

LEARNING STYLE PREFERENCES AMONG STUDENTS OF SHALAMAR MEDICAL AND DENTAL COLLEGE, PAKISTAN

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ABSTRACT

BACKGROUND Psychologists and researchers have discovered variations in learning styles of students across institutes, cultures and educational environments. Awareness of the predominant learning style will enable the facilitators to modify teaching methods and make the educational experience more effective.

AIM This study determines the VARK inventory based learning styles of students at a private medical college in Pakistan and relates them with the teaching methods preferred by the students.

METHODS A cross sectional study was conducted on 194 first and second year MBBS students, enrolled at Shalamar Medical and Dental College, Lahore. The version 7.1 of VARK questionnaire, was used to classify the learning preferences as visual (V), auditory (A), read and write (R) and kinaesthetic (K). Data was also collected about the students' gender and their preferred teaching methods.

RESULTS Only 36% of students preferred one learning style (uni-modal), primarily kinaesthetic, while the remaining students chose more than one learning style (multi-modal), where 44% were bi-modal, 15% tri-modal and only 5% were quadri-modal. The most and least chosen teaching methods were practical/dissection (38%) and tutorial (8%) respectively. Strong correlation was found between kinesthetic learners and those who preferred practical as teaching method.

CONCLUSION Multiple modes of instruction will cater for needs of the majority of the learners. The teachers' awareness about the preferred learning styles of the learners helps him to match it with modes of instruction to ensure a conducive learning atmosphere for the learners.

KEY WORDS Learning style, Instructional method, Teaching-learning strategies, Medical students.

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INTRODUCTION

The 'learning style' of an individual is the chosen method of collecting, processing, inferring, consolidating and analyzing information.¹ In 1960 Dunn presented the term 'learning style' for various methods of learning. He defined learning styles as diverse and exclusive ways used by individuals to learn and recall the information.² Learning style is an individuals' natural or

typical pattern of obtaining and processing information in different situations. The idea of specific learning styles initiated in the 1970s, and gained immense popularity.

Genetic traits, past experiences, and social environment help determining predominant learning styles of individuals.³ According to Keefe, "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 Individual learning style preference is also advocated by educational researchers.⁵ Traditionally, medical studies have been divided into pre-clinical years (mostly years one and two), characterized by learning environment focusing on acquiring large amounts of information through lectures, small group discussions and books. The later part of medical studies mostly consists of clinical years where the amount of interaction with the patients increases gradually, achieving its peak in the final year. As the educational environment and learning situations change with the passage of time, learning styles may also change.

In medical education the trends of pedagogy has been shifted to an-

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dragogy in recent years ⁶, therefore it is vital for educators to adapt instructions that incorporate learning styles of their learners. ⁷ Identification and measurement of learning styles has been a subject of great interest for educational psychologists for the past few decades. Since 1960s, psychologists crafted different inventories to identify the learning styles of learners. Some of these inventories include Honey and Mumford, VARK by Fleming and Kolb's learning style inventory. These learning styles inventories are based on different learning theories, principles of learning and psychological constructs.

This study uses VARK model for the determination of learning styles. VARK is an abbreviation for the Visual, Auditory, Read/Write and the kinesthetic sensory modalities. ⁸ It provides learners the insight of their preferred sensory modalities in perceiving the information. For the best information processing the visual learners prefer to see, the auditory learners prefer listening, the read-write learners like to read while the kinesthetic learners like to gain information by practice. The multi-modal learners have a strong preference for multiple modes whereas some learners have preference for one modality. ⁹

The learners' preference for different teaching-learning methods are dependent upon certain factors like familiarity with the method and results etc. Although there are many studies done on learning styles of students globally, ¹⁰⁻¹² there is only one study carried out in Pakistan in which comparison between the learning styles of postgraduate and undergraduate students revealed that the postgraduates were reflectors while the undergraduates were largely activists and theorists. ¹³ The present study determines the distribution of VARK based learning styles of basic sciences students in a medical college of Pakistan. The study also explored gender-based differences in learning style preferences

and how the learning styles are related to the learning situations. It will be helpful in formulating teaching-learning strategies that improve students' learning experience.

METHODS

This descriptive cross-sectional study was conducted at Shalamar Medical and Dental College, Lahore on the first and second year MBBS students. All students (n = 210) enrolled in the first and second year of the medical college were included in the study. A total of 194 students from both genders voluntarily participated (response rate = 92.4%). High response rate was achieved through the distribution of the questionnaire in two rounds to all students prior to a class with maximum student attendance. It took approximately 15 to 20 minutes for students to fill the questionnaire. A researcher was present during the exercise to answer any queries.

The questionnaire consisted of two parts, part one contained demographic information i.e. name, gender, age and their preferred teaching-learning methodologies like lectures, small group discussions, practicals/dissections, tutorials and Self-study. Part two consisted of VARK questionnaire, developed by Fleming (version 7.1) ⁷, to determine students' learning style preferences. The VARK questionnaire determines four perception preferences (V, A, R and K) through sixteen questions. The students could choose multiple options. The VARK model was chosen because it is a simple instrument with high reliability. ¹⁴

The distribution of the VARK preferences was calculated according to the guidelines given on VARK website (www.vark-learn.com). The preferences of the various VARK components, as well as the teaching-learning methods were analyzed by descriptive statistics. To compare the VARK scores for the male and female students the Student t-test was used. While to analysis of the correlation between the learning styles

and the preferred teaching- learning methodologies was done by Pearson's Correlation.

RESULTS

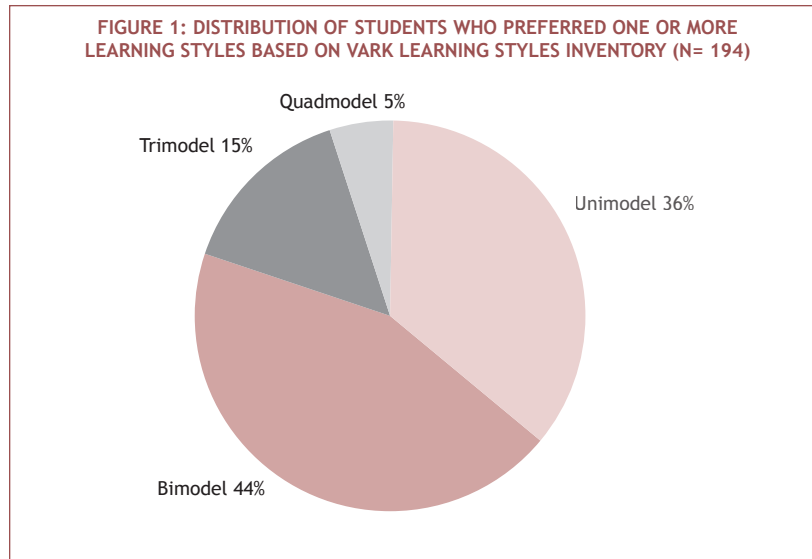
The VARK model suggests that the students' learning styles are dependent upon their preference of sensory modalities to receive information. Their preference could be a uni-model, bi-model, tri-model or quadri-model. In our study, 44% students had bi-model learning style preferences while 36% had uni-model preferences. Figure 1 provides the distribution of students among four models.

The students with uni-model style were further explored to identify their learning styles. Out of the 36% students with uni-model approach, 27% were kinesthetic learners, indicating that a vast majority of students like to learn by experience and practice.

Variations among the learning styles of male and female students were further explored within the uni-model group. The comparison shows that significantly more males had visual learning style ($p=0.03$) and significantly more females had kinesthetic learning style ($p=0.002$). Table 1 provides the comparison of four VARK learning styles between male and female students.

Uni-model, bi-model and tri-model learning styles were compared between male and female students. Figure 2 shows the distribution of all models between males and females. As evident from the figure, the three most predominant models among males and females included Kinesthetic (K), Visual and Kinesthetic (VK) and Auditory and kinesthetic (AK), kinesthetic being the most common style among all of them.

Students were also asked about their preferred teaching-learning methods. These methods can be divided into four groups: namely interactive mode of instruction (tutorials); direct mode (lectures and demonstrations); independent study mode (self-study); and experimental



mode (practicals/dissections). Data shows that among all students, the preferred teaching-learning methods were practicals/dissections (38%), lectures (28%), self-study (26%) and tutorials (8%) in descending order of preference. There were no statistically significant differences among males and females for the choice of methods. Figure 3 shows the distribution of teaching methods preferred by male and female students.

Data showed that kinesthetic mode was the most preferred VARK mode and practical/dissection the most preferred teaching-learning method. A positive correlation (Pearson's correlation coefficient, $r = 0.752$) was present between VARK

modes and teaching learning methodologies.

DISCUSSION

The aim of most instructional programs for medical graduates is to construct knowledge and skills that can be applied to the profession.¹⁵ Therefore instructions must be designed to maximize cognitive and learning processes. If we incorporate the learning styles of learners in our instructional techniques we can manage intrinsic load, decrease extraneous load, and optimize germane load.¹⁶

Most of the learners (64%) exhibited multimodal learning style. Other studies have also reported similar results (59-85%).^{1, 5, 17-18} This shows

that majority of learners learn actively when the combination of multiple modes of instruction is used, with predominant role played by Kinesthetic learning style. The use of multimedia can represent multiple contents (text, animations and images) to accommodate for the students with diverse learning styles. According to the "meshing hypothesis"¹⁷ learning increases exponentially by incorporating the predominant learning styles in teaching.¹⁸

The Kinesthetic mode was the top preference in the uni-modal and bi-modal categories. Therefore, the active learning strategies may be more beneficial than the traditional lecture formats for kinesthetic learners. Active learning strategies encourage critical thinking and improve problem solving and the decision making skills among students. In our study, the percentage of the auditory learners was lesser than the kinesthetic and the visual learners, indicating the need for learning situation that support kinesthetic learners.

Didactic lecturing is a passive learning strategy that works for auditory learner. Baykan and Nacar⁵ reported similar results of their study conducted on first year medical undergraduates in Turkey. Lujan and DiCarlo reported that, the first year medical students from Indiana, USA preferred read/write style.¹ Nuzhat et al. reported that auditory mode was preferred by the medical students of Saudi Arabia.¹⁹ These differences in the preference of the medical students around the globe may be due the exposure of various modes of instructions at the pre-medical studies and the use of the hands-on clinical experiences in the medical curriculum.

There is no single best teaching-learning strategy available that is fit for every student. Certain modes of instructions, like problem based learning, are preferred to lectures.^{20,21} This study reveals that practical/dissections were the most chosen methodologies for students

TABLE 1: COMPARISON OF FOUR VARK LEARNING STYLES BETWEEN MALE AND FEMALE STUDENTS

VARK	Gender	Mean \pm SD	p Value
Visual	Male	5.83 \pm 2.33	0.03*
	Female	4.83 \pm 2.29	
Auditory	Male	5.23 \pm 1.61	0.13
	Female	4.76 \pm 1.81	
Read-Write	Male	3.79 \pm 1.90	0.39
	Female	3.66 \pm 2.31	
Kinesthetic	Male	5.98 \pm 2.14	0.002*
	Female	7.45 \pm 2.01	

Comparison of VARK Scores

*Significant

FIGURE 2: DISTRIBUTION OF VARIOUS COMBINATIONS OF VARK LEARNING STYLES IN MALE & FEMALE STUDENTS

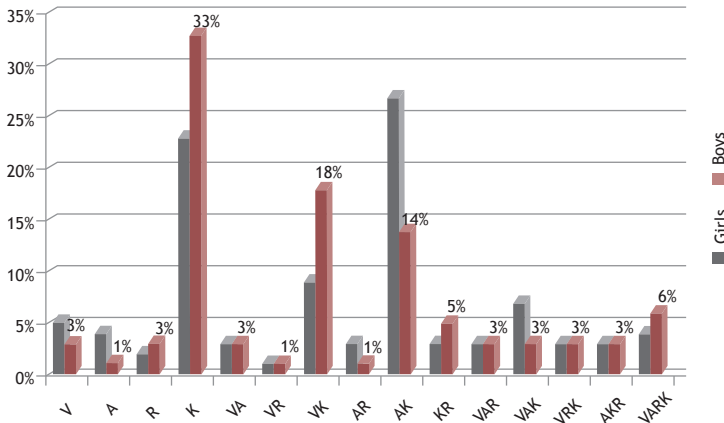
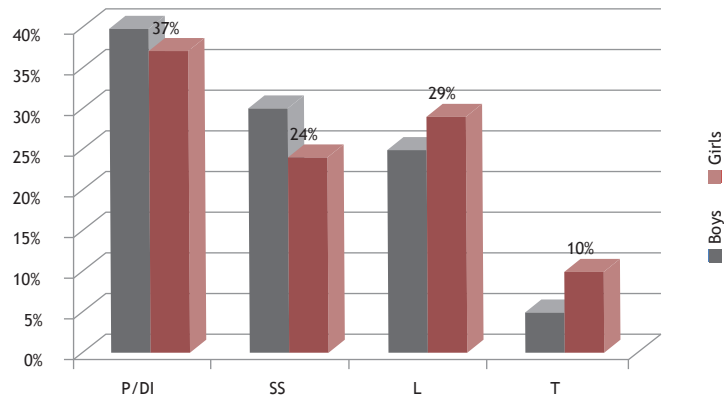


FIGURE 3: PERCENTAGE OF PREFERENCE OF TEACHING METHODS BETWEEN MALE AND FEMALE STUDENTS (N=194)



of both gender and is consistent with the kinesthetic as most preferred learning style of the student. For females the second preferred teaching methodology was lectures on multimedia, which is consistent with their inclination for auditory and visual modes of learning styles.

If there is no harmony between learning styles and teaching methodologies the learning will be minimum,^{22, 23} therefore instructional techniques should be matching with the students' learning style preferences.²³

The findings of the study are limited as the study is conducted in a private sector medical college in Pakistan. There is a need to conduct more studies in a variety of medical colleges in public and private sec-

tors. Studies should be conducted to explore the correlation between the performances after incorporation of the learning styles of students in instructional techniques and to find out the change in learning styles as the students shift from pre-clinical to the clinical phase.

CONCLUSION

The knowledge on the learning styles is beneficial for both the educator and the learners. If the learners identify their learning preferences, it will be helpful in the use of appropriate learning strategies that enable them to become lifelong and self-directed learners, thus maximizing their potential. Teachers can incorporate learning styles in teaching-learning strategies to maximize

the Germane load. This is likely to ensure an efficient learning and academic success.

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NOTES ON CONTRIBUTORS

All the authors contributed significantly to the research that resulted in the submitted manuscript.

CONFLICT OF INTEREST

Authors declare no conflict of interest.

ETHICS APPROVAL

The Ethical approval was obtained from Shalamar Medical and Dental College, Lahore.

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