

Assessing the Learning Style of Medical Students in Shahid Beheshti University of Medical Sciences by using VARK Approach

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Abstract

Background Extensive factors affect students' learning such as their learning style, the identification of which is considered as important in solving the problems and shortcomings of educational system in the current situation. The present study aimed to determine the learning style of first-year medical students in the Shahid Beheshti University of Medical Sciences in 2018.

Methods In the present descriptive and analytical study, 111 first-year medical students at the university were included through census method. The data were collected by using VARK learning style standard questionnaire and analyzed using SPSS16 software based on the questionnaire guide.

Results Most students had a multi-modal learning style (52%) although no significant difference was observed between preferring single- and multi-model styles. Among the multi-modal learning styles, bi-modal style was more applied by subjects (21.62%). In addition, aural and visual learning styles were determined as the most (20, 37.74%) and least (8, 15.09%) frequent styles preferred by students, respectively.

Conclusion Due to the preference of most students to use multimodal styles, medical instructors should highlight the diversity of learners' learning styles and select appropriate methods for students' learning.

Background

Learning is considered as the process of relatively sustained changes in individuals' potential behavior through experience. In fact, learning is a process and each process is affected by some factors and variables [1]. Thus, many factors influence students' learning such as learning style, the recognition of which is important for solving the problems and shortcomings of educational system in the current situation [2].

Learning style is a process through which an individual understands and retains information, and consequently acquires knowledge and skills. Additionally, it is the preferred style of thinking, processing, and perceiving information, upon which individuals receive information and through which they learn and solve problems [3].

The difference in individuals' learning style may be considered as one of the reasons for the failure of some students to learn well in spite of having the best instructors [4]. Indeed, they get and process information through various methods such as seeing and hearing, reflection and action, thinking, analysis, and imagination depending on their individual traits [5].

Instructors should know that students utilize different learning styles for various reasons, which means that their learning styles change depending on the variations in the learning environment, subjects, and training methods [6].

The issue of learning style is complex and more than 70 different models have been introduced for determining the styles based on the recent studies. The models provide various hypotheses and focus on the different aspects of learner [7]. An individual learning style specifies how new information is processed, internalized, and retained [8]. Bertolami proposed the mismatch between the learning content and teaching approach as one of the main factors for frustration with curriculum among the students [9].

Tailoring and updating the teaching approaches and assessing their effectiveness are considered as essential for improving the motivation and performance of students, and responding their various preferred learning styles [10, 11].

According to Vark, individuals acquire environmental knowledge through four sensory channels of visual, aural, read/write, and Kinaesthetic [12]. In other words, students learn by experiencing, visualizing, thinking, and acting in the education process [13]. This approach is based on three principles, the first of which expresses that everyone can learn academic issues but has his/her specific style and the second refers to an increase in individuals' motivation for learning when their learning styles are highlighted. Based on the third principle, educational content is best learned by utilizing senses and various perceptions [6].

Many literatures confirmed the awareness of learning styles as a small part of the learning process [14]. Identifying students' preferred learning style helps significantly to overcome the tendency of many instructors to behave similarly towards all students [15]. In practice, instructors can train more students because of creating a better fit between them with the learning styles of learner [10, 16–24].

Students acquire and process information through different methods such as seeing and hearing, reflection and action, thinking, analysis, and imagination depending on their individual characteristics [25]. Given that students having various behavioral and

personality traits exist in different training environments and recognition of their learning styles is considered as an applied guide for instructors to plan and achieve educational objectives, the present study sought to evaluate the learning styles of medical students at the Shahid Beheshti University of Medical Sciences by using VARK approach.

Methods

The present cross-sectional descriptive study aimed to assess the learning styles of medical students in the Shahid Beheshti University of Medical Sciences. The statistical population of the study included all medical students at the Shahid Beheshti University of Medical Sciences, among whom the first-year ones during 2018–2019 ($n = 111$) were selected as subjects through purposive sampling method.

In addition, the data were collected by using VARK learning style standard questionnaire. The questionnaire consists of two parts, the first of which contains the questions regarding gender, educational level, and diploma grade point average (GPA), while the second is related to the determination of learning styles among students.

The questions evoke real and understandable scenarios in daily life, which is considered as one of the advantages of using VARK learning styles for recognizing the learning styles. Considering the results related to the study conducted by Fleming in the VARK website, 60% of respondents confirmed the accuracy of the results obtained from examining their learning styles. However, 5% referred to the difference between the results and their preferred learning styles and the others did not know much about their preferred learning styles.

Based on the VARK standard questionnaire, learning styles include visual, aural, read/write, and kinaesthetic [25]. The questionnaire consists of 16 questions, each of which puts learner in a learning position. Regarding each question, respondents could select an option presenting the best explanation on their performance in the intended position or more than one item if an option alone does not reflect learners' status. Further, each question did not apply to them can be left unanswered. Furthermore, the content and face validity of the questionnaire was confirmed by medical education experts and the reliability was approved by calculating Cronbach's alpha coefficient in the different studies [26].

Finally, the data were analyzed through the descriptive and inferential statistical tests of chi-square by using SPSS 16 software.

Results

A total of 111 first-year medical students in Shahid Beheshti University of Medical Sciences participated in the present study. Table 1 summarizes the demographic characteristics of the subjects.

Table 1
Demographic characteristics of the students under study

Variable		Number	Percentage
Gender	Female	62	55.85
	Male	49	44.14
High school GPA	19–20	61	0.54
	18–19	8	7.20
	17–18	2	0.01
	16–17	2	0.01
	Unanswered	38	34.23

The results related to learning styles by model and students' preferences are presented in Table 2. Based on the results, most subjects applied multi-modal learning style (52%) although no significant statistical difference was attained between preferring single- and multi-modal ones ($P > 0.05$).

Table 2
Frequency of subjects by single- and multi-modal learning styles

Percentage	Frequency	Learning styles by students' preference in each model	Percentage	Frequency	Learning styles by model
15.09	8	Visual (V)	47.75	53	Single-modal
37.74	20	Aural (A)			
26.42	14	Read/write (R)			
20.75	11	Kinesthetic (K)			
100	53	Total			
20.83	5	AK	21.62	24	Bi-modal
37.50	9	AR			
8.33	2	RK			
16.67	4	VA			
8.33	2	VK			
8.33	2	VR			
100	24	Total			
40	6	ARK	13.51	15	Tri-modal
26.67	4	VAK			
13.33	2	VAR			
20	3	VRK			
100	15	Total			
			17.21	19	Quad-modal
100	111		Total		

The results related to the frequency of the students preferring single-modal learning style indicated aural and visual styles as the highest (37.74%) and least (15.09%) frequent styles, respectively. Regarding bi-modal style preference, the maximum frequency of students was observed in AR style (37.50%). Additionally, ARK style (12%) was more frequent among the students having tri-modal learning style, while the least frequent ones included VAK and VRK ones (both 1.4%).

Table 3 represents the results of assessing the relationship between demographic characteristics and learning styles. As shown, gender was not related to the styles significantly ($P > 0.05$). Further, both genders applied multi-modal learning style more than the single-model one. Furthermore, male students used multi-modal learning style higher than female ones did although their difference was statistically insignificant.

Table 3
Relationship between demographic characteristics and learning styles

Variable		Learning styles								P-value
		Single-modal		Bi-modal		Tri-modal		Quad-modal		
		Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	
Gender	Female	22	44.89	13	26.53	8	16.32	6	12.24	0.971
	Male	30	48.38	15	24.19	6	9.67	11	17.74	
Diploma GPA	16–17	0	0	0	0	1	0.9	1	0.9	0.985
	17–18	0	0	1	0.9	1	0.9	0	0	
	18–19	4	3.60	2	1.80	2	1.80	0	0	
	19–20	29	26.12	16	14.41	5	4.50	11	9.90	

Finally, no statistically significant relationship was obtained between diploma GPA and learning styles.

Discussion

In the present study, most students had multi-modal learning style, which is consistent with the results of some research [26–32]. It seems that humans tend to utilize their maximum capabilities for learning further and more perfectly. In other words, the use of various learning styles covers the learning objectives more completely.

The results of the present study are in agreement with those obtained by other researchers the target population of which was not only medical students (33–34).

However, they are not in line with those of some studies focused on examining the learning style of medical students (35–36). Given that teaching and learning are based on the context, some differences can be expected in the learning styles in the learning positions of other countries by considering cultural, social, and economic conditions, personality traits, and available learning infrastructures.

Various studies have been conducted on the learning style of other medical sciences students, in some of which the results related to medical students were combined with others and not analyzed separately, which are inconsistent with those obtained in the present one (37–39). Fleming pointed out in the VARK website that only 36% of individuals applied single-modal learning styles, while the most (64%) had multi-modal ones [25].

Based on the results of the present study, most students utilized bi-modal learning style (21.62%) among multi-modal ones, which is in agreement with those obtained by some researchers [27, 31–33, 36, 37, 39]. However, it is not in line with those of Farkas et al. [30] and Peyman et al. [33] which indicated preferring quad-modal style (VARK) by students. Ilpour reported tri-modal style as the dominant multi-modal ones among students. As already mentioned, learning position and its effect on teaching and learning can likely be effective on the results generally.

In the present study, 48% of students preferred single-modal learning style (visual, aural, read/write, or kinesthetic) during receiving information, among whom 37.74% learned through hearing and paid more attention to teachers' words, so-called aural learning style students. In addition, individuals with aural learning style can memorize information through reading aloud, especially when learning new thing [40–42]. Further, 26.02% of subjects preferred to gain information by applying printed writings, reading, and writing, read/write learning style students, one of the main traits of whom includes better learning through taking notes from lectures and reading the notes. Furthermore, 20.75% of individuals, kinesthetic learning style ones, preferred a combination of different senses (touching, hearing, smelling, tasting, and seeing), who learn more through experiencing and acting. Finally, 15.09% had visual style and preferred to acquire information by using figures, charts, and flowcharts. They can draw figure and chart during explaining issues and concepts for others. The results of the previous studies demonstrated that the students preferring visual style are often known as creative and highly imaginative [40].

Additionally, aural learning style was reported as the first priority preferred by students in some studies [26, 37, 43–45], which is in line with the results of the present study. Further, Salimi et al. [46] referred to the preference of aural style only among females. However, some researchers reported the priority of visual [47], kinesthetic [28, 30, 31, 49], and read/write style [48].

Due to the difference in the results of various studies, as well as observing multi-modal styles in most individuals, academic instructor should consider this point and utilize diverse teaching approaches to enhance learning.

Based on the results of the present study, most of the subjects having multi-modal learning style applied bi-modal one. Among bi- and tri-modal ones, AR and ARK styles were more preferred by students, respectively. Prithishkumar and Micheal [49] found the preference of first-year medical students in India to use AK and ARK styles among bi- and tri-modal styles. The issue can be related to the fact that subjects preferred to use kinesthetic learning style, and aural style was referred as the first priority in the study. Therefore, aural style was dominant in both single- and multi-modal styles and was utilized by a larger percentage of the students under study.

Finally, diploma GPA and gender were not related to learning style, which is consistent with the results of some researchers which reflected an insignificant relationship between gender and learning style [27, 28, 30, 32, 43, 47]. Accordingly, no relationship is observed between gender and preferred learning styles.

The limitations of the present study are provided as follows. The questionnaire was completed only based on the individual perceptions and could not measure interfering factors such as socio-economic status, race, and culture, similar to the other research using the tool. Additionally, the study was conducted only among first-year medical students who were highly affected by university entrance exam, known as Konkour, which may influence their preference to utilize the learning styles.

Conclusion

Due to the difference in students' learning styles, matching teaching approaches with the styles is considered as one of the effective methods on deep and sustainable learning. Identifying students' learning styles can result in developing appropriate educational strategies, along with extending proper educational approaches and creating opportunities for instructors [15, 50]. Based on the results of the studies in the education field, most students learn more effectively when instructor provides a combination of visual, aural, read/write, and kinesthetic activities.

Abbreviations

VARK: Visual, Aural, Read/write, and Kinesthetic.

Declarations

Ethics approval and consent to participate

The present article was extracted from a master's thesis in medical education at Shahid Beheshti University of Medical Sciences with the ethics code No. IR.SBMU.RETECH.REC.1396.952.

All methods were carried out in accordance with relevant guidelines and regulations and all experimental protocols were approved by ethics committee of Shahid Beheshti University of Medical Sciences in the ethics subsection of declaration. Informed consent was obtained from all subjects involved in his study.

Consent for publication

All authors agree to publish the article.

Availability of data and materials

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

LS and SY conceptualized the study, developed the proposal, coordinated the project. LSH and TN completed initial data entry and analysis, and wrote the report. LS and SYJ and JS conducted the statistical analyses. LSH, TN and SSH assisted in writing and editing the final Manuscript. SY and LSH participated in overall supervision of the project and revision of the report. All authors read and approved the final manuscript.

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