

Learning Styles in Students of Medical Sciences

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Abstract

Introduction: learning is a human's natural tendencies; therefore, the identification of factors affecting it, is very important in fixing problems and deficiencies in educational systems. One of the factors contributing to students' academic achievement and increased learning outcome is to identify their learning styles leading to better and more satisfying learning. The aim of the present study was to examine learning styles in students of Medical Sciences.

Methodology: The present descriptive-analytical study was conducted on 417 students of Medical Sciences selected based on cluster random sampling method in the academic year 2015-2016. The data were collected through a two-part questionnaire. The first part was consisting students' demographic characteristics. The second part was validated VARK questionnaire to categorize learning styles in the students. The collected data were analyzed through descriptive statistics, Fisher's exact test, Chi-square test and ANOVA in SPSS version 19.0

Results: The results showed the following average scores for students' learning styles: read/write learning style (7.21±1.52), kinesthetic learning style (6.59±0.97), visual learning style (6.23±1.00), auditory learning style (6.00±0.84) and multiple learning styles (5.25±1.00). The results showed no significant relationship between students' demographic characteristics and their learning styles ($p>0.05$).

Conclusions: Based on the results of this study, the most preferred learning style by medical students was the read/write style. Most university teachers believe that the cause of students' academic failure is lack of studying; however, this failure may be due to a mismatch between students' learning styles and teachers' teaching styles. In view of that, one of the requirements for appropriate education is to examine students' learning styles at the beginning of each educational year and apply appropriate teaching styles accordingly.

Keywords: learning styles, student

1. Introduction

Like eating, learning is a human natural tendency that begins at birth. The learning process includes seeing, hearing, storing and retrieving information (Mujtaba & Kennedy, 2014). Students' academic failure can be due to spiritual factors (certain mental disabilities), learning factors (lack of control over what is being taught), physical factors (poor health status, visual or hearing impairment, poor nutritional status and growth problems), emotional-social factors (dysfunctional teacher-learner and learner-learner relationships), psychological (attitudinal) factors, environmental factors (negative classroom atmosphere, inappropriate textbooks and inadequate school facilities) and teacher's personality (teacher's leadership style and charisma) (Abante et al., 2014). There is a wide-range of factors affecting learning and academic achievement; therefore, the identification of factors affecting them is very important in fixing problems and deficiencies in educational systems. Among the factors contributing to academic achievement are the consideration of students' differences, identification of their learning styles and provision of training programs based on their needs (Scott, Rodríguez, & Soria, 2014). Learning style is one of the factors that affect learning process (Abdul-Rahman & Du Boulay, 2014). In a study on 62 sophomores, Çakıroğlu and colleagues examined the relationship between learning styles and study habits

in an introductory programming course and found a significant relationship between learning styles and study habits (Çakiroğlu, 2014). There are various models of learning styles developed in universities all around the world (Mak et al., 2014) and identified based on the names of their developers (e.g. Kolb's learning styles) (Dascalu et al., 2015). In fact, learning style is the best way an individual selects to collect, organize and learn something (Çakiroğlu, 2014). Learning style is also the main construct in educational psychology that, as a representative of cognitive-emotional behaviors, determines how an individual interacts with learning situations. Any mismatch between teaching and students' learning styles will cost a lot (Laine, Myllymäki, & Hakala, 2015). Studies have shown that when students' learning styles are in line with teachers' teaching styles, students feel more responsible and usually receive higher scores. Moreover, feelings such as satisfaction, anxiety and anger are associated with students' learning styles (Hallin, 2014). Examining students' perceptions of their learning styles, both students and teachers will benefit from the results; thus, students can recognize their strengths and weaknesses and use their talents to learn more; similarly, teachers can assess and select proper teaching methodologies and provide adequate learning opportunities for students' learning (ALQahtani & Al-Gahtani, 2014). In a study on 242 students, Zeighami and colleagues investigated correlations between learning styles and some characteristics of students at Qazvin University and found that university teachers need to be aware of the variety of students' learning styles and select their teaching styles accordingly to improve the effectiveness of teaching-learning process (Zeighami & Jahani-Hashem, 2013). In Iranian health houses, as pillars of the country's health system, personnel must be trained properly to fix future problems in the community by providing services related to their duties (Miandoab et al., 2015). When teachers are teaching and students are just watching, teachers cannot understand whether their students have understood the contents or not; therefore, by examining students' learning styles, teachers can have a better understanding of the teaching-learning process (Mak et al., 2014). Teachers' knowledge of students' learning styles improves students' learning. With this knowledge, teachers can also help their students avoid bad habits (Geranmayeh et al., 2011). By identifying the preferred learning styles, students can apply the best strategies to learn better and guide their cognitive system properly (Cheng, 2014). In a study on 214 nursing and midwifery students, Jafari and colleagues examined the priority of learning styles and their roles in self-directed learning. They concluded that most students prefer the assimilating learning style (Jaafari et al., 2013).

Given that the aim of teaching is learning and that students have an innate need to know their learning styles in order to support their learning process (Khuzzan, Goulding, & Rahimian, 2015). This study was conducted to investigate students of medical sciences learning styles.

2. Materials and Methods

In the present descriptive-analytical study, learning styles among medical sciences students who were studying at schools of medicine, dentistry, nursing, health, rehabilitation and paramedics were examined. According to a study conducted by Sani, the sample size was determined using the following formula:

$$n = \frac{z_{1-\alpha/2}^2 - p(1-p)}{d^2} \quad (1)$$

Therefore, the minimum sample size was determined to be 417 medical sciences' students who were selected using cluster random sampling method. The only inclusion criterion was passing at least one semester of medical courses. The data were collected through a two-part questionnaire consisting of questions about students' demographic characteristics (e.g. age, gender, school and type of housing) and the validated 16-item VARK questionnaire to categorize their learning styles (visual, auditory, read/write and kinesthetic). The learning styles included 1) visual learning style (learners with visual learning style mostly learn through observation); 2) auditory learning style (learners with auditory learning style mostly learn through listening and oral presentation of the contents); 3) read/write learning style (learners with read/write learning style usually learn through note taking and reading); and 4) kinesthetic learning style (learners with kinesthetic learning style mostly learn through physical activities, experiments and manipulation of physical objects). Items in the VARK questionnaire are designed based on people's performance in different situations. Each item consists of four options each indicates one of the styles of learning. Thus, the maximum and minimum possible scores are 16 and 0 in each style. The preferred learning style of each respondent is the one in which who has obtained the highest score. If a person obtains similar scores in two or more styles, s/he will be identified as a learner with multiple learning styles. The VARK questionnaire is a validated scale. Javadinia and colleagues have reported a test-retest reliability of 0.80 for this questionnaire (Javadinia et al., 2012). After receiving approval of the project and an introduction letter from the vice chancellor for research, the researchers referred to all schools for data collection. Doing so, some classes were randomly

selected out of the available classes in each school and the number of respondents from each class was determined based on the number of selected classes in each school. After selecting the subjects, explaining the research objectives and obtaining their verbal consent, the questionnaire was distributed among them. At the top of each questionnaire, two sentences of “your cooperation in this research project indicates your informed consent to participate in this study” and “the information provided here is confidential” were written. After receiving each questionnaire, it was reviewed by the researcher and in cases of incomplete questionnaires, the respondents were asked to complete them. Finally, using the SPSS-19 software, the collected data were analyzed through descriptive statistics, Fisher’s exact test, Chi-square test and ANOVA.

3. Results

In this study, 191 male (45.8%) and 226 female (54.2%) students participated. The average age of the participants was 21.39 ± 3.09 years. Out of the whole participants, 72 students (17.3%) were studying at school of nursing, 71 (17%) at school of dentistry, 80 (19.2%) at school of medicine, 66 (15.8%) at school of paramedics, 72 (17.7%) at school of public health and 54 (12.9%) at school of rehabilitation; 280 students (67.1%) were living in dormitory, 56 students (13.4) were from other cities and living in rented homes and 81 students (19.4%) were living with their parents in the city if Zahedan.

The results showed no significant relationship between learning styles and demographic characteristics of the students ($p > 0.05$).

The average scores obtained in the VARK learning styles are presented in the following table.

Table 1.

	N	Mean	SD
VARK Learning Styles	Kinesthetic	61	6.59
	Auditory	26	6.00
	Read/Write	196	7.21
	Visual	66	6.23
	Multiple styles	68	5.25
	Total	417	6.57

Frequencies, means and SDs of the VARK learning styles.

4. Discussion

The results of this study showed that the majority of medical students prefer the Read/Write learning style which was in line with results of studies conducted by Sarabi and colleagues and Zeighami and colleagues (Sarabi et al., 2015; Zeighami & Jahani-Hashem, 2013). However, this result was not in line with results of Seyal and colleagues and Saga and colleagues studies who found the kinesthetic learning style as the most preferred style (Seyal & Rahman, 2015; Saga, Qamar, & Trali, 2015). Saga and colleagues concluded that one of the best strategies for learning is learning through activities and experiments (Saga, Qamar, & Trali, 2015). The transmission of knowledge to students is done through teachers’ lectures; however, students’ activities in clinical settings specify that the expansion of their learning requires movement and experiments. Javadinia and colleagues conducted a study on 148 students studying at Birjand University of Medical Sciences and found that the most preferred learning style is the auditory style (Javidinia et al., 2012). This finding may be explained by considering the common teaching styles used in their schooling period. In a similar study, Karimi and colleagues in their study found that a teacher-centered teaching develops students’ listening and note-taking abilities (Karimi et al., 2009).

The population in the present study and Javadi Nia’s study consisted of medical students and the used instrument was the VARK questionnaire. Since the results were different, it seems that the impacts of other factors such as age, cultural habits, levels of learning, levels of motivation and type of educational institutions on medical students’ learning preferences must also be examined. In a longitudinal study, medical students’ learning styles can be altered as they progress (Seyal & Rahman, 2015). They explained this finding by considering that medical students try to adapt their learning styles to a student-centered curriculum based on problem-solving model of education. In this regard, it must be noted that freshmen were not included in the present study.

The lowest average score in the present study was associated with multiple learning styles. Learners with multiple learning styles prefer to get information from different sources. In other words, they apply different learning styles

in learning situations and benefit more from active learning strategies than the traditional teacher-centered methods in which students are passive (Lujan & DiCarlo, 2006; Hamouzadeh et al., 2012). One of the features of effective learning is having the ability to apply multiple learning styles and strategies in different learning situations. In other words, effective learning, which must be appreciated by teachers, happens when students are able to diversify their learning styles. Given that medical students usually perform clinical trials as a team, they must not be limited to only one style of learning; therefore, they must be encouraged to apply multiple learning styles (Zeighami & Jahani-Hashem, 2013; Ahadi, Abedsaidi, Arshadi, & Ghorbani, 2010).

The results of this study did not reveal any significant relationship between gender and learning style which was consistent with results of some studies (Hosseini et al., 2015; Ghaffari et al., 2013). The results of our study were inconsistent with results of some other studies (Sarabi-Asiabar et al., 2015; Ibrahim & Hussein, 2015). Similarly, the relationships between age and type of housing with learning style were not significant. These findings were in line with results of studies conducted by Najaf Pour and colleagues (Najaf Pour et al., 2014) and Lee and colleagues (Lee et al., 2011). However, these results were not consistent with results of a study conducted by Zeighami and colleagues (Zeighami & Jahani-Hashem, 2013) which might be due to the differences in cultural and educational conditions between the examined students.

According to the results of this study, it is recommended to examine students' learning styles at the beginning of each educational year and apply proper teaching styles in order to enhance effective learning and save more time and energy. Obviously, having a prior knowledge of students' learning styles can be very effective for teachers (Zhang, 2010) and can help them design an appropriate learning environment for their students (Yassin, 2015). However, teachers need to be flexible in their teaching practices for being successful in this process (Mondal, 2011).

Among the limitations of the present study, examining a limited sample size selected from only one university and not considering influential factors such as students' socioeconomic status, race and cultural background can be mentioned.

In the present study, the VARK Questionnaire was used as the instrument. Among the advantages of using this data collection tool is that its items have been designed based on understandable and real life scenarios. In this regard, Fleming conducted a study on the VARK website and found that almost 60% of the respondent confirm the accuracy of its results, 5% are disagree with its results and the rest do not have knowledge about their learning preferences.

5. Conclusions

The results of this study showed that the majority of medical students at Zahedan University of Medical Sciences prefer the Read/Write learning style. Most university teachers believe that the cause of students' academic failure is lack of studying; however, this failure may be due to a mismatch between students' learning styles and teachers' teaching styles. In view of that, one of the requirements for appropriate education is to examine students' learning styles at the beginning of each educational year and apply appropriate teaching styles accordingly. It is also recommended that university teachers provide the opportunity for developing students' abilities by delegating practical tasks (e.g. the presentation of hypothetical anatomical models in the course of Anatomy) to them. In several studies have ruled out that every individual has a preferred learning style. One of the most common and known of learning styles system is Fleming's VARK system. He acknowledged that there is four basic styles for learning, although one learner can become multi-style (More than one learning style used systematically) (Arbabisarjou, 2014).

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Competing Interests Statement

The authors declare that there is no conflict of interests regarding the publication of this paper.

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