

# The Relationship Between Learning Styles and Baseline Characteristics of Postgraduate Students at Kerman University of Medical Sciences During 2013 - 2014

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Received: February 8, 2015; Accepted: February 14, 2015

**Background:** The most spectacular progress of the mankind is made by learning. One of the most effective factors that help learning among students is their learning styles. According to individual differences, people use various learning styles; therefore, it is of utmost importance to know the learning style of learners and find what reasons can affect it, in order to train them.

**Objectives:** The purpose of this study was to identify the relationship between the learning styles of postgraduate students in Kerman University of Medical Sciences and their baseline characteristics.

**Patients and Methods:** In this cross-correlation study, 400 postgraduate students of Kerman University of Medical Sciences were randomly selected. To collect data, the Kolb's learning styles questionnaire was distributed among the participants. The validity of the instruments was determined in terms of content validity, and the reliability was gained through internal consistency methods. The Cronbach's alpha coefficient was found to be 0.75; Descriptive statistics (percentage, frequency, mean, and standard deviation) and analytical tests (ANOVA and chi-square) were performed to analyze the data.

**Results:** The findings indicated a significant difference between learning styles; most postgraduate students at Kerman University of Medical Sciences used the converging learning style. Totally, 51%, 31%, 10%, and 8% of the participants used convergent, assimilator, accommodator, and divergent learning styles, respectively. No statistically significant relationship was found between the learning styles and baseline variables.

**Conclusions:** According to the results of this study, the most dominant learning style of postgraduate students is the convergent style. These findings are useful for learning system. Therefore, the results of this study and similar research on students' learning styles in other universities can be considered as a baseline for the identification of learning styles as well as planning for them.

*Keywords:* Learning; Students; Medical; Kolb's Learning Styles

## 1. Background

Different theories about learning are associated with different knowledge views. Experiential theories discuss about how each person learn things in different ways as they react to personal perceptions of experiences during their lives (1). One of the important factors that affect learning among students is their learning styles. To achieve the desired level of learning, differences among students and their learning style must be identified (2). There has been interest about different learning styles because of individual learners characteristics (1, 3). There is a prediction about matching learning preference with learning style could develop learning and there has been a huge effort to identify personal learning preference (1, 4) There are several learning style modes which among them, The Kolb method was mostly used (5, 6) and the latest version of the Kolb Learning Style Inventory instru-

ment is version 3 (LSI 3) (7). Researchers found that Kolb's learning theory is useful for explaining Substructure which is related to learning process in medical education (1, 8, 9) According to the Kolb theory, learning styles consist of four stage cycle (Figure 1) (10).

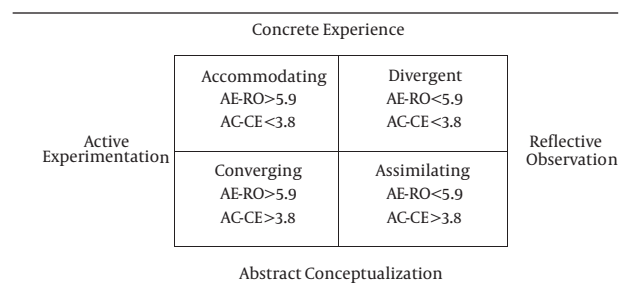


Figure 1. Analysis of Learning Styles Questionnaire

The four modes of adaptive learning that constituted his cycle were 'concrete experience, reflective observation, abstract conceptualization and active experimentation' (11). In this model, there are two processes for perceiving information: concrete experience mode and abstract conceptualization mode and two processes for processing experience into learning: active experimentation mode and reflective observation mode. These four processes are combined into four learning styles as follows:

- 1) Converging (abstract conceptualization mode and active experimentation mode)
- 2) Accommodating (concrete experience mode and active experimentation mode)
- 3) Diverging (concrete experience mode and reflective observation mode) and
- 4) Assimilating (abstract conceptualization mode and reflective observation mode).

Diverging style these individuals value generating skills including building relationships with others, preferring to help others and they have sense making (reasoning). Assimilating learning style is related to thinking abilities including collecting information, analyzing data and they like to build theory. Converging learning style is related to decision skills including ability of quantitative analysis, technical device use and formulation of goals. Accommodating learning style is related to acting skills including leadership, initiative and action (6, 11-13). Learning styles of the Kolb model are not only associated with skill, but also with adaptively and flexibility concerning management of different situations. Curry (12) mentioned that learning styles are different from capability and strategy. Styles might be monitored along content domains, personalities and interpersonal treats and they are assessed in terms of ordinary performance. According to Curry, learning style is spontaneously demonstrated without conscious awareness or choice from different situations. Strategies are results of conscious awareness for making decisions and methods might be monitored in specific performing situations (6, 12).

Searching among different articles support that the learning styles of medical students in different countries which have different culture are diverse (14-19). There was a research has conducted in Germany which showed that the preferred learning style among medical students was assimilator and has relationship with psychological ailments (20). Moreover, a research on nursing students in USA showed that the preferred learning style was assimilating (21).

In Iran, various studies declared, students' preferred learning styles: medical students' preferred learning style in Alborz University of Tehran was convergent and had relationship with their gender, field, semester, and job (14); the preferred learning style in Tehran University was divergent but master students more preferred convergent style and has no relationship with their gen-

der, (22) and the preferred learning style in Isfahan University was divergent (23). The preferred learning style in Brijand on medical students was convergent and has no relationship with their age, sex and their score in university (24) and in a study that was conducted in Qazvin University on nursing students, it was more assimilating and had no relationship with their demographic features (25). Since university educational managers and teachers have the responsibility of teaching and learning activities; the positive role of learning styles assessment has been proven in development of students' academic achievement, motivation, and professors teaching methods, so, it is essential to take these assessing learning styles into consideration (2, 4, 14, 15, 17, 20). There is a criticism of investigating about individual learning style in learning system; this could lead to the individual training which would put a burden on educational systems (26). Despite such criticism, the majority of studies about searching the preferred learning style were declared the positive role of learning styles on students' success and improve their motivation (20, 27). Determining individuals' learning styles, based on their differences has been found to be effective for programming (17, 18, 20). So, determining effective kind of learning based on people's characteristics is so important (28). Studies performed to determine learning styles and baseline characteristics to meet the learning needs also can provide valuable information about the relationship between learning styles and these characteristics. The results gained from the current study for training programs can be configured to meet the needs of staffs and students, and thus progress can be made for students and university.

## 2. Objectives

As long as learning styles have an important impact on student learning, and different cultures of students affects that, and also for preparing the best learning curriculum for students, it is necessary to know what is their learning styles. Therefore, this study aimed to assess learning styles of individuals and examine the relationship between learning styles and baseline characteristics of students at Kerman University of Medical Sciences.

## 3. Patients and Methods

In this cross-sectional single stage study, the study population consisted of 400 masters' and doctoral postgraduate students in Kerman University of Medical Sciences in the second semester of the academic year 2013-14. . The sample size was determined by using the formula of limited population (29-31). In this regard, 365 cases were identified but in order to increase the reliability of data 400 cases were included. To collect data, the students were randomly selected and were given a questionnaire.

### 3.1. Tool

We used a questionnaire to gather data. This questionnaire consisted of 2 parts. The first part contained baseline characteristics or demographic features such as sex, age, place of living, marital status, and job. The second part was Kolb learning style inventory (7), which is widely used and accepted as a measuring tool to determine the learning styles of the learners (32). The questionnaire has 12 questions and each question has 4 multiple choice answers as Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC), and Active Experimentation (AE). Students were asked to give numbers 1 to 4 to each question (number 4 completely agreeable and number 1 not agreeable). By summing the scores for each of the 4 options, we can determine the learning style of each individual. By subtracting the AC score from CE score (AC - CE) and RO from AE (AE - RO), two scores can be obtained. These two scores are then placed on the x and y axes. At one end of the vertical axis and on the other end AC and CE are placed, respectively. This is true for AE and RO on horizontal axis as well. These can form 4 quadrants in which each square represents one quarter of the learning styles (Figure 1). The quarter of CE and RO represents a divergent learning style and the quarter of CE and AE represents an accommodating learning style. In a similar vein, the quarter of AC and AE represents a convergent learning style and the quarter of AC and RO represents an assimilating learning style.

### 3.2. Reliability and Validity

The content validity of this questionnaire that was approved in a study by Brower Cronbach was 0.73 to 0.88 (33). Ibrahimoglu et al. Cronbach's alpha was 0.64 to 0.77 (34) and in Romanelli study was 0.69 (17). In the study by Darvishzadeh and Sabzevari (28) in Iran the correlation coefficient (to determine learning styles) was 50%. In addition, to determine the internal consistency, Cronbach's alpha coefficient was calculated to be 0.7 (28). In this study, the validity of the tool was assessed and the scale factors were determined to be 0.75 for the Cronbach's alpha reliability value, which meant that the scale was reliable. To analyze data, SPSS version 22 software was used. We applied descriptive statistics (frequency distribution, mean, and standard deviation) as well as analytical tests (ANOVA).

## 4. Results

In our study, 246 women (61.5%) and 154 men (38.5%) were participated. Among the participants, 376 cases (94%) lived in town and only 24 (6%) lived in a village. Moreover, 334 cases (83.5%) used the dormitory and the rest (n = 66, 16.5%) did not use dormitory. In terms of marital status, 297 cases (74.3%) were single and 103 (25.7%) were married. In addition, 108 cases (27%) had a job and 292 (73%) did not have a job. In the initial research process,

the learning styles of the participants were determined. The distribution frequency and percentages are shown in Table 1. Findings indicate that the highest frequency of learning style is 204 out of 400 cases (51%) for learners with convergent learning style. No correlation was found between the baseline features and the learning styles. Moreover, the results showed that learners living in town had convergent style more than other learning styles, while learners living in village had assimilating style more than other learning styles. Additionally, both genders had more convergent learning style.

**Table 1.** Distribution of the Participants According to Their Learning Styles

Learning Styles	No. (%)
Divergent	32 (8)
Assimilating	124 (31)
Converging	204 (51)
Accommodating	40 (10)
Total	400 (100)

## 5. Discussion

In this paper, we assessed the relationship between the learning styles and baseline characteristics. The results of various studies demonstrate that learners have different learning styles and this diverse is due to dissimilar places and variant personality (14-19, 28, 34). The results also showed that the learning styles of women and men are different (14, 35).

In this study, most participants had convergent learning style and the learning style had no correlation with baseline characteristics. However, it had a relationship with the place of living in which those participants who lived in town had more convergent learning style compared to other learning styles. In comparison, those participants who lived in village had more assimilation learning style. Both men and women had the same preferred learning style. But the percentage among women was 3% higher than that in men. In preferred learning those people who stay in dormitory had the same results in comparison with others. Regarding marital status both single and married participants had a convergent learning style more than other learning styles. According to Table 2 both single and married learners had convergent learning styles which in single learners convergent style percentage was almost 10% higher than married learners (53.5 > 43.7%). In terms of occupation, both single and married learners had a higher convergent style. Employed participants had 6% more convergent learning style. Various study showed preference of convergent style: study of Alborz university more convergent style and had relationship with gender, and job (14).

**Table 2.** Summarized Related Attitudes and Personality Characteristics <sup>a</sup>

Baseline Characteristics	Learning Style				Total	P Value
	Assimilating	Convergent	Divergent	Accommodating		
<b>Gender</b>						0.309
Female	69 (28)	128 (52)	23 (9.3)	26 (10.6)	246	
Male	55 (35.7)	76 (49.4)	9 (5.8)	14 (9.3)	154	
<b>Place of live</b>						0.191
Town	112 (29.8)	194 (51.6)	31 (8.2)	39 (10.4)	376	
Village	12 (50)	10 (41.7)	1 (4.2)	1 (4.2)	24	
<b>Stay in dorm</b>						0.261
Yes	110 (32.9)	167 (50)	26 (7.8)	31 (9.3)	334	
No	14 (21.2)	37 (56.1)	6 (9.1)	9 (13.6)	66	
<b>Marital status</b>						0.232
Single	85 (28.6)	159 (53.5)	22 (7.4)	31 (10.4)	297	
Married	39 (37.9)	45 (43.7)	10 (9.7)	9 (8.7)	103	
<b>Employment status</b>						0.496
Employed	30 (27.8)	60 (55.6)	10 (9.3)	8 (7.4)	108	
Unemployed	94 (32.2)	144 (49.3)	22 (7.5)	32 (11)	292	

<sup>a</sup> Data are presented as No. (%).

In a study which was conducted in Birjand, showed that medical students had more convergent learning style and their styles had no relationship with their age, sex and score of university (24) besides in Richard et al. study, which was conducted in Pennsylvania on postgraduate medical students demonstrated preferring converging learning style and had correlation with their individual features (36) which their findings almost followed our results. However, the study of Hosseini and Seif in Tehran indicated that learners had more assimilating learning style (30%) and then convergent learning style was prominent with 1% difference (29%) (22). In the study conducted by Burger and Scholz in Germany, the preferred learning style was assimilator and has relationship with psychological ailments (20). Furthermore, in a research of Shinnick and Woo in California the preferred learning style was assimilating (21). In the study of Darvishzadeh and Sabzevari (28), medical students preferred the assimilating learning style and no correlation was found between learning styles and variables such as age, sex, and marital status. However, a significant correlation was found between student's living place and learning styles. Furthermore, findings highlighted that learners who lived in town used assimilating learning style more than other learning styles and learners in villages used divergent learning style more than other styles (32). In Ibrahimoglu et al. research, which was performed on 421 students in Gaziantep University of turkey using the Kolb questionnaire, it was shown that most students used assimilating learning style and their learning styles had a correlation with their personal characteristics (34). The

result of this study is not consistent with our findings. This can be concluded that the learning style of students differs in various cultures. For example, those learners who lived in different places had different learning styles. In the studies of Darvishzadeh et al. (28) and Ibrahimoglu et al. (34) due to the differences we have various styles. Furthermore, we should consider that these styles can have different results in individuals. For example, in this study the participants were postgraduate students but in the study of Darvishzadeh (28) they were medical students and in Ibrahimoglu et al. (34) they were undergraduate students. The convergent learning style is suitable for those students who are more logical. Our research is suitable for teachers and the educational system. We hope the findings of our research be used in planning the curriculum and we also suggest more research in other disciplines of Kerman Medical University for instance, among undergraduate and dental students to find their preferred learning style in order to plan teaching and learning methods.

### Acknowledgements

We would like to express our gratitude to all students who participated in our research. Special thanks go to Jeyranzebardast for her efforts in analyzing the data.

### Authors' Contributions

Atena Rahmati and Sakine Sabzevari have done most parts. Amin Beigzadeh and Maryam Karbasi helped through analysis, editing.



## References

- Yardley S, Teunissen PW, Dornan T. Experiential learning: AMEE Guide No. 63. *Med Teach*. 2012;**34**(2):e102-15.
- Forrest S. Learning and teaching: the reciprocal link. *J Contin Educ Nurs*. 2004;**35**(2):74-9.
- Kaufman DM, Mann KV, Jennett PA. *Teaching and learning in medical education: how theory can inform practice*. Edinburgh: Association for the Study of Medical Education; 2000.
- Lesmes-Anel J, Robinson G, Moody S. Learning preferences and learning styles: a study of Wessex general practice registrars. *Br J Gen Pract*. 2001;**51**(468):559-64.
- Kolb DA. *Bibliography on Experiential Learning Theory 1971- 2004*.. Available from: [http://www.learningfromexperience.com/Research\\_Library.htm](http://www.learningfromexperience.com/Research_Library.htm).
- Bergman LG, Force UG. Computer-aided DSM-IV-diagnostics - acceptance, use and perceived usefulness in relation to users' learning styles, . *BMC Medical Informatics and Decision Making*. 2005;**7**(5).
- Kolb DA. *Learning Style Inventory Version 3, Experienced Based Learning Systems*. Boston, USA: Inc Hay/McBer; 1999.
- Dorman T, Maan K, Scherpbier A, Spenser J. *Medical Education: Theory and Practice*. 1 ed; 2010.
- Smith CS, Morris M, Francovich C, Hill W, Gieselman J. A qualitative study of resident learning in ambulatory clinic. The importance of exposure to 'breakdown' in settings that support effective response. *Adv Health Sci Educ Theory Pract*. 2004;**9**(2):93-105.
- Eraut M. Informal learning in the workplace. *Stud Contin Med Educ*. 2004;**26**(2):247-73.
- Kolb DA. *Experiential Learning: Experience as The Source of Learning and Development*. Eaglewood Cliffs New Jersey 07632: Prentice Hall PT R; 1984.
- Curry L. Cognitive and learning styles in medical education. *Acad Med*. 1999;**74**(4):409-13.
- Kolb DA. *Facilitator's Guide to Learning, Experience Based Learning Systems*. Boston, USA: Inc Hay/McBer, Training Resources Group; 2000.
- Ghazivakili Z, Norouzi Nia R, Panahi F, Karimi M, Ghosorkhi H, Ahmadi Z. The role of critical thinking skills and learning styles of university students in their academic performance. *J Adv Med Educ Prof*. 2014;**2**(3):95-102.
- Contessa J, Ciardiello KA, Perlman S. Surgery resident learning styles and academic achievement. *Curr Surg*. 2005;**62**(3):344-7.
- Mammen JM, Fischer DR, Anderson A, James LE, Nussbaum MS, Bower RH, et al. Learning styles vary among general surgery residents: analysis of 12 years of data. *J Surg Educ*. 2007;**64**(6):386-9.
- Romanelli F, Bird E, Ryan M. Learning styles: a review of theory, application, and best practices. *Am J Pharm Educ*. 2009;**73**(1):9.
- Vita GD. Learning Styles, Culture and Inclusive Instruction in the Multicultural Classroom: A Business and Management Perspective. *Innov Educ Teach Int*. 2001;**38**(2):165-74.
- Grasha AF. Using traditional versus naturalistic approaches to assessing learning styles in college teaching. *J Excell Coll Teach*. 1990;**1**(1):23-38.
- Burger PH, Scholz M. The learning type makes the difference—the interrelation of Kolb's learning styles and psychological status of preclinical medical students at the University of Erlangen. *GMS J Med Educ*. 2014;**31**(4):42.
- Shinnick MA, Woo MA. Learning style impact on knowledge gains in human patient simulation. *Nurse Educ Today*. 2015;**35**(1):63-7.
- Hosseini LL, Seif AA. [Learning style's students with regard to sex, sections and educational methods]. *Seasonal Res Program High Educ*. 2001;**19**:114-93.
- Salehi SH, Soleimani B, Amini P, Shahnooshi EA. [survey of relation between learning styles and preferred teaching methods in students of nursing, Isfahan University of medical sciences]. *Iran J Med Educ*. 2000;**1**(1):40-6.
- Kalbasi S, Naseri M, Sharifzadeh GH, Poursafar A. [Medical students learning styles in Birjand Medical University]. *Stride DevMed Educ*. 2008;**5**(1).
- Sarchami R, Hosseini M. Relationship of learning styles with educational progress of nursing students in Qazvin. *J Qazvin Med Sci Univ*. 2004;64-7.
- Stahl SA. Different Strokes for Different Folks? A Critique of Learning Styles. *Am Educator*. 1999;**23**(3):27-31.
- Honigsfeld A, Schiering M. Diverse approaches to the diversity of learning styles in teacher education. *Educ Psychology*. 2004;**24**(4):487-507.
- Darvishzadeh M, Sabzevari S. check students learning styles of Kerman University of Medical Sciences and presenting a model of teaching based on their views. *J namhaye*. 2013;**10**(3):258-66.
- Ghosh M, Meeden G. Empirical Bayes estimation in finite population sampling. *J Am Stat Assoc* . 1986;**81**(396):1058-62.
- Rukhin AL. Bayesian Methods for Finite Population Sampling. *Technometrics J*. 2012;**40**(3):262-3.
- Baneshi AR, Dehghan Tezerjani M, Mokhtarpour H. Grasha-Richmann college students' learning styles of classroom participation: role of gender and major. *J Adv Med Educ Prof*. 2014;**2**(3):103-7.
- Gencel L. Kolb 's experiential learning theory adapted to work-based learning styles inventory-III. *Dokuz Eylul Univ Inst Soc Sci*. 2007;**9**(2):120-39.
- Brower KA, Stemmans CL, Ingersoll CD, Langley DJ. An Investigation of Undergraduate Athletic Training Students' Learning Styles and Program Admission Success. *J Athl Train*. 2001;**36**(2):130-5.
- Ibrahimoglu N, Unaldi I, Samancioglu M, Baglibel M. The relationship between personality traits and learning styles: a cluster analysis. *Asian J Manag Sci Educ*. 2013;**3**(3):93-108.
- Kingt K, Elfienbien M, Martin M. A psychometrics redenomination of kolb's experiential Learning cycle construct: A Separation of Level, Style, and process. *Educa Psychol Meas*. 1997;**59**(5):401- 474.
- Richard RD, Deegan BF, Klena JC. The Learning Styles of orthopedic Residents, faculty, and applicants at an academic program. *J Surg Educ*. 2013;**71**(1):110-8.