

# Identification of Medical Students' Learning Styles in Terms of Gender

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## Abstract

**Introduction:** Every amazing human development in the modern world is resulted from learning; therefore, teaching and learning improvement are the bases of all activities. There is a wide-range of factors affecting learning and the identification of these factors is very important in fixing problems and deficiencies in educational systems. Among the factors contributing to academic achievement are the consideration of students' differences and identification of their learning styles. Accordingly, the present study was conducted to identify medical students' learning styles in terms of gender.

**Methodology:** This is a descriptive-analytical study that it conducted in 2015 on 360 students of Medical Sciences. The data collected through a two-part questionnaire consisting of questions about students' demographic characteristics and the validated VARK questionnaire to categorize their learning styles. Using the SPSS-19 software, the collected data were analyzed through descriptive statistics, Chi-square test and ANOVA.

**Results:** the results showed that the mostly preferred learning style among medical students was the Read/Write style (48.3% of students at school of nursing, 56.7% of students at school of dentistry, 40% of students at school of medicine, 36.7% of students at school of paramedics, 53.3% of students at school of public health and 43.3% of students at school of rehabilitation). The results also showed no significant relationship between learning style and age ( $p=0.60$ ), school ( $p=0.106$ ) and gender ( $p=0.41$ ).

**Conclusions:** the results of this study showed that there is no significant relationship between gender and learning style of medical students. Furthermore, the mostly preferred learning style of students at Zahedan University of Medical Sciences is the Read/Write style.

**Keywords:** learning style, gender, students, Zahedan University of Medical Sciences

## 1. Introduction

Students learning can be affected by 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). Every amazing human development in the modern world is resulted from learning; therefore, teaching and learning improvement are the bases of all activities in educational institutions (Kalbasi et al., 2008). Universities play an important role in social developments (Barratt & Moyer, 2004). When the models listed in academic development are not rooted in the recognition of the university and its environment, they make the university away from real issues, increase scientific and technological dependencies and lead to negative consequences. The idea that people's differences in learning are just due to their differences in levels of intelligence and ability was accepted in the world of education for a long time; however, now, it has been specified that other factors such as personality traits, task difficulty and different learning styles are also involved in people's differences in learning (Emamipour & Shams Esfandabad, 2007). There is a wide-range of factors affecting learning and the identification of these factors 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 et al., 2014). These factors lead to better organization and modification of learning environments, teachers-students interactions and effective teaching-learning processes (Ahmadi & Allami, 2014). Learning style is actually the best way an individual selects to collect, organize and learn new information (Ismail & Azman, 2010). If an individual's learning styles is not compatible with his field of study, he may either drop out or continue his education unsatisfactorily (Nasirzadeh et al., 2014). Kolb believed that selecting teaching methods based on students' learning styles will result in better outcomes (Kolb & Kolb, 2005). Some researchers believe that one of the reasons for students' frustration is a mismatch between their learning styles and their teachers' teaching methods (Bertolami, 2001). Therefore, the identification of students' learning styles (Nuzhat et al., 2013) and selection of appropriate teaching strategies can enhance the teaching-learning process (Kharb et al., 2013).

In many medical schools around the world, the assessment of students' learning styles is carried out as a continuous and necessary program to raise teachers' awareness of their students' capacities (Shakurnia et al., 2012). Today, there are a variety of methods for the assessment of people's learning styles and the VARK model is one of them. In the VARK model of learning styles, learners are divided into subgroups based on their learning preferences. This model consists of Visual (learning through seeing), auditory (learning through listening), Read/Write (learning through reading and writing), Kinesthetic (Learning through activities and experiments) and multiple (learning through a mixture of two or more learning styles) learning styles (Khandaqi Maqsood & Rajai, 2013).

Some studies have indicated that gender-based differences can affect students' learning styles. Hickson and Baltimore believed that men have a greater tendency to learn through objective experiments while women usually act more reflectively (Hickson & Baltimore, 1996). People's personality traits can also affect the way they learn (Vollers, 2008). Nonetheless, in most studies, no significant difference has been observed in learning styles between men and women (Safari 2009; Alkhasawneh et al., 2008).

Education experts believe that students respond to their learning environments through different sensory channels; thus, knowledge in this field can be effective in the selection of teaching method (Mohammadi et al., 2015). Given that students and teachers need to be constantly updated regarding the best ways of learning (Samarakoon et al., 2013) and that descriptive information about the status quo is required for making constructive changes in every field (Miandoab et al., 2016; Nazanin Yousefian Miandoab et al., 2015; Miandoab et al., 2015), this survey was conducted to investigate medical students' learning styles in terms of gender.

## 2. Materials and Methods

This is a descriptive-analytical study and learning styles of medical students studying at six schools of medicine, dentistry, nursing, public health, rehabilitation and paramedics were examined in terms of gender. According to a study conducted by Sani (Jafari Sani et al., 2013), the sample size was determined using the following formula:

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

Therefore, the minimum sample size was determined to be 360 medical students who were selected using cluster random sampling method. The only inclusion criterion was passing at least one semester. The data were collected through a two-part questionnaire. The first part was consisting of items about students' demographic characteristics (e.g. age, gender, school and type of residency), the second part was 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 are designed based on people's performance in different situations in the VARK questionnaire. Each item consisted of four options each indicated 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. Javadi Nia and colleagues have reported a test-retest

reliability of 0.80 for this questionnaire (Alkhasawneh et al., 2008). After receiving approval of the project and an introduction letter from the vice chancellor for research of Zahedan University of Medical Sciences, the researcher 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 equally among male and female students. 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, Chi-square test and ANOVA.

### 3. Results

At least 360 medical students studying at the six schools of nursing, medicine, paramedics, dentistry, public health and rehabilitation participated in the present study voluntarily. The cluster random sampling method was used to select 60 students (30 males, 30 females) out of the total population in each school. The average age of the participants was  $21.48 \pm 3.07$  years. The results showed that the majority preferred learning style among medical students is the Read/Write style (48.3% of students at school of nursing, 56.7% of students at school of dentistry, 40% of students at school of medicine, 36.7% of students at school of paramedics, 53.3% of students at school of public health and 43.3% of students at school of rehabilitation). The results also showed no significant relationship between learning style and age ( $p=0.60$ ) and school ( $p=0.106$ ).

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

Table 1. Frequencies, means and SDs of the VARK learning styles

|                      | N               | Mean | SD   | Minimum | Maximum |    |
|----------------------|-----------------|------|------|---------|---------|----|
| VARK Learning Styles | Kinesthetic     | 58   | 6.60 | 0.954   | 5       | 9  |
|                      | Auditory        | 24   | 6.04 | 0.859   | 5       | 8  |
|                      | Read/Write      | 167  | 7.19 | 1.521   | 1       | 12 |
|                      | Visual          | 55   | 6.20 | 1.007   | 5       | 8  |
|                      | Multiple styles | 56   | 5.29 | 0.563   | 4       | 7  |
|                      | Total           | 360  | 6.57 | 1.393   | 1       | 12 |

The relationships between gender and VARK learning styles are presented in the following table.

Table 2. Relationships between gender and VARK learning styles

|                          |            | Gender |        | Total | p-value |
|--------------------------|------------|--------|--------|-------|---------|
|                          |            | Male   | Female |       |         |
| Kinesthetic              | Number     | 31     | 27     | 58    | 0.412   |
|                          | Percentage | 53.4   | 46.6   | 100   |         |
| Auditory                 | Number     | 11     | 13     | 24    |         |
|                          | Percentage | 45.8   | 54.2   | 100   |         |
| Read/Write               | Number     | 79     | 88     | 167   |         |
|                          | Percentage | 47.3   | 52.7   | 100   |         |
| Visual                   | Number     | 25     | 30     | 55    |         |
|                          | Percentage | 45.5   | 54.5   | 100   |         |
| Multiple learning styles | Number     | 34     | 22     | 56    |         |
|                          | Percentage | 60.7   | 39.3   | 100   |         |
| Total                    | Number     | 180    | 180    | 360   |         |
|                          | Percentage | 50     | 50     | 100   |         |

#### 4. Discussion

Being aware of students' learning styles and factors affecting them can encourage teachers to adapt their teaching styles to their students' needs, improve the structure of education, develop teaching methodologies and overcome the traditional teacher-centered methods (Lujan & DiCarlo, 2006). The results of this study indicated no significant relationship between gender and learning style of medical students which was in line with results of other studies (Alkhasawneh et al., 2008; Safari, 2009). In a study, Amini and colleagues found some gender-based differences in learning styles which were not statistically significant (Amini et al., 2010). However, in studies conducted by Mohammadi et al. (Mohamadi Azni et al., 2008) and Sarabi et al. (Sarabi-Asiabar et al., 2015), a significant relationship was observed between gender and learning styles. Honigsfeld examined gender-based differences in learning styles in five different countries and reported that compared to males, females have higher levels of personal motivation, persistence, responsibility and needs for social diversity and warm relationships. He also found a significant relationship between gender and learning styles (Honigsfeld & Dunn, 2003). These different results can be attributed to issues such as the number of male and female students in the examined fields of study (in some fields of study, the girls outnumbered the boys and vice versa) and the differences in students' preferred learning styles in different universities (Nasirzadeh et al., 2014). Furthermore, the mentioned studies were conducted on students with different demographic characteristics; therefore, demographic characteristics can affect students' learning styles (Nasirzadeh et al., 2014). It must also be noted that learning styles are not necessarily fixed and can change due to many reasons such as changes in learning environment, subjects and teaching methods (Curry, 1999). Moreover, in the present study, both male and female students were enjoying similar educational conditions, subject matters, teaching methodologies and teachers; accordingly, it would be natural if no significant difference was observed in learning styles between them (Jafari Sani et al., 2013).

The results of this study indicated that the most and the least preferred learning styles of medical students are Read/write and auditory styles respectively. In a similar study conducted (Ahmadi & Allami 2014), the most and the least preferred learning styles of health workers were Read/Write and Visual learning styles respectively. They also concluded that most medical students at Iran University of Medical Sciences prefer the visual learning style after finishing their second term (Amini et al., 2010). Mohammadi et al. found the auditory learning style as the most preferred one (Mohammadi et al., 2015). One of the reasons behind students' preference for the Read/Write learning style may be the common teaching methodology used in their schooling period which was mostly based on reading texts and note-taking. Saga and colleagues concluded that one of the best strategies for learning is learning through activities and experiments. The transmission of knowledge to medical students is done through teachers' lectures; however, students' activities in clinical settings specify that the expansion of their learning requires movement and experiments (Saga et al., 2015). Mohammadi et al. also stated that university teachers should provide the opportunity for developing students' kinesthetic abilities by delegating practical tasks (e.g. the presentation of hypothetical anatomical models in the course of Anatomy) to them (Mohammadi et al., 2015). In studies conducted on Turkish medical students (Baykan & Naçar, 2007) and on students at Michigan University (Urval et al., 2014), most students preferred multiple learning styles. It must be noted that 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 (Ahadi et al., 2010; Zeighami & Jahani-Hashem, 2013).

Studies have shown a variety of learning styles resulting from different factors including teaching methods, learning environments, learning tasks (Nasirzadeh et al., 2014), pre-university teaching methods and cultural and social differences (Mohammadi et al., 2015).

Among the limitations of the present study, examining a limited sample size selected from only one university and collecting data based on students' self-reports can be mentioned. The instrument used in this study was the VARK questionnaire which, according to Fleming, has been designed to assess learners' learning styles at the time of its completion; thus, it cannot assess people's lifelong learning styles (Landry, 2011).

#### 5. Conclusion

The results of this study showed that there is no significant relationship between gender and learning style of medical students. Furthermore, the mostly preferred learning style of students at Zahedan University of Medical Sciences is the Read/Write style. Considering the distribution of male and female students and the availability of some single-sex classes at Zahedan University of Medical Sciences, the consideration of students' learning style

can be very helpful in the development of training programs and promotion of educational mechanisms.

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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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