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ORIGINAL ARTICLE

VARK: Assessment of the Learning Mode Preferences of Undergraduate Students in a Dental Teaching Hospital

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ABSTRACT

Objective: This study aimed to evaluate preferences of learning style among third-year and final-year students of dentistry by VARK questionnaire and to evaluate the relationship between learning style preferences between both sexes.

Materials and Methods: This descriptive, cross-sectional study was conducted at de'Montmorency College of Dentistry, Lahore. In this study, 385 students participated voluntarily. We administered a learning style questionnaire (VARK mode version 8.01l) to all students and evaluate their chosen learning mode. The questionnaire contains 16 multiple-choice questions. The students were asked to select any one option. The frequency of VARK preferences was determined using guidelines that are given on the VARK® guidelines. In this study, the unimodal (V, A, R, or K) category of learning mode preferences was used. Percentage and frequency were determined for qualitative variables. Chi-square test was used to determine relationship between learning style preferences among sexes. A p-value ≤0.05 was considered significant.

Results: In this study out of 385 students (114 males and 271 females), the frequency of various VARK model reported were Visual (20.50%), auditory (27.95%), read/write (14.84%), and kinesthetic (36.70%). The kinesthetic (36.70%) and auditory (27.95%) were the most common unimodal learning modes. In respect to gender, about 11.87% male whereas 24.84% females preferred the kinesthetic mode of learning.

Conclusion: This study provides information to make better the learning of students and to match the style of teaching with the learning mode preferences of students.

Keywords: Visual, Auditory, Reading, Writing, Kinesthetic, Learning style, Dental students, Teaching hospital

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INTRODUCTION

In medical and dental colleges, students belonged to different educational and academic backgrounds and have a vast range of learning styles.[1] Academic achievement is affected by the learning styles of students.[2] In medical education emphasizes is given to covering an extensive syllabus in a limited period. This method of education provides little knowledge about learning mode assessment and improvement in teaching methods.[3] Now trends in medical education have changed from teacher-centered learning (pedagogy) to student-centered learning (andragogy).[4] It has become essential for instructors to understand the learning styles of students and different educational materials are required for a particular learning style.[5]

According to Jensen "learning style" is a preferred way of thinking, reasoning, and storing information that is based on accomplishing knowledge and utilizing it to solve issues.[6] To increase learning motivation and effectiveness, teachers and students must be aware of different learning styles.[7] Different factors affect the learning styles of students and gender is one of these factors. Other factors include age, creative thinking, academic achievement, and brain processing.[8,9] Different methods are used to teach the student at the undergraduate level in medical colleges i.e., lectures, practical sessions, tutorials, demonstrations, seminars, and bedside teaching.[10,11]

Similarly, different models have been introduced to evaluate the learning modes of students in this regard; the VARK learning model is one of them.[12] VARK questionnaire is simple, valid, and easy to conduct. It enables students to find out their learning modes.[3] It is based on sensory modalities. It involves visual, aural, read-write, and kinesthetic sensory modalities (hence the acronym VARK) based questionnaire that helps to access the learning mode preferences of students. A visual learner who chooses the representation of knowledge in diagrams, graphs, or maps. The auditory learner summons the knowledge better in heard and/or spoken form. Whereas, read/write learners retrieve knowledge in the form of printed words, and kinesthetic learners choose all of their senses to learn.[7,13,14]

In institutes, different learning modes are used by different learners. Students may be unimodal (using a single learning mode), bimodal (using two learning modes), trimodal (using three learning modes), or quadrimodal (using all four learning modes).[4,15,16]

This study aimed to examine the preferred learning modes of 3rd year and final-year students in a dental teaching hospital using the VARK questionnaire. Additionally, the research sought to establish correlations between learning mode preferences in both sexes. The ultimate goal of this study is to enhance the overall learning experience for students by aligning teaching styles with their individual learning preferences. This orientation is anticipated to contribute to an improved educational environment, where instructional methods are designed to better suit the diverse needs and preferences of the students, in order to develop an effective and personalized learning.

MATERIALS AND METHODS

This cross-sectional survey was conducted at de' Montmorency College of Dentistry Lahore after receiving ethical approval from the institutional board of de' Montmorency College of Dentistry (letter no. 1020/DCD). Non-probability purposive sampling technique was used to select participants. The sample size was collected with a confidence level of 95%, alpha error of 5% and power of test 80. The estimated sample size in this study was 385 participants. All students were requested to answer the VARK questionnaire (version 8.01, http: //www. vark-learn.com) The Unimodal (V, A, R, or K) category of learning mode preferences was used in this study.[13] It contains 16 multiple-choice questions and every question contains four options. The students were asked to select one of the four options. Each VARK category was scored and its frequency was analyzed according to the VARK questionnaire guidelines. The percentage of data for each category of learning mode was evaluated and its distribution was calculated.

Table 1: The VARK questionnaire adopted in this study

1. I need to find the way to a shop that a friend has recommended. I would:
a. find out where the shop is about somewhere I know.
b. ask my friend to tell me the directions.
c. write down the street directions I need to remember.
d. use a map.
2. A website has a video showing how to make a special graph or chart. A person is speaking, some lists and words describing what to do, and some diagrams. I would learn most from:
a. seeing the diagrams.

b. listening.
c. reading the words.
d. watching the actions.
3. I want to find out more about a tour that I am going on. I would:
a. look at details about the highlights and activities on the tour.
b. use a map and see where the places are.
c. read about the tour on the itinerary.
d. talk with the person who planned the tour or others who are going on the tour.
4. When choosing a career or area of study, these are important for me:
a. Applying my knowledge in real situations.
b. Communicating with others through discussion.
c. Working with designs, maps, or charts.
d. Using words well in written communications.
5. When I am learning, I:
a. like to talk things through.
b. see patterns in things.
c. use examples and applications.
d. read books, articles, and handouts.
6. I want to save more money and decide between a range of options. I would:
a. consider examples of each option using my financial information.
b. read a print brochure that describes the options in detail.
c. use graphs showing different options for different periods.
d. talk with an expert about the options.
7. I want to learn how to play a new board game or card game. I would:
a. watch others play the game before joining in.
b. listen to somebody explaining it and ask questions.
c. use the diagrams that explain the various stages, moves, and strategies in the game.
d. read the instructions.
8. I have a problem with my heart. I would prefer that the doctor:
a. gave me something to read to explain what was wrong.
b. used a plastic model to show me what was wrong.
c. described what was wrong.
d. showed me a diagram of what was wrong.
9. I want to learn to do something new on a computer. I would:
a. read the written instructions that came with the program.
b. talk with people who know about the program.
c. start using it and learn by trial and error.
d. follow the diagrams in a book.
10. When learning from the Internet, I like:
a. videos showing how to do or make things.
b. interesting design and visual features.
c. interesting written descriptions, lists, and explanations.
d. audio channels where I can listen to podcasts or interviews.
11. I want to learn about a new project. I would ask for:
a. diagrams to show the project stages with charts of benefits and costs.
b. a written report describing the main features of the project.
c. an opportunity to discuss the project.
d. examples where the project has been used successfully.
12. I want to learn how to take better photos. I would:
a. ask questions and talk about the camera and its features.
b. use the written instructions about what to do.
c. use diagrams showing the camera and what each part does.
d. use examples of good and poor photos showing how to improve them.
13. I prefer a presenter or a teacher who uses:
a. demonstrations, models, or practical sessions.
b. question and answer, talk, group discussion, or guest speakers.
c. handouts, books, or readings.
d. diagrams, charts, maps, or graphs.
14. I have finished a competition or test and I would like some feedback. I would like to have feedback:
a. using examples from what I have done.
b. using a written description of my results.
c. from somebody who talks it through with me.
d. using graphs showing what I achieved.
15. I want to find out about a house or an apartment. Before visiting it I would want:
a. to view a video of the property.
b. a discussion with the owner.
c. a printed description of the rooms and features.
d. a plan showing the rooms and a map of the area.
16. I want to assemble a wooden table that comes in parts (kits). I would learn best from:
a. diagrams showing each stage of the assembly.
b. advice from someone who has done it before.
c. written instructions that came with the parts for the table.

d. watching a video of a person assembling a similar table.

Statistical analysis

Data were analyzed using SPSS version 20.0. The mean ± standard deviation of quantitative variables like gender was calculated using Descriptive statistics and for qualitative variables like visual, auditory, read/ write, and kinesthetic responses. The Chi-square test was used to evaluate the significance of all comparative statistics. The p- value ≤ 0.05 was deemed significant.

RESULTS

A total of 385 undergraduate dental students participated in this study, with all students categorized as unimodal learners. The distribution frequency among unimodal learning mode preferences was as follows: visual (20.50%), auditory (27.95%), read/write (14.84%), and kinesthetic (36.70%). Notably, kinesthetic (36.70%) and auditory (27.95%) learning modes emerged as predominant among unimodal preferences. Figure 1 illustrates the percentage and frequency of the VARK model among dental undergraduate students.

Among genders, approximately 11.87% of males exhibited a preference for the kinesthetic response, while 24.84% of females favored the kinesthetic response, as depicted in Figure 2. These findings suggest that females demonstrate a higher prevalence of kinesthetic learning preferences compared to males.

The frequency table of students including both male and female is shown in Table 2.

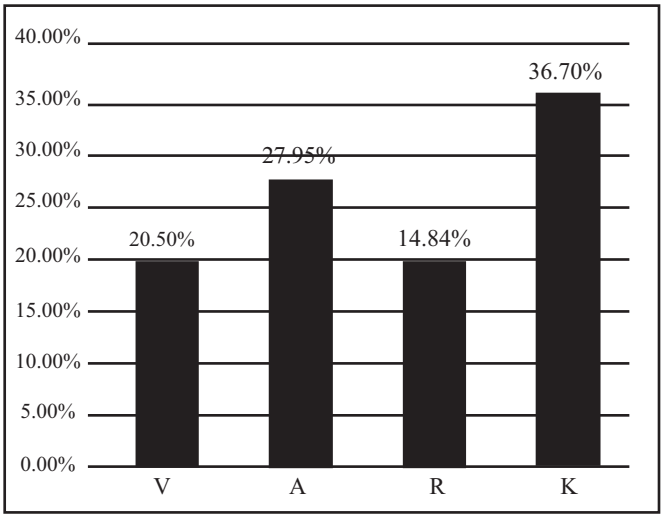

Figure 1: Characteristics of VARK model in the studied population

Table 3 shows the mean VARK scores for each sensory modality. The score for Visual, Aural, Read/ Write, and Kinesthetic mode was 3.28±1.34, 4.47±1.47, 2.37±1.33 and 5.87 ± 1.93 respectively. The highest mean score was observed for kinesthetic learning (6.11 ± 2.66) and the lowest mean score was for read/ write learning (2.44 ± 2). The range of score was 7 to 9 in all VARK parameters.

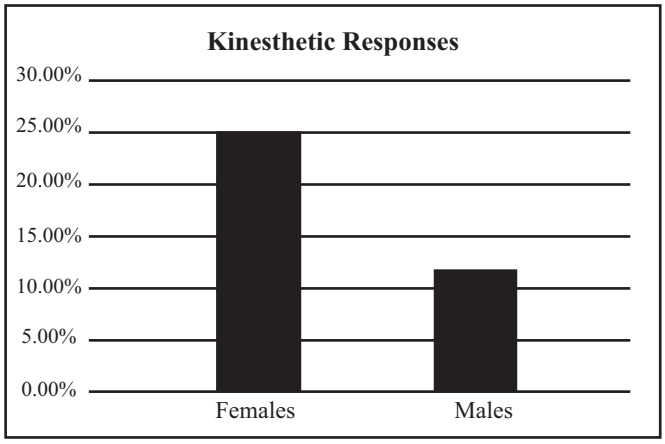

Figure 2: Distribution of kinesthetic response between both genders

Table 2. Gender distribution (n=385)

Gender	Frequency	Percent	Cumulative Percent
Male	114	29.61	29.61
Female	271	70.39	100.0

Table 3: Characteristics of VARK parameters n=385

VARK Model	N	Range	Minimum	Maximum	Mean	Std. Deviation
Visual	385	7.00	0.00	7.00	3.2805	1.3460
Aural	385	8.0	1.00	9.00	4.4727	1.4701
Read and White	385	6.00	0.00	6.00	2.3740	1.3347
Kinesthetic	385	9.00	2.00	11.00	5.8727	1.9343

DISCUSSION

VARK questionnaire has been used in many studies to find out the preferred mode of learning among preclinical medical students, the results are variable. In this study, the VARK questionnaire was used to find out the learning preferences of undergraduate dental students because it is a recognized, easy, and validated questionnaire to assess students' learning styles.[16,17] Female student's response was much higher than male students. According to the results, most of the students had kinesthetic learning mode preferences, which is observed commonly in adult learners. The females were the prominent kinesthetic learners. It was similar to the findings of other studies reported by Kharb et al. for medical students of India,[4] Good et al. for preclinical allied health students 11 and Panambur et al. for preclinical medical students in Oman.[13] The unimodal learning style preference observed in this study also agrees with Al-Saud's study,[5] Liew et al[18] as well as Baykan and Nacar for Turkish medical students[19] in which kinesthetic (K) was most predominant. It disagrees with the study conducted in India by Panja et al, according to which most of the students were read/write learners.[20]

Studies about students' learning style preferences will help educators to teach the students in a better way. It can also be beneficial for learners to find out different strategies to learn. In medical colleges, lectures delivered using PowerPoint slides and libraries containing reading materials benefit auditory and/or read/write learners. Laboratory demonstrations, hands-on activities, and interactive stations benefit to some extent to visual and kinesthetic learners. Our current teaching strategies does not benefit all four types of learners. Most of our students does not like the teaching method, in the present mode. This requires us to incorporate necessary measures in our teaching style to deliver knowledge in effective way for all categories of learners.

In this study, the predominant unimodal learning style preference was kinesthetic and auditory. It means that if the knowledge is delivered to the students in connection with reality, experience, and practice the students would acquire the information in a better way and learning can be accomplished effectively. This could help educators to find out and to solve the learning problems in students. It will be beneficial for a better academic career. Awareness of learners about their learning modes would also be beneficial for them to be self-directed learners who maximize their potential. The limitation of this study is the use of a unimodal learning style. Further studies with large sample sizes and all four learning style models (unimodal, bimodal, trimodal, and quadrimodal) are required.

CONCLUSION

Recognizing and adapting to diverse learning styles is crucial for educators to enhance the effectiveness of their teaching methods. This study emphasizes the significance of tailoring instructional approaches to accommodate individual preferences, with a particular focus on dental students. The findings reveal a prevalent kinesthetic learning preference among dental students, indicating a preference for engaging multiple senses; auditory, read/write, and visual, simultaneously in their learning process. By understanding and incorporating such predominant learning modes, educators can create more engaging and tailored learning environments, promoting improved knowledge and academic success for students pursuing careers in dentistry.

Authors contribution

NS: has made the Literature search, contributed to data collection, result interpretation, and manuscript writing. **MA**: has conceived the study, analyzed the data, and proofread.

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Institutional ethical board approval

Ethical approval for this study was obtained from the Institutional board of de' Montmorency College of Dentistry, Lahore, No. 1020/DCD.

Informed Consent

The written consent was obtained from all participants in this study.

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Conflict of interest

No conflict of interest.

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