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Original Article

Anaesthesia Section

Using VARK Approach for Assessing Preferred Learning Styles of First Year Medical Sciences Students: A Survey from Iran

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ABSTRACT

Background: Preferred learning styles of learners are different, which depend on tastes, mentality preparedness, as well as physical condition, in terms of sensory modalities. Identifying and employing appropriate learning styles could play an important role in selecting teaching styles, which can improve education ultimately.

Aim: The present study aimed to assess the diversity of learning styles amongst medical students of a medical sciences university which was located west of Iran, in 2010.

Methods: A cross-sectional study which employed VARK learning style's questionnaire was done on 141 first year medical sciences students at Ilam University of Medical Sciences in 2010. Data was collected with use of VARK questionnaire. The validity of the questionnaire was assessed on basis of experts' views and its reliability was calculated by using Cronbach's alpha coefficients (α=0.86). Data were analysed by using SPSS software and Chi-square test.

Results: Overall, 41.6% of the samples preferred to use a single learning style (Uni-modal). Of these, 17.7% preferred the Aural style, 17% preferred Reading and Writing, 6.4% preferred Kinesthetic style and 0.7% preferred Visual styles. Among the rest of the 82 students who preferred more than one style (multimodal), 17% chose two modes (bimodal), 13.5% chose three modes (tri-modal), and 27.6% chose four modes (quad-modal). There was a significant difference between educational levels and majors on one hand and choice of quad modal of VARK styles on the other hand (p=0.008). A significant association was also found between participants' genders and selection of visual and reading/writing styles (p=0.03).

Conclusion: The preferred learning styles of medical students in the present study were aural and reading/writing. It is suggested that all medical students must be tested to determine their desired learning styles by using VARK questionnaire, also to choose appropriate teaching methods and to improve educational goals.

Keywords: Aural, Kinesthetic, Quad modal

INTRODUCTION

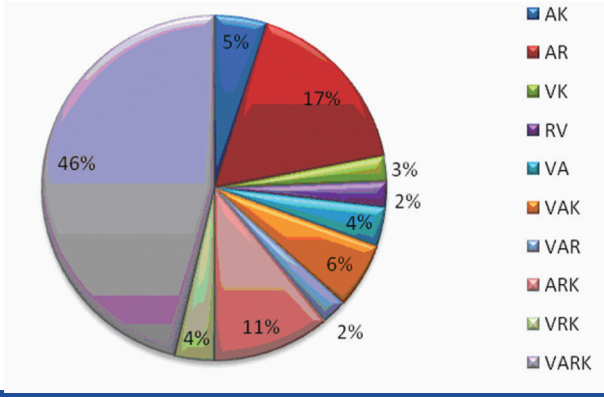
The characteristics of university learners are very varied in terms of age, culture, level of mentality preparedness, intelligence and psychological conditions, which lead to differences in individual learning styles in sensory modalities [1]. Medical students basically use different approaches to obtain required information, as their learning is affected by learning atmosphere and curricular issues, as well as teaching methods [2]. Therefore, it seems that teaching methods have to be organized individually, according to their individual characteristics [3]. Learning style is a complicated approach in which the learner should save, recall and process the concepts efficiently and effectively [4].

Visual, aural, reading and writing and kinesthetic (VARK) is one of the instruments which can be used to determine the learning styles. The VARK questionnaire was primarily developed by Lincoln University of New Zealand in 1998. It is based on three principles, which are as follows: 1. everyone can learn academic issues; otherwise everyone has their own styles 2. The learner's motivation is increased when different learning styles of learners are taken into account and 3. Educational concepts are learned through utilization of senses and different perceptions [4]. From this perspective, people acquire environmental knowledge through four sensory modalities: visual, auditory, reading/writing and kinesthetic [5]. In other words, students learn the education force process by experience, projection, contemplation and accomplishment [6].

VARK instrument, which is based on interaction and response to learning environment of the students, divides students into four categories, including; Visual (a group of learners who learn best by observation and visual presentation, such as diagrams, pictures and figures, which are associated with clarification), Aural or auditory (a group of learners who learn best through listening and verbal instructions), Reading/writing (a group of learners who learn best by taking notes during lectures or reading written or printed texts) and Kinesthetic or practical (a group of learners who learn best by doing practicals, through gaining of experience and by manipulation of objects during a physical process) [7].

You are not sure whether a word should be spelled 'dependent' or 'dependant'. You would:
A. Write both words on paper and choose one.
B. Think about how each word sounds and chooses one.
C. Find it in a dictionary.
D. See the words in your mind and choose by the way they look.
I like websites that have:
A. Interesting written descriptions, lists, and explanations.
B. Audio channels where I can hear music, radio programs or interviews.
C. Things I can click on, shift, or try.
D. Interesting design and visual features.
A group of tourists wants to learn about the parks or wildlife reserves in your area. You would:
A. Take them to a park or wildlife reserve and walk with them.
B. Show them internet pictures, photographs, or picture books.
C. Talk about or arrange a talk for them about parks or wildlife reserves.
D. Give them a book or pamphlets about the parks or wildlife reserves.

[Table/Fig-1]: Selected questions from Flemming's online VARK assessment



[Table/Fig-2]: Frequency of students who preferred bi-modal, tri-modal and quad-modal learning styles V : Visual A : Auditory R : Read & Write K : Kinesthetic

Single Modal (n=59) 41.6%	Bi-Modal (n=24) 17%	Tri-modal (n=19) 13.4%	Quad-modal (n=39) 27.6%
V (n=1) 0.7%	VA (n=3) 2.1%	VAK (n=5) 3.5%	VARK (n=39) 27.6%
A (n=25) 17.7%	AR (n=14) 9.9%	VAK (n=2) 1.4%	-
R (n=24) 17%	VR (n=2) 1.4%	ARK (n=9) 6.4%	-
K (n=9) 6.3%	AK (n=4) 2.8%	VRK (n=3) 2.1%	-
-	VK (n=2) 1.4%	-	-

[Table/Fig-3]: Frequency of desired learning styles amongst medical students

Many studies have been conducted on learning styles of medical students, that have highlighted the importance of this issue. For example, studies done by Alkhasawneh et al, on nursing students [8], Salimi et al., on medical students [9], Peyman et al., on nursing and midwifery students [10] Lujan et al., on medical students [11] have demonstrated more preference of students in using multidimensional learning styles. Only few studies have been performed by using VARK questionnaire in Iran. So, the current study was undertaken to determine preferred learning styles of first year medical sciences students at Ilam University of Medical Sciences, by using VARK questionnaire.

METHODS

Sample

This research was performed as a descriptive-cross sectional study in 2010. The target population was the students of a university of Medical Sciences which was located in the west of Iran (Ilam University of Medical Sciences). To guarantee greater representation of the data, all the first year students of medicine, health, nursing and midwifery (n= 231), who had been enrolled in this university through clearance of the 2010 entrance exam, as a sample, were selected by using census method. From the target sample of 231 questionnaires, 141 questionnaires were completed. Hence, the response rate was 61%. The final sample consisted of 93 females (66%) and 48 males (34%); overall, more than half of them (53.8%) were studying at Bachelor of Sciences (BSc) level, 40 students (28.4%) were doing associated degrees and 24 students (17%) were studying at the general practitioner (GP) level.

Data Collection

Data were collected by using a questionnaire which was composed of two parts. The first part included questions on age, gender, educational major and Grade Point Average (GPA) for per university (Diploma). The second part was use of VARK standard questionnaire which was developed by Fleming, which could determine learning styles of students [Table/Fig-1]. The VARK questionnaire, as a learning preference assessment tool, consists of 16 multiple choice questions, each having four choices. All choices correspond to the four sensory modalities which are measured by VARK (visual, aural/auditory, read/write, and kinesthetic). The students can select one or more choices, based on the sensory modalities which are preferred by them, to take in new information. The English version of VARK questionnaire was translated and its validity was approved by experts. Its Cronbach's alpha coefficient was calculated ($\alpha = 0.86$).

The participants were visited by the researchers in their classes, who handed to them the questionnaires, and then these questionnaires were collected at the same time. Before the questionnaire filling, the explanation which was needed was given to the students.

Data Analysis

Data were reported as percentages of students in each category of learning style preference. The number of students who preferred each mode of learning was divided by the total number of responses to determine the percentage. Data were entered and processed by using the Statistical Package for the Social Sciences (SPSS) software, version 16 and $\chi 2$ test.

Ethical issues

Due to the type of this study, no formal ethical approval was obtained from the University's Research Ethics Committee. The questionnaires which had participant information sheets which had questions on the nature of the study were distributed to participants. Written consent forms were obtained from participants for their participation in the study. The questionnaire data were kept confidential and respondents were assured of their right to withdraw from the study at any time. The names of the respondents were not recorded on the questionnaire, which rendered the data as anonymous.

RESULTS

A total of 141 students completed the questionnaires and so the response rate of this survey was 61%. Of them, 93 individuals (66%) were females. More than half of them (53.8%) were studying at Bachelor of Sciences (BSc) level, 40 students (28.4%) were doing associated degrees and 24 students (17%) were studying at general practitioner (GP) level.

In total, 59 students (41.6%) preferred only one learning style (single modal) and 82 students preferred to use multiple learning styles (multimodal). Of those who preferred only one style, 25 students (42.4%) were interested in auditory style and 24 students (40.7%) chose reading/writing style. Those who preferred to use more than one learning style (multi-modal) were as follows: 29.3% (n=24) preferred bi-modal styles, 23.2 % (n=19) preferred tri-modal styles and 47.5% (n=39) preferred quad-modal styles [Table/Fig-2].

[Table/Fig-3] shows students' preferences in using two, three or four modes of information processing styles. Twenty four students chose two modes of presentations, 9.9% (n=14) preferred auditory and reading/writing styles (AR), 2.8% (n=4) preferred auditory and kinesthetic styles (AK), 2.1% (n=3) preferred visual and auditory styles (VA), 1.4 % (n=2) preferred reading/writing and visual styles (RV) and 1.4 % (n=2) preferred visual and kinesthetic styles (VK).

Nineteen students preferred three modes of presentations, 6.4% (n=9) preferred aural, reading/writing and kinesthetic (ARK) style, 3.5% (n=5) preferred visual, auditory and kinesthetic (VAK) style, 2.1% (n=3) preferred visual, reading/writing and kinesthetic (VRK) style and 1.4% (n=2) preferred visual, auditory and reading/writing (VAR) style.

There was a significant difference between educational levels and majors and choosing quad modal of VARK styles (p=0.008). Also,

a significant association was found between participants' genders and their selections of visual and reading/writing styles (p=0.03).

DISCUSSION

Using VARK questionnaire to recognize preferred learning styles of students is a key approach which can be used to increase the quality of teaching and learning process. Self-awareness of distinctions and own learning styles lead each learner to individually choose appropriate study techniques. The VARK philosophy developed from the idea that everyone can learn if his/her distinction is verified. Recognizing learners' interests will help teachers in moving onto the students' learning styles from her/his learning style, in overcoming the situation in which all students tend to prefer specific styles and in improving teaching structures with consideration of the learners' points of views [12].

In our study, 41.8% participants preferred only one learning style and 58.2% of them preferred to use multiple learning styles. Seventeen percent, 13.4% and 27.6% preferred bi-modal, tri-modal and quad modal styles respectively. In an Australian study which was done amongst nursing students, 16% students chose quad modal and 47% preferred single modal learning styles [13]. In a recent study done in the United States (Michigan) amongst first-year medical students, it was found that 43.45% preferred quad-modal and that 36.1% selected single modal learning styles [11]. However, in the present study, these rates were found to be 27% for quad-modal and 41.8% for single modal styles.

A recent report made by Liu and Ginther on American students showed that between 20-30% preferred aural style, that 40% percent preferred visual style and that between 30-40% preferred either reading/writing and kinesthetic or their combination [14]. Lujan and Dicarlo reported that 36.1% of first year medical students preferred single modal styles and that 63.8% preferred multi modal learning styles [11].

Baykan and Nacar, in their study which was done to investigate the preferred learning styles of first year medical student by using VARK questionnaire, found that 36.1% preferred single modal styles and that 63.9% preferred multi modal styles. No significant difference was found between gender and mean score obtained in first semester with respect to students' learning styles. This result was not consistent with that of the present study [15].

Multi modal learners prefer to receive information by using different methods. This group of learners will not learn by using only a single method, for example, attending lectures [16]. This group of learners should read and write more about their preferences and their previous experiences and use them in everyday life accordingly [16,17]. It has been estimated that only one in five learners (20%) can remember what he/she had read. The corresponding rates for remembering after listening, watching, speaking and performing have been reported to be, 30 %, 40%, 50% and 60% respectively. These percentages for those who speak, listen, observe and perform simultaneously can be increased up to 90% [18].

Active learning strategies are more reasonable, as they consider different characteristics of learners through ratiocination and making problem solving improvements, as well as through development of decision- making skills. Discussions in class, collaborating learning skills, playing roles, simulating, models, struggles and games are active strategies that can be utilized in large classrooms [11, 17].

RECOMMENDATIONS

It can be recommended that the learning preferences of medical students should be verified prior to the start of their academic tasks by using VARK questionnaire, to find appropriate teaching methods and to achieve educational goals. According to results of present study, regarding different types of learning styles, students need to try different methods to educate themselves and it is better for both lecturers and students to try different methods of educating.

LIMITATION

This study had some potential limitations that may have affected the results. It was limited to a single university and it had a limited sample size. It was unlikely that the results of statistical analysis were attributed to chance, but this did not necessarily imply that they were valid outside this university or that they could be generalized to other settings.

Another limitation of this study, and use of the VARK questionnaire as designed, was that it did not account for confounding factors such as socioeconomic status, race, culture, etc. The relatively homogenous population which was surveyed in this study may have tended to have less variety in these factors [19].

CONCLUSION

The preferred learning styles of medical students in the present study were aural and reading/writing styles. According to results of this study, regarding different types of learning styles, students need different methods to educate themselves and it is better for both lecturers and students to try different methods of educating.

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