.⁶ With increasing number of subjects and vast syllabus, it is when they enter the medical college that they start recognizing their learning abilities and learning style preferences.

The Visual-Aural-Reading/Writing-Kinesthetic (VARK) questionnaire is a validated questionnaire developed by Neil Fleming (1992) to assess the sensory modalities of learning namely the Visual, Auditory, Read/ Write and Kinesthetic.⁷ The students may have one or more dominant sensory modalities in learning. This questionnaire has been used in many studies to assess the learning style preferences of the students.

Data on the learning style preferences of medical and dental students and that too from the Telangana state of India is limited. The present study was therefore planned to assess the learning style preferences of the students using VARK questionnaire and to suggest teaching strategies so that medical teaching will be in line with the learning preferences of the students.

MATERIALS AND METHODS

An open label cross sectional study was carried out among the students of Malla Reddy Medical College for Women and Malla Reddy Dental College for Women, Suraram, Hyderabad, Telangana. The students who were absent on the day of data collection were excluded from the study. Permission to use VARK questionnaire,⁸ version 7.3, was obtained from the copyright holders. The study and

its purpose was explained to the students and informed consent was obtained from them. The VARK questionnaire consisting of 16 questions with four options each was then administered to the students. The students were asked to mark one or more options to each question. Sufficient time was given to the students to complete the questionnaire. The completed questionnaires were collected and the responses were scored according to the VARK scoring chart. The scoring procedure generated a sum ranging from 0-16. These scores were entered into excel sheet and sent to the copyright holder of the questionnaire for converting them into VARK categories for further analysis. The copyright holder assigned two algorithms to each student as per their VARK scores namely Standard algorithm and Research algorithm. The Standard algorithm was based on the arithmetic differences between each respondent's VARK scores noting the differences between his or her highest scores and the next ranked scores relative to total score of all four. Research algorithm is based on standard deviation of individual score from the scores in VARK database. Accordingly, Students who prefer a single learning style preference either Visual, Auditory, Read/write or kinesthetic mode are termed as unimodal while those who prefer information to arrive in a variety of modes are termed multimodal. Those who prefer two or three modes of learning are termed bimodal and trimodal.. The scores obtained from the research algorithm were used, analyzed further and presented in graphically in the present study.

RESULTS

Out of 460 students, 231 second year medical students (107 students of third semester and 124 students of fifth semester) and 168 dental students (79 in first year and 89 in the second year) participated and completed the given questionnaire, The results showed that majority of both MBBS and BDS students were unimodal (60.1%) learners while multimodal were only 39.8%. There were no students in bimodal or trimodal preferences of learning. (Fig 1 and Fig 2)

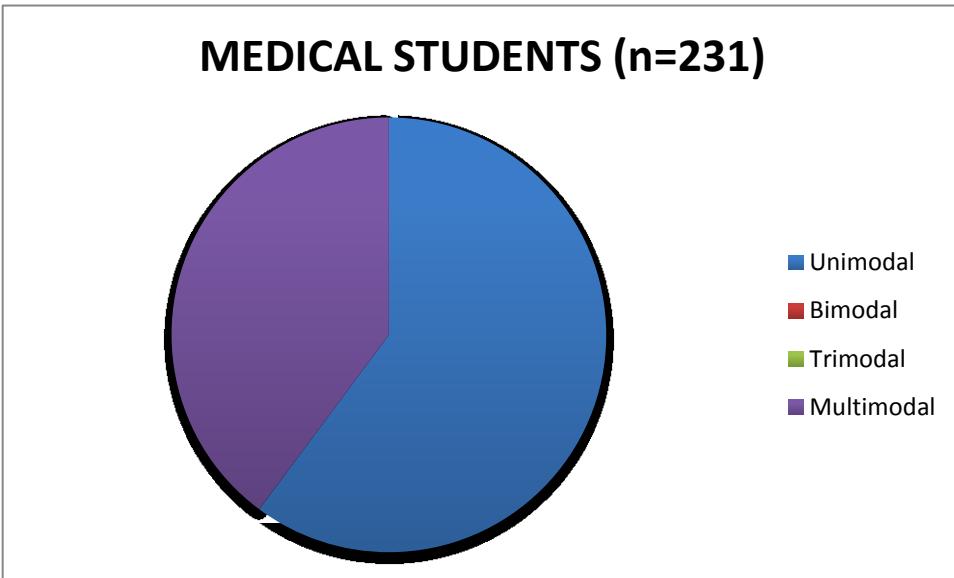


Figure 1. Learning style preferences of Medical Students

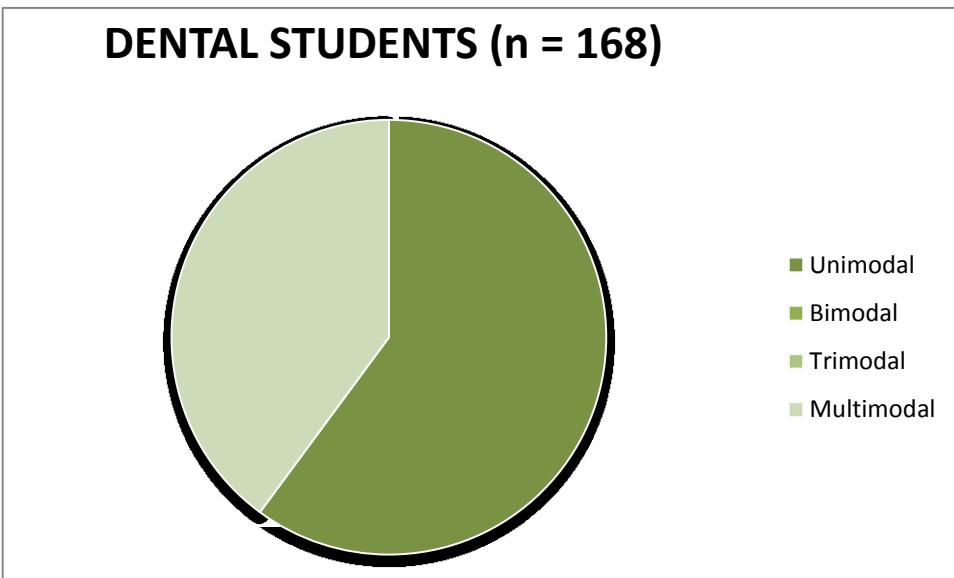


Figure 2. Learning Style Preferences of Dental Students

Among the unimodal learners, Visual mode of learning most preferred by the students, while

read/write mode of learning was least preferred (Fig 3).

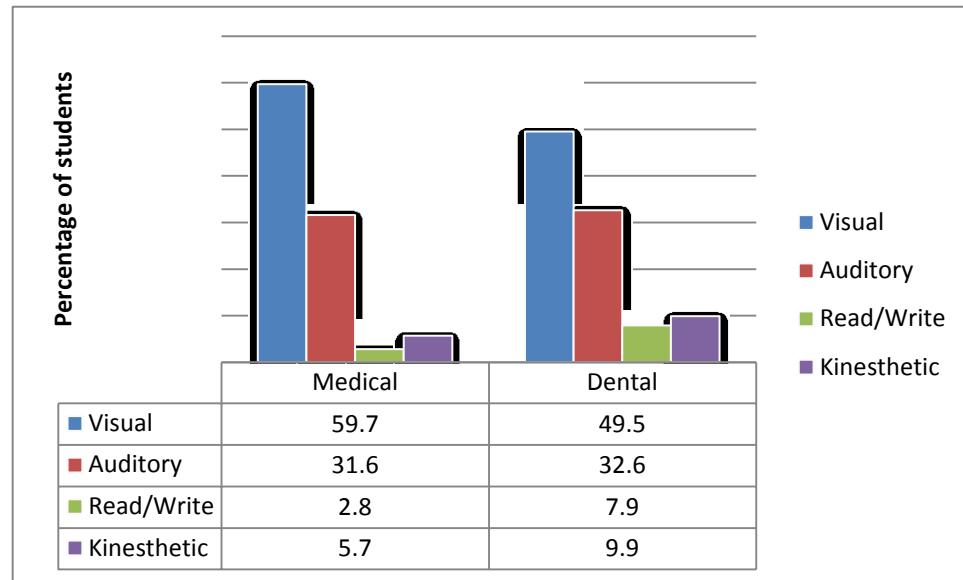


Figure 3. Students' preferences in Unimodal Learning

Furthermore, The multimodal learners further categorized into three segments. The type one, who tend to use their preference according to the situation (context specific), Type 2 multimodal learners use all the preferences to get deeper understanding of the

learning but in longer time (context blind). The third group is Transition; between Type 1 and 2. The preferences of Multimodal learners is presented in the figure 4

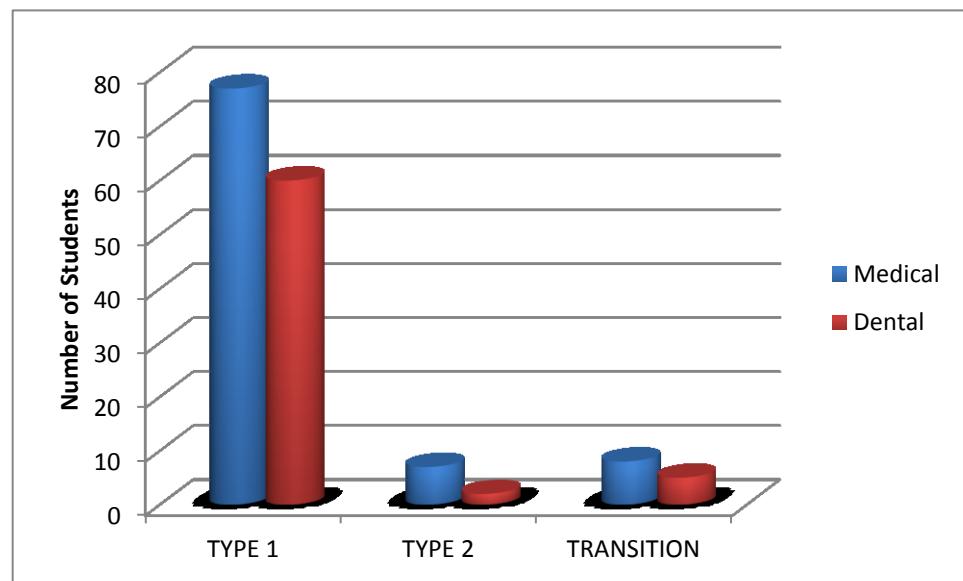


Figure 4. Comparison of preferences of Multimodal Learners

DISCUSSION

Medical Education has a goal of developing knowledge and skill in an individual that can be applied to the profession. Therefore teaching methodologies must be so designed to maximize the cognitive and learning process.

Majority of the students in the present study were unimodal Visual learners (60.1%).

The results of similar studies conducted both nationally and internationally are variable. Two studies carried out on first year medical students one at a rural medical college in West Bengal and another at Salem reported that the most preferred learning style was Multimodal – 84.2%⁹ and 62.04%¹⁰ respectively. Another study carried out by Ranganath et al¹¹ reported that 61% of the second year medical students preferred multimodal style of learning. 66.1% males and 65.38% females of a medical college in Mumbai liked Multimodal preference.¹² Similar studies from Malaysia^{13,14}, Sohar¹⁵, Lahore¹⁶ are reported that the preferred learning style is multimodal. A study from International medical University, Kaula Lumpur reported that majority of the students were unimodal- kinesthetic learners.¹⁷

Studies on learning style preferences among dental students showed that they preferred multimodal learning styles.¹⁸

Since majority of the students are Visual learners who learn best by visualizing the information in the form of charts or diagrams, the faculty should try to use as many illustrations/charts/ pictures in their presentations. They should also avoid visual distractions in the classroom like frequent opening of doors and windows, disturbances in the audio/visual aids to retain the attention of the students. Incorporation of timed breakups in the lectures through active learning exercises and brain storming sessions gives students an opportunity to assimilate and visualize in the brain, the information taught to them. During the practical sessions, we can also make them visualize the charts and models displayed in the museum to grasp the information better. It should be kept in mind that most of these students cannot

answer questions spontaneously as in *viva voce*. They need time to visualize the information in their mind and can then only answer the questions.

These students must also be taught some strategies to learn better which includes concept maps/ mind maps, color coding, flash cards. Concept maps or mind maps are used to graphically organize the data. The main idea is written in the centre of the page and then draw branches out to secondary ideas. Such mind maps help in easy understanding and recollecting of the subject. These concept maps can be incorporated in the lecture presentations also. They should also be trained to use color coding in their text books to group similar ideas together. Practicing the concepts by drawing and redrawing images also helps the visual learners. During the tutorial classes, Flash cards can be used to revise the topic of discussion. The students should also be trained to revise during the examination by looking at the pages and redrawing the pages from memory.

The findings of the study are limited as it is conducted in two private colleges in the state of Telangana. There is a need to conduct more studies in other government and private medical colleges. Studies should also be done to correlate the performances after the adopting new teaching strategies in relation to the students learning preferences. Knowing if there is change in the learning styles as the students reach the clinical phases would also be helpful in planning the medical education curriculum.

CONCLUSION

Most of our students were found to be visual learners in present study using VARK questionnaire. Knowledge of learning style preferences will help to develop teaching strategies to cater the needs of the individual learners. It will also help to identify and solve learning problems among the students.

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APPENDIX

HOW DO I LEARN BEST?

Choose the answer which best explains your preference and circle the letter(s) next to it. Please circle more than one if a single answer does not match your perception.
Leave blank any question that does not apply.

1. I like websites that have:

1. Things I can click on and do
2. Audio channels for music, chat and discussion
3. Interesting information and articles in print
4. Interesting design and visual effects

2. You are not sure whether a word should be spelled 'dependent' or 'dependant'. I would:

1. See the words in my mind and choose by how they look
2. Hear them in my mind or out loud
3. Find them in the dictionary
4. Write both words on paper and choose one

3. You want to plan a surprise party for a friend. I would:

1. Invite friends and just let it happen
2. Imagine the party happening
3. Make lists of what to do and what to buy for the party
4. Talk about it on the phone or text others

4. You are going to make something special for your family. I would:

1. Make something I have made before
2. Talk it over with my friends

3. Look for ideas and plans in books and magazines
4. Find written instructions to make it
5. **You have been selected as a tutor or a leader for a holiday program. This is interesting for your friends. I would:**
 1. Describe the activities I will be doing in the program
 2. Show them the map of where it will be held and photos about it
 3. Start practicing the activities I will be doing in the program
 4. Show them the list of activities in the program
6. **You are about to buy a new digital camera or mobile phone. Other than price, what would most influence your decision?**
 1. Trying it
 2. Reading the details about its features
 3. It is the latest design and looks good
 4. The salesperson telling me about it
7. **Remember when you learned how to play a new computer or board game. I learned best by:**
 1. Watching others do it first
 2. Listening to somebody explaining it and asking questions
 3. Clues from the diagrams in the instructions
 4. Reading the instructions
8. **After reading a play you need to do a project. Would you prefer to?**
 1. Write about the play
 2. Act out a scene from the play
 3. Draw or sketch something that happened in the play
 4. Read a speech from the play

9. You are about to hook up your parent's new computer. I would:

1. Read the instructions that came with it
2. Phone, text or email a friend and ask how to do it
3. Unpack the box and start putting the pieces together
4. Follow the diagrams that show how it is done

10. You need to give directions to go to a house nearby. I would:

1. Walk with them
2. Draw a map on a piece of paper or get a map online
3. Write down the directions as a list
4. Tell them the directions

11. You have a problem with your knee.

Would you prefer that the doctor:

1. Showed you a diagram of what was wrong
2. Gave you an article or brochure that explained knee injuries
3. Described to you what was wrong
4. Demonstrated what was wrong using a model of a knee

12. A new movie has arrived in town.

What would most influence your decision to go (or not go)?

1. You hear friends talking about it
2. You read what others say about it online or in a magazine
3. You see a preview of it
4. It is similar to others you have liked

13. Do you prefer a teacher who likes to use:

1. Demonstrations, models or practical sessions
2. Class discussions, online discussion, online chat and guest speakers

3. A textbook and plenty of handouts
4. An overview diagram, charts, labeled diagrams and maps

14. You are learning to take photos with your new digital camera or mobile phone. I would like to have:

1. Examples of good and poor photos and how to improve them
2. Clear written instructions with lists and bullet points
3. A chance to ask questions and talk about the camera's features
4. Diagrams showing the camera and how to use it

15. You want some feedback about an event, competition or test. I would like to have feedback:

1. That used examples of what I have done
2. From somebody who discussed it with me
3. That used a written description or table of my results
4. That used graphs showing what I achieved

16. You have to present your ideas to your class. I would:

1. Make diagrams or get graphs to help explain my ideas
2. Write a few key words and practice what to say again and again
3. Write out my speech and learn it by reading it again and again
4. Gather examples and stories to make it real and practical