

RESEARCH ARTICLE

Learning style preferences of physiology undergraduate students of rural medical college of Maharashtra

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ABSTRACT

Background: A learning style is the process by which a learner takes in, focuses on, understands, and retains information. This concept of learning style has got great interest among educators to recognize learning abilities of their student. It is essential to have knowledge of learning method preferred by students and identify them as, visual learner, kinesthetic learner, or aural or read-write type learner. If the information is delivered to student according to their preferred learning style, their learning would be much enhanced. Thus, as a medical educator, it is our task to assess and teach knowledge, attitudes, and skills considering the student interests. **Aim and Objective:** The purpose of our study was to determine preferred learning styles of physiology undergraduate students of a rural medical college of Maharashtra, India. **Materials and Methods:** Visual-aural-read/write-kinesthetic (VARK) questionnaire was given to 100 undergraduate medical students. The distributions of VARK preferences were calculated, and the learning style of each student was determined. Descriptive statistics were used to describe the variables. **Results:** About 76% of students showed multiple learning styles. Among multimodal learners, bimodal learners 56% were highest, trimodal 19%, and then quadmodal learners. The most preferred combination of learning style among bimodal students were auditory kinesthetic (33%). **Conclusion:** Physiology undergraduate student prefers multimodal learning styles.


KEY WORDS: Visual-Aural-Read/Write-Kinesthetic Questionnaire; Learning Styles; Physiology; Undergraduate Students

INTRODUCTION

Medical education is considered as continued process that put demands on both medical educator and medical students to update themselves always and, thus, they are lifelong learners. Distinctive challenges of medical curriculum are confronted by medical students such as knowledge overload, learning, and assimilating the knowledge in lesser time than they are accustomed to. Thus, it places a great strain and

stress on young intellectual minds. Hence, medical educator must deliver knowledge in a manner it is effectively retained, recalled, and interpreted by medical student. For achieving this goal, medical education is shifting from conventional teaching to the use of student-centered, problem-based learning and interactive teaching session. This has resulted in important changes in the field of medical education, with implementation of creative methods of teaching and learning to deliver medical syllabuses.^[1] It has been argued that being aware of facts of learning styles can be helpful to both medical educator and students. Thus, educator can chose a proper teaching method, suitable according to learning styles of students^[2] and can make teaching much more effective.

Medical student's learning style is one of the most essential factors for academic and professional success. The unique and different ways used by student to learn and recall

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information^[3] are considered as learning styles. Learning style could be a set of behaviors, conducts, and attitudes which facilitate learning of an individual for a given situation. Style can be considered as a contextual variable because what the learner brings to the learning experience is as much a part of the context as are the important features of the experience itself. Keefe stated that “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.”^[4] He also suggested that teachers need to know and understand the learning styles of students, so that students’ learning is facilitated. It has also been argued that along with mastering the medical information to be delivered,^[5] medical educator must be aware of their learner’s attributes.

Educational researchers intensely believe that students had diverse learning styles, and if the information is addressed to them according to their preferred learning style, their learning will be much more improved and enhanced. The factors influencing student’s learning styles are age, gender, brain development, culture, educational success, and creative intelligent.^[6] However, it is also important to know that different sensory modalities are used by students to integrate knowledge and information.^[7] Fleming described four sensory modalities: Visual (V), aural (A), reading/writing (R), and kinesthetic (K) called as visual-aural-read/write-kinesthetic (VARK).^[8] Briefly, a visual student, learn visually, and an aural student prefer to use listening methods for assimilating and accommodating the information, whereas some students use reading and writing as their first preference for learning, while a kinesthetic student practices learning by all sensory modalities, which include somatosensory, visual, auditory, olfactory, gustative, etc.^[9] The VARK questionnaire has been developed specifically for assessing the strategies and modalities of learning styles. Several countries had used VARK questionnaire to evaluate learning style preferences of students in the past few years.

Knowing the preference of student’s learning styles is a valuable skill and technique in teaching. Knowledge of learning fashion could be useful to teacher for recognizing, learning troubles and difficulties of students. Thus by utilizing this information, teacher can appropriately design their teaching to transform students into more successful and effective learners.^[10] Thus, it can also help in progressing toward the way of deep and strategic learning. The learning attitude adopted by students, decides final outcome of any educational endeavor.^[11] Furthermore, it plays a significant role in determining the quality and quantity of learning. It is essential for teachers to fully understand their students as “learners” to deliver the education in effective and efficient way.^[12] Accordingly, it is necessary for the educators to find the VARK performance of the students in a certain classroom to deliver useful lectures.

Moreover, limited data are available on medical students of rural medical college. Hence, we felt a need of this study of the assessment of preference of learning styles in our physiology 1st year MBBS students. Subsequently, it will be helpful for faculty in understanding demands and needs of student as well as planning appropriate teaching tactics. Thus, it would facilitate improved learning among student. It was felt that gaining insight into the learning modalities preferred by student would encourage teachers of physiology in designing relevant teaching methodologies more effectively, especially in India where many curriculum revision plans are being proposed and recommended for implementation in future, with increasing emphasis on student-centered approaches in teaching learning methods. Hence, this study was undertaken to assess the predominant learning styles of the 1st year medical students.

MATERIALS AND METHODS

Study Design

This was a cross-sectional study.

Study Setting

The data collection of the study was completed at the Department of Physiology, JIU’S IIMSR Medical College, Warudi, Jalna, Maharashtra.

Sampling

This was a convenient sampling.

Setting and Participant

A total of hundred 1st year medical students participated in the study. There were 49 male students and 51 female students. Written informed consent was obtained from students those who agreed to participate.

Instrument

Questionnaire used in this study was Version 7 of the VARK consisting of 16 questions. Each question is designed to classify the learning style preferences of respondents. Each question has four choices, all of which corresponded four perceptual preferences (V, A, R, and K). Respondents could select more than 1 option. Students choosing one option were considered unimodal and mainly had one learning style preference, whereas the students who select two or more options were considered as multimodal and had two or more learning style preferences. Satisfactory levels of reliability and validity of the VARK have been reported using factor analysis techniques.^[13]

Procedures

VARK questionnaire was distributed to students during regular physiology classes. The completed questionnaires were collected by investigator after 20 min. Students had the freedom of not to hand back the questionnaire. It was explained to the students that the VARK questionnaire was designed to assess learning styles preferences of students. Furthermore, they were informed that the study findings could be used for research purposes. The Institutional Ethical Committee approval was taken before conduction of study.

Statistical Analyses

Data from VARK responses were decoded into visual, auditory, read/write, and kinesthetic or mixed. Students' scores were calculated according to scoring system guidelines provided by VARK producers.^[8] The percentage of students for each VARK component is calculated.

RESULTS

Response rate in our study was 100%. There were 51 females and 49 males. Statistical details of VARK score, i.e., mean and standard deviation are presented in Table 1.

Students using a single learning modality (V, A, R, or K) were recognized as unimodal learner. Those who use blend of more than 1 (VA, RK, VAR, VARK, etc.) are grouped as multimodal learners. Those preferring combination of two learning modalities (VA, AR, RK, etc.) were categorized as bimodal learners. Those choosing three (VAR, RAK, KVR, etc.) are trimodal learners and those using all four (VARK) are quadmodal learners. In our study, 76% of students showed multimodal and only 24% showed unimodal learning style, as shown in Figure 1.

On additional analysis of unimodal learners, it was observed that most prevailing unimodal style used by student was kinesthetic method 17%. This was followed by 6% for aural, 1% of students preferring read/write, and surprisingly visual was 0%, Figure 2.

Figure 3 shows the distribution of multimodality, predominant learning style was bimodal, i.e., 56%, followed by trimodal (19%) and only 1% of students showed preference as quadmodal, these students used all mechanisms for learning, i.e., kinesthetic, auditory, reading/writing, and visual.

Figure 4 shows, on further analysis that among the bimodal students, most favored combination was found to be auditory and kinesthetic 33%, followed by visual and kinesthetic (8%), auditory, and reading/writing (6%), and reading/writing and kinesthetic (5%). However, only 2% of students used reading/writing and visual, and aural and visual learning modalities. The dominant learning preferences of the trimodal students were auditory, reading/writing, and kinesthetic (10%).

Table 1: Mean and standard deviation of learning modalities of VARK

VAR K	Mean	SDEV
V	2.51	1.572348
A	5	2.24667
R	2.66	1.815063
K	5.82	2.358595

VAR K: Visual-aural-read/write-kinesthetic

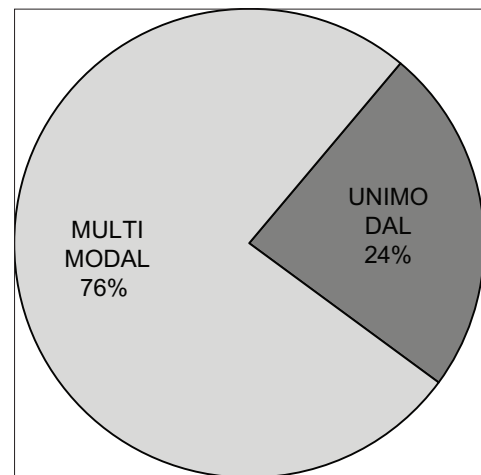


Figure 1: Distribution of learning styles as unimodal and multimodal among students

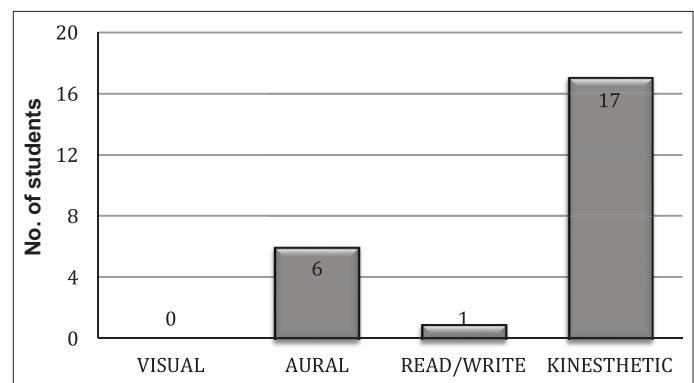


Figure 2: Distribution of unimodal learning styles

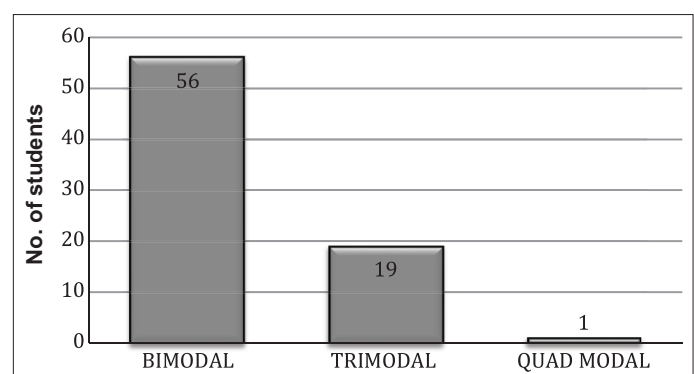


Figure 3: Distribution of multimodal learning styles

Figure 4 also shows that only 1% of students are quadmodal learner, preferring all modes of learning, i.e., visual, auditory, reading/writing, and kinesthetic. Majority of students among multimodal learning styles strongly preferred the kinesthetic method in comparison to other three methods.

DISCUSSION

Our study showed that 76% of our students are multimodal, indicating that they use composites of different learning styles for effective learning. This finding of the present study regarding preferring predominant multimodal style in the undergraduate physiology students of our rural medical college is in agreement with numerous former studies^[10,14,15] that have used the VARK questionnaire as tool for evaluating learning style preferences and said that the most common was multimodality. Similar results were found by Anjali and Garkal,^[16] 82.66% of students to be multimodal and 17.33% to be unimodal. For instance, Lujan and Dicarlo^[14] found multimodality in the 1st year medical students to be 63.8%. It was highly similar to a study done by Kharb *et al.*^[17] indicated 61% multimodality preference, with 39% being unimodal learners among the undergraduate physiology medical students in India using the VARK study. A study by Lonie *et al.*^[18] among the 1st year medical students showed that 29% are unimodal and 71% are multimodal learners at University of Wisconsin School of Medicine and Public Health. Baykan and Nacar had done study in medical students of Turkey using a Turkish version of the VARK questionnaire^[19] and reported 36.1% unimodality and 63.9% multimodality preferences.

The present study revealed that even though all learning styles except visual are represented by student, most commonly endorsed categories were the kinesthetic (17%) and aural (6%). Renganath and Priya found that though majority were multimodal learners, most preferred kinesthetic method study.^[20] The kinesthetic (70%) was most commonly preferred

learning mode either single or in blends with other mode, followed by aural (57%), read/write, and visual. Comparable findings were reported in a study by Dobson of the USA,^[21] in his study, the learning mode frequencies were kinesthetic (76%), read/write (64%), aural (58%), and visual (51%). By contrast, in another study, among Saudi undergraduate medical students, it was found that the dominant single learning preferences were aural (11.6%) and kinesthetic (8.1%).^[22] Furthermore, Murphy *et al.*^[10] reported that two dominant single learning mode in the U.S. dental students were read-write (20.1%) and visual (14.5%).

In the present study, among bimodality, predominant combinations recognized were aural and kinesthetic 33%. Similarly, in the trimodal learning style, most common were aural, read/write, and kinesthetic 10%. Our findings regarding bimodal and trimodal learning style preferences are in agreement with the study reported by Baykan and Nacar^[19] though the frequencies were not the same, 20% for aural and kinesthetic and 14% for aural, read/write, and kinesthetic.

In this study, we recognized that some students selected one of the modalities over the other and some preferred all. At times, students adhere so strongly to their learning style that it becomes troublesome for them to understand the subject, unless the information is offered to them in their preferred style. Thus to accomplish these needs, it is essential that medical educator should distinguish learning style diversity of students and address accordingly. Subsequently, teachers approach should be multisensory and teaching must be filled with variety. Our study provides evidence that students are able to learn more efficiently when the educator practices use of combination of visual, auditory, reading/writing, and kinesthetic activities.^[23] In the intervening time, it becomes important to introduce active learning approaches. With active learning strategies, visual

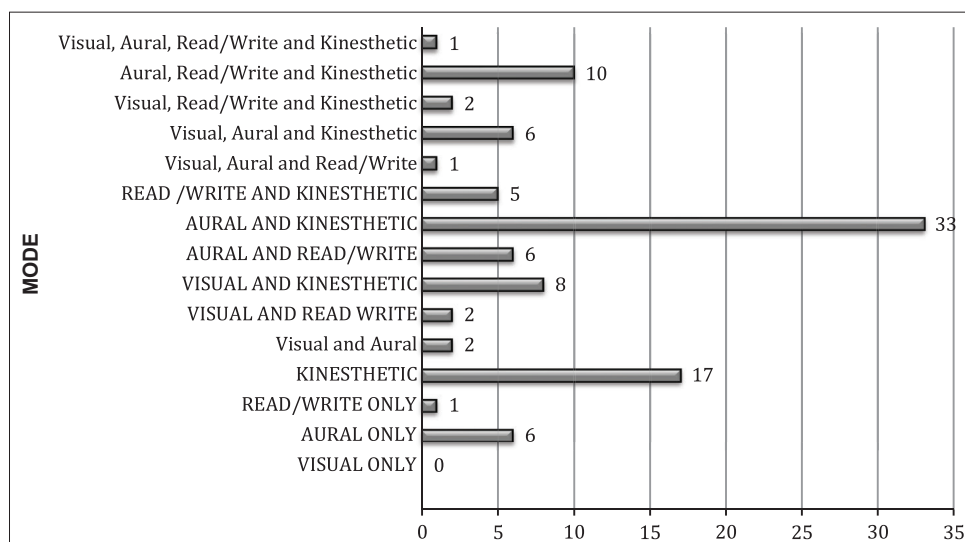


Figure 4: Distribution of learning styles of 100 students

learners are reached by observing models, illustration, photographs, and demonstrations. Auditory learners are directed through discussion, during peer instruction^[24] and debate. Read and write type learners should be addressed through interactions with textual materials. Kinesthetic and tactile learners are fulfilled by handling models and role playing.^[25] These active learning strategies can be used successfully in large classrooms to make learning easy and effective. These activities also encourage working in groups and generate high levels of enthusiasm, interest, and motivation.

With the knowledge of students learning style, medical teachers will be able to progress in their pedagogical approaches.^[9] Thus, this will help them in modifying the instruction patterns, according to the learning preferences of medical students. Thus, teaching becomes more impactful and successful enough to incorporate finest skills and healthier attitude along with excellent knowledge, among the students, and it certainly would help them to become an expert medical student.

Study Limitations

The limitations of this study are small sample size, particularly low number of students, and conducting this study only in the pre-clinical phase of the medical faculty. The findings of the study should be generalized with caution in other settings in the region and worldwide. A larger sample size may help to identify whether any significant differences in this area exist.

CONCLUSION

The finding of the present study shows that three-fourth (76%) of medical students have multimodal learning preferences. The most common single learning preference was kinesthetic (K) followed by aural (A). The results of this study can provide valuable information for refining the quality of learning experiences of medical students in their years in the medical college. For effective education, medical teachers must broaden their presentation by making use of multiple styles, to generate more positive and effective learning atmospheres for all students.

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