


## Research Article

# The Relationship between Learning Styles and Career Decision-Making Self-Efficacy among Medicine and Dentistry Students of Ardabil University of Medical Sciences

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**Background and Objectives.** The career decision-making self-efficacy (CDSE) in medical, pharmacy, and dental students is more important than other disciplines due to professional sensitivity, direct involvement in decision-making for the treatment process, and the significant clinical involvement. It is also expected that learning styles can have a significant impact on the academic success, and the CDSE also affects the quality of clinical care. Therefore, the aim of this study was to examine the relationship between the learning styles and the career decision-making self-efficacy among medicine and dentistry students. **Materials and Methods.** This cross-sectional study was conducted on 235 medical interns and fifth- and sixth-year dental students of Ardabil University of Medical Sciences, Iran. The data were collected using Kolb Learning Style Inventory and Betz and Luzzo career decision-making self-efficacy questionnaire. Statistical tests such as Kolmogorov-Smirnov, Spearman correlation coefficient, Chi-square, one-way ANOVA were used to analyze the data. **Results.** The mean age of participants was  $25.9 \pm 1.30$ ; a majority of them were dental students (134 persons, 59.3%), and 92 were medical students (40.7%). The predominant learning styles in dental and medical students were assimilating (40.3%) and converging (47.8%), respectively. There was no significant relationship between students' learning styles and career decision-making self-efficacy and none of its subscales ( $P > 0.05$ ). The Chi-square test results showed that a significant difference was observed between the field of study and learning styles of the participants ( $P = 0.024$ ). **Conclusion.** This study showed that there was no significant relationship between learning style and career decision-making self-efficacy of the participants.

## 1. Introduction

Learning styles reflect a person's preferred learning style, related to individual differences in mental and personality dimensions [1]. Previous research has highlighted the importance of learning styles [2–4]. It has already been proven that instructional outcomes can vary by considering learning styles [4–6]. Achieving the educational goals requires proper policy making, proper implementation of programs by professors, and proper receipt of this training by students [7]. Medical sciences such as medicine and dentistry are among the fields that need a high attention to the quality of education due to direct interventions performed on human

tissue and the impacts on maintaining and preserving human health [8]. The learning process and its quality depend on several factors. Among these, learning patterns that enhance students' learning are important [8, 9]. A learning style is a unique way to understand and retain information. The ultimate goal of learning is to acquire the desired knowledge and skills [10]. Various models and classification approaches for learning styles have been described in the literature, including the models of David Kleb and Anthony Gregork and Gardner's multiple intelligences theory [11–13]. Nonetheless, most studies have focused on Kolb's learning study inventory (LSI), peculiarly in the the field of medical education [14].

The Kolb's LSI model classifies the knowledge acquisition process into four categories: assimilating, accommodating, converging, and diverging. This division is based on four stages of learning, including active experimentation (AE), abstract conceptualization (AC), concrete experience (CE), and reflection observe (RO) [15]. Accommodators favoring concrete experience and the dynamic experimentation are more pragmatic and rapidly adjust to an assortment of circumstances, appreciating new difficulties while depending on their own encounters and others' data. "Assimilators" utilize the two strategies of reflective observation and abstract conceptualization to learn, and these people are more likely to listen to lectures, read content, and explore analytical models. "Convergent" learning is based on abstract conceptualization and active experimentation with the precedence of hypothetical reasoning and deductive problem analysis. They are best at finding reasonable applications for thoughts and hypotheses and pay little attention to the exchange of information between people interested in technical tasks. "Divergers" depend on the concrete experience and reflective observation. They have a lot of creativity and imagination and are interested in communicating with people and are superior to others in seeing situations from different angles [11]. The difference in learning styles of medical students based on their cultural condition has been confirmed despite the difference in their learning styles at home and abroad [16].

One of the basic aspects of human development is career development, which is considered as a particularly crucial element of psychosocial advancement [17]. The term "career" refers to a combination of work tasks that people experience throughout their lives [18]. There are many factors contributing to the individuals' career decision [19]. Self-efficacy beliefs include the psychological processes that can have a significant impact on the acquisition or change of behaviors [20]. Self-efficacy refers to an individual's beliefs about his/her abilities in order to be able to use these abilities to demonstrate behavior that can lead to the production of desirable and acceptable returns. According to Bieschke, people who think they are capable of getting things done are always interested in trying and getting things done successfully [21]. According to theory of social cognitive career, the self-efficacy is defined as one's belief in one's capability to succeed in the career field, which is considered as a fundamental variable that effectively predicts career performance [22]. According to Bandura (2006), career decision-making self-efficacy (CDSE) has been very influential in the area of career development as proposed by Taylor and Betz (1983) [23]. Taylor and Betz's (1983) theory is in fact a combination of Crites's career maturity model (1961, 1965) and Bandura's theory of self-efficacy (1977) [24].

The fields of medicine and dentistry are related to the health of the community, and enhancing students' knowledge in these fields is associated with improving community health. It is thus important to pay more attention the education and learning of these students. Identifying the learning styles of these students can help determine the ways to improve their education. Also, due to the sensitivity of medical sciences, the CDSE of graduates in these fields is of

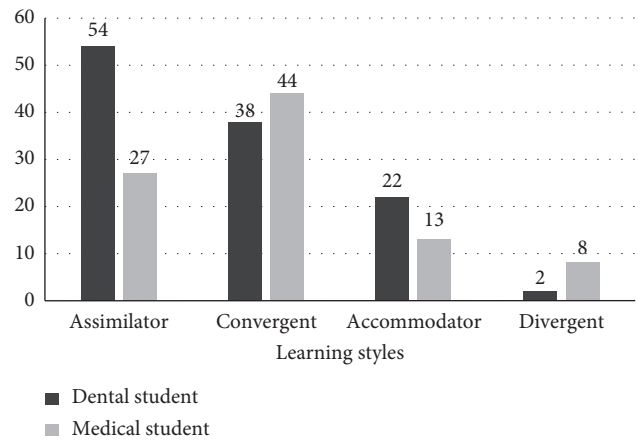


FIGURE 1: The frequency of learning styles of the study participants by the field of study.

special importance. Accordingly, the aim of this study was to examine the relationship between career decision self-efficacy and learning styles of medical and dental students.

## 2. Materials and Methods

This cross-sectional study was conducted on the medical interns and fifth- and sixth-year dental students of Ardabil University of Medical Sciences, Iran, who were selected by census sampling method. After providing the sufficient explanations about objectives of the study, participants were asked to complete the questionnaires accurately and honestly. The data were collected by Kolb Learning Style Inventory, Betz and Luzzo career decision-making self-efficacy scale (CDSE), and demographic questionnaire. Kolb et al. confirmed the validity and reliability of the initial version of the learning styles questionnaire (LQS) [25]. In Iran, various studies examined the validity and reliability of the Persian version of this questionnaire [26–28]. This questionnaire consisted of twelve phrases with four options. Participants rated each phrase on a Likert scale of 1–4 based on their opinions. Individual orientation scores for each learning style were determined according to the relevant benchmarks and charts. The validity and reliability of the CDSE scale have also been confirmed by various studies [29, 30]. This scale has 25 sentences containing 5 subscales with 5 sentences. Participants rated their success or disapproval of each of the statements on a five-point Likert scale (from not at all to absolutely sure). Statistical tests such as Kolmogorov-Smirnov, Spearman correlation coefficient, Chi-square, and Oone-way ANOVA were used to analyze the data.

## 3. Results

A total of 235 students were participated in this study. 226 out of 235 participants had completed all the questionnaires. The mean age of the subjects was  $25.9 \pm 1.30$  years. The study population comprised slightly more females than males (51.3%). Dental and medical students made up 59.3% and 40.7% of the participants, respectively. A majority of the students (62.8%) were living in Ardabil. The GPA average of

TABLE 1: Association between learning styles and demographic and academic variables of the study participants.

	Assimilating	Converging	Accommodating	Diverging	Total	$F/X^2$	$P$ value
Self appraisal	13.38 ± 5.12	13.41 ± 3.63	13.02 ± 3.83	11.39 ± 3.68	13.09 ± 4.28	1.76*	0.155
Occupational information	12.69 ± 3.39	12.57 ± 3.70	11.57 ± 3.68	10.96 ± 3.62	12.26 ± 3.61	2.24*	0.083
Goal selection	12.80 ± 3.06	12.93 ± 3.24	12.40 ± 3.40	11.07 ± 3.80	12.57 ± 3.31	2.46*	0.064
Planning	12.54 ± 3.42	12.21 ± 4.07	11.28 ± 3.79	11.50 ± 3.42	12.10 ± 3.73	1.20*	0.308
Problem solving	12.54 ± 3.41	12.18 ± 3.74	10.80 ± 4.36	10.89 ± 4.09	11.93 ± 3.81	2.58*	0.054
CDMSE	63.96 ± 15.55	63.32 ± 16.60	59.08 ± 17.62	55.82 ± 17.11	61.96 ± 16.60	2.24*	0.084
Age	26.17 ± 1.33	25.89 ± 1.38	25.88 ± 1.15	25.53 ± 1.03	25.94 ± 1.30	1.83*	0.142
GPA	16.23 ± 1.08	16.07 ± 1.00	16.28 ± 1.10	16.43 ± 1.13	16.20 ± 1.06	0.94*	0.420
<i>Gender</i>							
Man	42 (38.2%)	40 (36.4%)	18 (16.4%)	10 (9.1%)	110 (100%)	2.31**	0.509
Woman	39 (33.6%)	42 (36.2%)	17 (14.7%)	18 (15.5%)	116 (100%)		
<i>Study field</i>							
Dental	54 (40.3%)	38 (28.4%)	22 (16.4%)	20 (14.9%)	134 (100%)	9.41**	0.024
Medical	27 (29.3%)	44 (47.8%)	13 (14.1%)	8 (8.7%)	92 (100%)		
<i>Native status</i>							
Native	53 (37.3%)	50 (35.2%)	21 (14.8%)	18 (12.7%)	142 (100%)	0.501**	0.919
Nonnative	28 (33.3%)	32 (38.1%)	14 (16.7%)	10 (11.9%)	84 (100%)		
Total	81 (35.8%)	82 (36.3%)	35 (15.5%)	28 (12.4%)	226 (100%)		

\*One-way ANOVA. \*\*Chi-square.

TABLE 2: The relationship between CDMSE and academic/demographic variables.

	Mean	Standard deviation	$T/r^2$	$P$ value
<i>Gender</i>				
Man	62.96	16.44	0.876*	0.382
Woman	61.02	16.77		
<i>Study field</i>				
Dental	62	16.53	0.34*	0.973
Medical	61.92	16.80		
<i>Native status</i>				
Native	61.52	17.13	0.518*	0.605
Non-native	62.71	15.74		
Age	—	—	0.064**	0.339
GPA	—	—	0.060**	0.371

\*Independent  $T$ -test. \*\*Pearson correlation coefficient.

students was 16.20. The frequency of different learning styles of the participants based on the field of study is shown in Figure 1.

The results of Chi-square test showed that there was a significant difference between the field of study and learning styles of the participants ( $P = 0.024$ ,  $X^2 = 9.41$ ,  $df = 3$ ). The predominant learning styles in dental and medical students were assimilating (40.3%) and converging (47.8%), respectively. The mean scores of CDSE and all its subscales in both medicine and dentistry students were average scores ( $61.96 \pm 16.60$ ). No significant differences were found between the participants with respect to gender, age, grade point average, and native status with learning styles ( $P > 0.05$ ) (1). There is no significant relationship between students' learning styles and career decision-making self-efficacy and none of its subscales based on one-way ANOVA test ( $P > 0.05$ ) (Table 1). Also, there was no significant difference between the study participants with respect to gender, age, grade point average, native status, and field of

study ( $P > 0.05$ ) (Table 2). Self appraisal and problem solving had the highest and lowest mean of CDSE dimension with self-efficacy scores, respectively, 13.9 and 11.93.

#### 4. Discussion

In the present study, the dominant learning style was "assimilating" in dental students and "converging" in medical students, and there was a significant correlation between learning styles and field of study of the participants. A review of past studies has shown that the results are controversial. A study performed by ALQahtani and Al-Gahtani in Saudi Arabia reported that "diverging" is the most common learning style among dental students [31]. While the studies of Meyari et al. [16] and Kalbasi et al. [32] showed that most medical students have a convergent learning style that was consistent with our findings. In their study, Nasirzadeh et al. found no difference between medical and dental students with respect to the learning styles, and most students had a converging learning style [33]. On the other hand, studies performed by Engels and de Gara [34] in Canada and Gurpinar et al. [35] in Turkey reported that the learning style of most medical students was assimilating. Our results are consistent with the studies conducted in Turkey; thus, the differences in students' learning styles may be due to cultural differences.

In the present study, there was no statistically significant association between sex, age, grade point average, native status, and learning styles. The results of the study of ALQahtani and Al-Gahtani [31] confirmed that no significant association was found between age, sex, and students' learning style. In contrast, Adesunloye et al.'s study demonstrated that LSI Kolb is gender-sensitive [10]. The findings show small but real difference in learning styles between the females and males: abstract conceptualization was preferred by men more than women. However, the two studies that

used early versions of the LSI found no difference between learning styles by gender [36, 37]. The study of Hosseini et al. [38] and Al-Qarafi et al. [31] found no significant relationship between learning styles and GPA of dental students which was consistent with our results.

The learning strategy of “assimilators” includes abstract conceptualization and reflective observation [39]. Furthermore, an assimilator is keen on ideas and theories while not paying much attention to their application [25]. However, assimilators are highly skilled in systematic planning and logic and are interested in lecturing, reading, and conceptualizing theoretical models. The preferred method of learning in convergent students is both abstract conceptualization and active experimentation. Due to their high problem-solving skills, they are able to actually implement theories. They are interested in lab sessions and experiments [11, 25, 39].

In the field of career decision-making self-efficacy, in all aspects of self-appraisal, occupational information, goal selection, planning, and problem solving, students showed a moderate level, meaning that medical and dental students have a relatively good assessment of their abilities. They strive for their professional goals and do not give up quickly; they set short-term, medium-term, and long-term goals for themselves and find their ideal jobs or job opportunities and are able to overcome obstacles to achieving goals logically. But this self-efficacy is not at a high level and will be vulnerable. These findings are consistent with those of Shafiee et al.'s study [29]. We found no significant association between gender and CDMS. The findings of some studies were similar [29, 40], but some studies showed a significant relationship between gender and CDMS [41, 42]. Therefore, the findings were controversial.

The findings of this study showed no relationship between learning styles and CDMS of students. Considering that this topic is new and no study has been done in this field so far, it is not possible to be satisfied with the results of this study, and it is recommended that further studies are needed in order to examine relationship between learning styles and CDMS. Attention to two key variables in medical education, considering the importance of career decision-making of students in this field and the special place of this profession in the health and well-being of society, is one of the strengths of this study. Therefore, it is important to find ways to improve CDMS in medical and dental students. Studies conducted by Wang et al. [43] and Breaux [44] showed that group training and cooperative education have a significant effect on improving students' CDMS. One of the limitations of this study is relying on the questionnaire as the only tool for data collection and not using semistructured interviews to discover the live experiences of students in this field. In order to reduce the effect of the mentioned limitation, the most relevant and comprehensive tools in the field of learning styles and career decision-making self-efficacy were selected.

## 5. Recommendation

Kolb mentioned that assimilators prefer structured, systematic, logical, and comprehensive information, but

convergers preferred learning by PBL method, case analysis, and brainstorming [35]. Given that evidence has shown that students' learning styles change in relation to time, we suggest that, at the beginning of each course, students' learning styles can be identified to tailor their teaching methods to their curricula. There is a hypothesis for us that more learning happens in groups with the same learning styles. We suggest that more studies be done on this topic. And if the hypothesis is proved, student groupings in clinical education should be considered based on the learning style factor.

## 6. Conclusion

This study examined the relationship between learning style and career decision-making self-efficacy and found no relationship between the two variables. As this was the first study conducted in this field, the results are not conclusively reliable, and further studies are needed.

## Data Availability

We can make data available on request through a data access committee, institutional review board.

## Conflicts of Interest

The authors declare that they have no conflicts of interest.

## Acknowledgments

This study was approved by the Research Ethics Committee of Ardabil University of Medical Sciences with approval ID: IR.ARUMS.REC.1399.141.

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