



## Original research

# The effect of teaching based on dominant learning style on nursing students' academic achievement



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## ABSTRACT

The recognition of learning styles and teaching based on that recognition will help lecturers use suitable methods of teaching. The aim of this study was to evaluate the effect of education based on dominant learning styles on the academic achievement of nursing students. The population of this quasi-experimental research consisted of 40 third-semester nursing students. The data were collected by using Kolb's Learning Style questionnaire. To determine the dominant learning style of the students, the researchers had them take a pre-test; then, based on the dominant learning style, the students were taught through group discussion. A formative exam and a summative exam were taken. The most and least preferred learning styles of the participants were the divergent style and the assimilative style respectively. Education based on learning styles, particularly for college students, can not only enhance students' academic achievement and teachers' professional satisfaction, but can help with training professional nurses.

## 1. Introduction

Learning styles are factors that directly affect students' learning processes. Learners use different styles based on their personal differences. The recognition of learning styles and teaching based on that recognition will help lecturers use suitable methods of teaching. Teachers should pay attention to their students' personal differences for the learners' educational needs to be met effectively (Engels and Gara, 2010; Samarakoon et al., 2013; Nuzhat et al., 2013; Boström and Hallin, 2013).

Investigating the factors which are effective in learning is a multi-dimensional task which depends on the social, political, cognitive and affective growth of learners. One of the issues which can guide us to desirable learning is doing research about learning styles and their relationship with academic achievement. Learning style is a person's learning preferences in apprehending, organizing, and processing information and learning experiences (Smith, 2010; Buali et al., 2013). Learners use different learning styles due to their personal differences. Different methods have been designed for determining people's learning styles. One of the most prominent ones is Kolb's learning style. Kolb recognizes learning as a process by means of which knowledge is created through a change in experience (Kolb and Kolb, 2005).

Research and the results of the application of learning style-related theories have led to a variety of classifications for learning styles. Therefore, different researchers use different scales and categories to

classify learning styles (Dobson, 2009). Yet, most of these scales and classifications are very similar to each other and focus on learning environment preferences, emotional and cognitive conditions, personality types or cognitive styles (Boyde et al., 2009; McVicar et al., 2010). Nurse education should enhance students' capacities and prepare them for life-long learning so that they can update their knowledge with regard to nursing theories and practice. One of the important matters in nurse education is how to create a proper environment for learning (Falk et al., 2016). In view of the important role of learning styles in learning and academic achievement, the present study aims to investigate the effects of education based on nursing students' preferred learning style on their academic achievement.

### 1.1. Background

Kolb's model is designed based on empirical learning. Learning involves a series of human activities, including sensation, reflex, thinking and doing. Based on this style, the four main learning abilities are reflection observation, concrete experiences, active experiment and abstract conceptualization. A person's preference for using any one of these four items will develop a different learning style. Thus, the four learning styles are divergent, convergent, assimilative and accommodative. Each of the learning styles has weak points and positive points; the perfect learner is someone who uses different styles in different situations appropriately (Kolb and Kolb, 2005; van den Berg,

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2015; Manolis et al., 2013; Jilardi Damavandi et al., 2011). Diagram 1 shows the learning cycle of Kolb and the way the points are given.

Many students attempt to master effective skills in studying and appropriate learning strategies. Students have an extensive spectrum of personal differences in learning methods and many studies have been done to explore the adaptation of teaching methods with learning styles (Vasileva-Stojanovska et al., 2015; Smith, 2010; Boström and Hallin, 2013). Many students are after promotion and academic achievement and are ready to modify their study skills and take advantage of their learning strategies (Boström, 2011). Inattention to learning style will lead to students' and lecturers' dissatisfaction and disorder in the learning process (Kharb et al., 2013; Shenoy et al., 2013).

Different studies indicate that learning styles are diverse in different fields of study. Most of these studies are descriptive and have limited themselves to identification of learning styles (Boström, 2011; Joy and Kolb, 2009; D'Amore et al., 2012; Suliman, 2006). The profession of nursing is moving towards fundamental changes; for this reason, there is need for change in nursing education (Li et al., 2014; Rassool and Rawaf, 2008). Recognition of learning styles and modifying education accordingly will cause lecturers to make use of appropriate methods of teaching and pay attention to personal differences. In this manner, learners' educational needs are met effectively. (Boström, 2011; Smith, 2010). Therefore, it is necessary that the effects of education based on learning style on students' academic achievement be studied. The aim of this study was to investigate the effects of education based on dominant learning styles on nursing students' academic achievement.

## 2. Methods

This is an interventional study, carried out with the objective of investigating the effects of education based on learning style on nursing students' academic achievement. The study population was made up of 40 third-semester nursing students, in the first semester of the academic year 2014–2015. All the students in this class were invited to participate in this study. In the nursing education program in Iran, nursing students are required to take a course entitled “The Principles of Patient Education” in the first semester of their second year, and since education is one of the primary roles of nurses, the researchers aimed to maximize the subjects' learning in this course by modifying the teaching approach according to their dominant learning style. The entire study population participated in the study (response rate 100%). At the time of sampling, 40 students were studying the course of “patient education;” to minimize the confounding influence of multiple teachers and multiple lessons, the researchers, after consulting a statistics analyzer, set the number of subjects at 40. Based on teaching sources, small-group discussions and role modeling are effective methods based on learners' dominant learning studies for most classes (Kolb and Kolb, 2005).

The data collection tool was a two-section questionnaire: the first section consisted of questions about demographic characteristics of the samples, including sex, place of birth, the total average score of the two previous semesters, the most satisfactory method of teaching theory lessons in the students' opinion, the most satisfactory method of teaching practical lessons in the students' opinion, and the last question was related to their opinion about a suitable method of teaching the lesson “the learning process and education of patients”. The second section included Kolb's learning style questionnaire, version 3.1.

This questionnaire had 12 questions. The students should give a score from 1 to 4 to any of the four choices in this questionnaire based on the similarity of the choice to their learning style. In this manner, in any of the question, the score 4 is given to the choice which resembles their learning style the most, and respectively the scores 1, 2, 3 is marked if their learning style bears resemblance to any of the choices as “to some extent”, a little, and very little”. From the 12 questions, which fall into 4 parts, 4 overall scores are obtained which are indicative of the four learning methods. The overall score of the questionnaire ranges between 12 and 48. The first choice of any of the 12 questions was

indicative of concrete experiences, the second choice, of reflection observation, the third choice, of abstract conceptualization and the last choice, of active experiment. If you subtract the abstract conceptualization from concrete experience and active experiment from reflection observation, two scores are obtained. These two scores lie on the Cartesian coordinates (considering the scores being either negative or positive): one on the vertical axis (i.e., the difference of concrete experience from abstract conceptualization) and the other on the horizontal axis (i.e., the difference between reflection observation and active experiment). These two axes form the four quarters of a square, each one of which is indicative of a learning style. Diagram 2 shows the way learning styles are determined based on Kolb's principle. In this manner, the students' dominant learning styles are specified. According to Kolb's theory, the four main learning styles are divergent, convergent, assimilative and accommodative (D'Amore et al., 2012).

The reliability of Kolb's questionnaire has been verified in diverse studies across in the world: its Cronbach's coefficient has been found to be between 0.73 and 0.78 (Metallidou and Platsidou, 2008); other studies report the alpha to range between ( $\alpha = 0.80$  and  $\alpha = 0.89$ ), (Willcoxson and Prosser, 1996; Manolis et al., 2013; Andreou et al., 2008). Likewise, the validity of Kolb's questionnaire has been confirmed in many psychometric studies (Koob and Funk, 2002; Platsidou and Metallidou, 2009). In Iran, the Cronbach's alpha coefficient of the questionnaire has been found to be 0.71 and 0.73 by concrete experience, 0.71 and 0.73 by reflective observation, 0.92 and 89.0 by abstract conceptualization and 90.0 and 90.0 by active experimentation. Four factors were obtained through exploratory factor analysis which explained 76% of the total variance (Ghasemi et al., 2015).

### 2.1. Data gathering

First, the aims of the study were explained to the students, and the researchers got their consent for participation in the study. Then, a pretest was given about all the topics of the course “the learning process and education of the patient for students”. Next, the students completed Kolb's learning questionnaire. The items on the pretest and the posttest were the same. The purpose of the pretest was to determine the participants' awareness of the goals of the courses; the purpose of the posttest was to measure their academic success. The length of each term was approximately 4 months.

Considering the dominant learning style, the students who were in the “divergent” category made use of the group discussion method with an overflow of ideas for learning the topics of the course in question. The lecturer, in addition to introducing appropriate sources for studying the lesson before beginning a group discussion, presented the necessary guidelines before each discussion. Each group had one leader who, besides guiding the group, would, at the end or beginning of each session, present a summary of the results of the group's discussion for the whole class. The lecturer, in addition to supervising the activities of the groups during the discussion, would guide the students as necessary. The lecturer would specify a time during the class, as well as outside-class hours, for problem-solving and guide the students if they needed help. The participants were free to consult the teacher outside the class hours if they had any questions about the implementation of the method of education or the course sources (none of the participants visited the teacher for this purpose, however). To implement the intervention of small-group discussions, the researchers divided the students into 8 groups with 5 students in each. The students were divided randomly; yet the groups were formed in such a way that each group would include a student with one of the four learning styles, except the assimilative style which only one student was found to have.

At the end of the fourth session, the students took one exam, and at the end of the term, the final exam was given. Then, the data was analyzed using SPSS software, version 16, and descriptive and analytical statistics (Chi-Square, Wilcoxon and Friedman Test).

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