

Learning Style Preferences Assessed by Kolb's Learning Style Inventory among Respiratory Therapy Students in Saudi Arabia

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Abstract

Introduction: The concept of learning styles has many implications for students and educators. Implementing a variety of teaching strategies by identifying and applying the student learning styles would enhance teaching effectiveness by increasing the information retention and depth of comprehension. **Aim:** To determine the learning style of respiratory therapy (RT) students using Arabic translated Kolb's learning style questionnaire. **Methodology:** This was a cross-sectional, prospective study among RT students in a private medical college in Saudi Arabia. Kolb's Learning Style Inventory (LSI) Questionnaire was translated to Arabic and validated. Questionnaire was sent in the Google form and the spreadsheet was created from the responses. The LSI questionnaire was sent to the students through the official E-mail ID requesting them to participate in this survey. Student's learning style was calculated according to Kolb's LSI manual. Descriptive statistics are reported as frequency and percentages. SPSS 16.0 (SPSS Inc, Chicago, Illinois, USA) was used. **Results:** A total of 84 participants (25 males, 59 females) responded out of the 150 survey questionnaires that was sent (response rate: 56%). Most students had the Active Experimentation (AE) pattern of learning. The dominant learning style was convergent among the respondents. Both male and female participants had AE as the prominent learning style. **Conclusion:** Arabic translation of Kolb's Learning style questionnaire is found to be valid instrument for the assessment of RT students. The convergent style is the dominant learning style among RT students.

Keywords: Allied Health, Kolb's learning style inventory, respiratory therapist, respiratory therapy

INTRODUCTION

In the field of education, one of the most commonly used terms is learning. "Learning is the process whereby knowledge is created through the transformation of experience."^[1] Students as learners grasp information in a variety of ways and teachers as facilitators of learning must employ the best teaching methods to match the student's learning styles. Cognitive, perceptual, psychosocial, and behavioral characteristics are the key elements that a learner should display, interact with, and reciprocate to the learning environment.^[2-5]

The concept of learning styles has many implications for students and educators. Implementing a variety of teaching strategies by identifying and applying the student learning styles would enhance teaching effectiveness by increasing the information retention and depth of comprehension.^[6-11] There appears to have no validated translation of Kolb's learning style questionnaire in Arabic. Arabic is one of the five most widely

spoken languages in the world and expected to gain more popularity in future even outside the Arab countries.^[12] Across the Middle East and North Africa, there are almost as many native Arabic speakers as there are native English speakers around the world. Arabic is the official language of over 20 countries and has nearly 300 million native speakers. In many aspects, Arabic deviates from many other languages.^[13]

The aim of the study was to find out the learning style of RT students and cross-cultural adaptation of Kolb's Learning Style Inventory (LSI) questionnaire.

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METHODOLOGY

This was a cross-sectional study conducted to test the Arabic translation of Kolb’s LSI questionnaire. The study was approved by the Institutional Review Board of the Scientific Research Unit of the Colleges. Participants were recruited through convenience sampling. Participants were informed about the study and written informed consent was taken before participation.

We used convenient sampling method. The sample size of 184 was calculated with a level of significance $P = 0.05$, Power of the study 80%, and Confidence Interval of 95%. The inclusion criteria were student of respiratory therapy (RT), Arabic speaking person, and willing to participate.

Students in each level were asked to participate in the study according to their willingness. The LSI was distributed electronically to the participants using their college E-mail ID. Kolb’s LSI has four items in each row, which represents different self-perception of learning styles. The participant was asked to assign a score of 4 to the word which represents their best learning style, score of 3 to the next best, score of 2 to the next best, and a score of 1 to the least representative word as shown in Table 1. Participants were also informed that they assign different scores to each of the four words and should not have ties to the sum of the score in each of the four columns. The first column sum is the score for CE-Concrete Experience, the second column sum gives a score of RO: Reflective Observation, sum of the third column gives the score of AC: Abstract Conceptualization and the fourth column gives a score of Active Experimentation (AE). The score was then transferred to the learning style profile by placing a mark by the number scored on each of the four dimensions. The scores for the four marks are joined with a straight line. Individual scores offer with a quantity of the relative importance that is given to each of the four different learning styles.

The main learning style of a person which is how they resolve the tensions between conceptualizations and experience, and between action and reflection, is decided by locating the largest enclosed space quadrant on Learning Style Profile. The

quadrant is labeled on the LSI. The inventory gives an idea of how a person learns; it does not assess his/her learning ability.

Translation and cross-cultural adaptation

The categories of words with 4 words in each category were translated to Arabic by a native Arabic person (Saudi National) who is a Respiratory Therapist.

Kolb’s LSI was translated following the recommended guidelines in terms of forward and backward translation.^[12] A bilingual translator (Native Arabic speaking) and a bilingual Respiratory therapist, familiar with the terminology carried out the forward translation into Arabic. Translators were requested to use standardized literary Arabic. The translation was reviewed and revised by an expert panel including four bilingual experienced teaching faculty in RT and two bilingual researchers. Words with inadequate expressions and concepts were identified and resolved. The backward translation into English was conducted by two bilingual experts who did not participate in the first stage. A consensus regarding the accuracy of the version translated back into English was done by two researchers. The final version in Arabic was tested on 10 participants who were RT students. Students reported that all items were well understood.

Statistical analysis

Descriptive statistics are reported as frequency and percentages. Descriptive statistics of AE, RO, AC, and CE per academic year and gender were calculated and graphed to present the learning style area. The values of AE-RO and AC-CE for all students were plotted on the X and Y axis, respectively. AE-RO and AC-CE were graphed to decide the four quadrants of learning ability; convergent, assimilating, divergent, and accommodating learning styles to get the descriptive statistics on the AE-RO and AC-CE. A Chi-square test was performed to determine the differences in the scores between the learning styles among the two genders. SPSS 23.0 (SPSS Inc, Chicago, Illinois) was used.

RESULTS

This study attempted to assess the validity of Kolb’s LSI by administering to a sample of 84 RT students in Saudi Arabia. There was a total of 84 participants in this study who were

Table 1: Kolb’s learning style inventory

	1	2	3	4
1	Involved	Tentative	Discriminating	Practical
2	Receptive	Impartial	Analytical	Relevant
3	Feeling	Watching	Thinking	Doing
4	Accepting	Aware	Evaluating	Risk-taker
5	Intuitive	Questioning	Logical	Productive
6	Concrete	Observing	Abstract	Active
7	Present-oriented	Reflecting	Future-oriented	Practical
8	Open to new experiences	Perceptive	Intelligent	Competent
9	Experience	Observation	Conceptualization	Experimentation
10	Intense	Reserve	Rational	Responsible
	_____ (CE)	_____ (RO)	_____ (AC)	_____ (AE)

CE: Concrete experience, RO: Reflective observation, AC: Abstract conceptualization, AE: Active experimentation

RT students, 25 males, and 59 females. A total of 84 students responded out of the 150 survey questionnaires that were sent (response rate: 56%). Table 2 shows the distribution of the participants across different levels of the study. There were more participants from Level 5 (18, 21.4%) and Level 8 (17, 20%). There were less participants from Level 1, 2, and 3 when compared with Level 4–8.

As shown in Figure 1, male (27.3) and female (28) participants had AE as the prominent learning style. Other Learning styles were CE 23.85 for females and 22.9 for males, RO was 24.26 for females and 24.4 for males, AC was 24.2 for females, and 25.65 for males. As shown in Figure 2 Convergent was the preferred style (34%, 29) of the RT student participants. Accommodative was the second (29.7%, 25) preferred learning style. Divergent was the third preferred style (19%, 16) and assimilative was the least preferred style (14, 16.6%).

We also looked at the gender differences in learning styles. Figure 3 shows the frequency of different learning styles of male and female participants. There were no significant differences between males and females regarding learning style. Male and female participants have AE as the dominant style of learning.

The difference between the AE-RO and the AC-CE for all students and males and females separately were plotted as in Figure 4, where Scatter plots A: All students, B: Male Students, C: Female Students are given. The presence of more scattered points in the quadrant indicates the chance of having that quadrant as the dominant learning style. This is plotted to look at the dominant learning style of the students.

DISCUSSION

In this research study, the main aim was to find out the learning style of RT students and cross-cultural adaptation of the LS questionnaire through Kolb’s learning style. Validation of the Arabic translation was done and then it was tested it in a small sample of RT students. Translated questionnaire in Arabic is validated with the help of experts. There are translations available in 14 different languages for LSI.^[13]

A study by ALQahtani DA *et al.* showed that the dominant style was Diverging style among the dental students. The independent factors that predicted the learning style were gender, Level of clinical experience, grade point average, and

Interest in the specialty.^[14] Learning style evaluated through the Kolb’s LSI among emergency medicine residents and faculty showed that they had accommodating style as the dominant style.^[8] In this research comparison of the different aspects such as CE, RO, AC, and AE were done between male and female participants and was found to be similar in both the groups-AE as the dominant learning style.

This study showed that both genders have similar learning styles and AE is frequently used by both and convergent style is adopted by them in learning. RT being a skill-based course may require students to know the competencies and the skills. Their inclination to AE learning style will contribute more to their practice-based learning skills such as taught in the

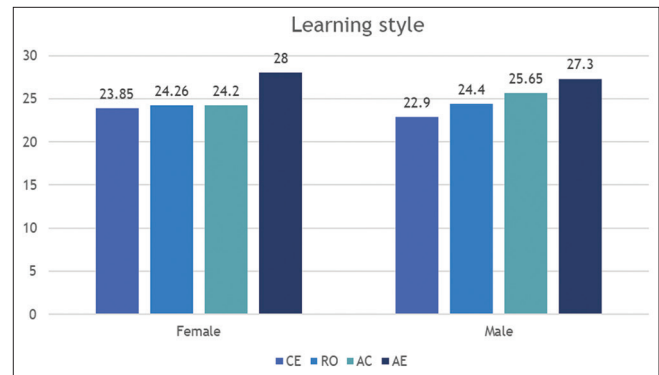


Figure 1: Learning style difference between the gender

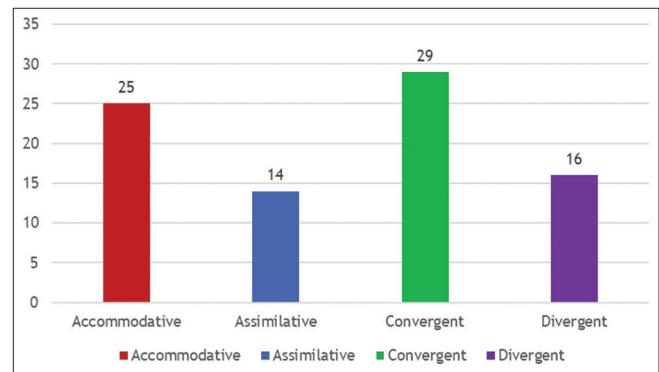


Figure 2: Learning preferences of all the participants

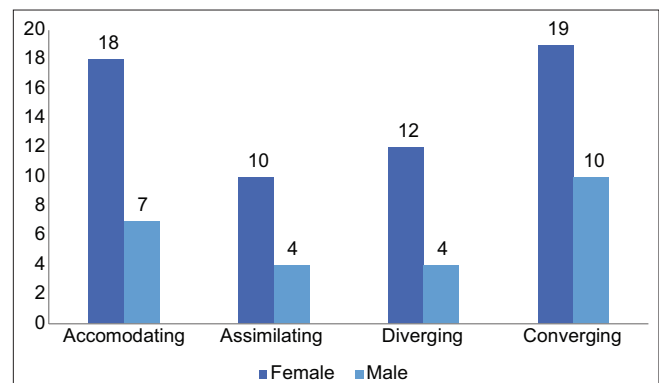


Figure 3: Gender distribution of learning styles

Table 2: Distribution of participants and level of study

Level of study semester	Number of participants, frequency, n (%)
1	4 (4.8)
2	1 (1.2)
3	8 (9.5)
4	12 (14.3)
5	18 (21.4)
6	12 (14.3)
7	12 (14.3)
8	17 (20.2)

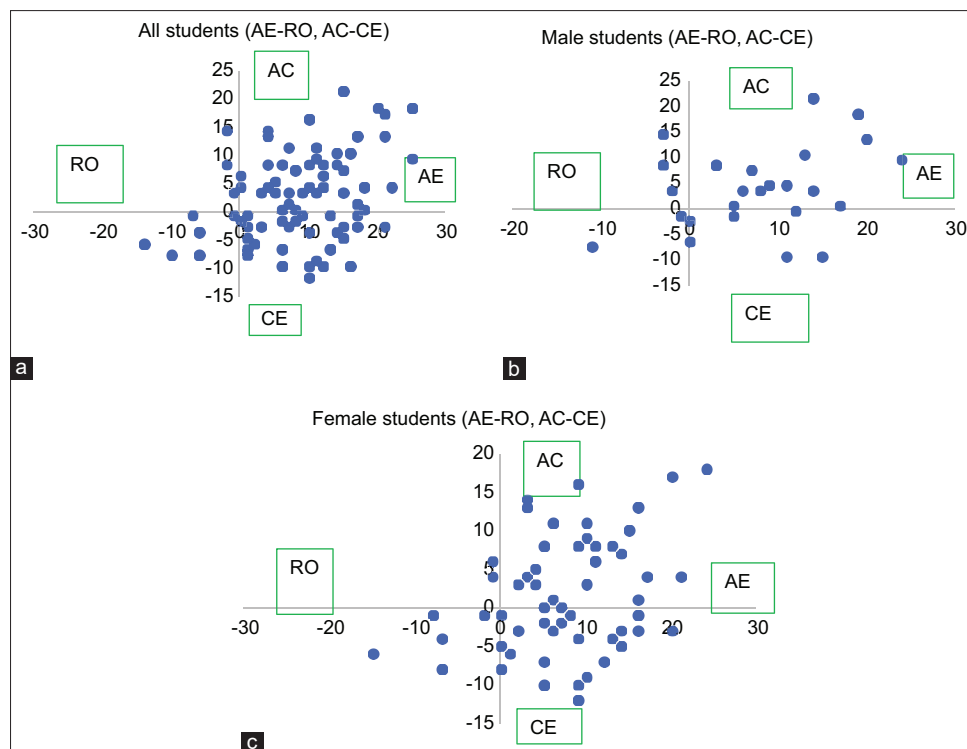


Figure 4: Scatter plots (a) All students, (b) Male students, (c) Female students

skill's laboratory, simulation laboratory, clinical rotation, and mechanical ventilation laboratory. This result also focuses on the need to assess the learning styles of the students at the beginning of their academic study year and then formulate and modify the current teaching styles accordingly. Russian, C.J reported that RT students in Texas study also showed AE learning method ($P = 0.03$) and convergent style of learning.^[3]

In the divergent style with learning preferences of CE and RO are those of independent self-learners. There is a difference in the American and western European independent self, they involve the learning abilities AC and AE which contributes to (Convergent style) with reliance upon clear concepts and distinct logic in their minds.^[15] Convergent combines abstract conceptualization with AE. These people tend to apply their knowledge to examine the problems and come to a conclusion and solutions in a hypothetical deductive manner. They seem to prefer the practical application of ideas and work on technical problems. In a study conducted among Saudi medical students, it was shown that male students had convergent accommodating learning styles and female students had divergent and assimilating styles.^[9,16]

According to Edward T. Hall there are cultural classification names as high context and low context depending how the individual's identity rests on the total communication network. Arabic countries belong to high context cultures and are associated with a CE mode of learning, so they tend to learn through feeling in proximate frameworks.^[17] In a review, it was reported that though many learning styles inventories have been incorporated to evaluate the health science education

students, the use of predicting the learning outcome is not so strong. The ability of LSI to improve the learner self-awareness is not explored much.^[8,18] This research was conducted among the Arab population and the finding is important in the context of Arab RT students. In this research, all learning styles are represented and therefore educators must teach in a multi-modal manner to assure reaching all students. The sample size was low and so the result cannot be generalized and data collection was done only in one center.

CONCLUSION

In this current study, both male and female student participants had convergent and accommodating styles. RT is a clinically oriented and skill-based program and the inclination toward these learning styles gives positive information towards their adaptation to the program. Understanding the student's learning style would give an insight to the teaching faculty and instructors on how to modify the lectures and practical sessions to suit the class.

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Conflicts of interest

There are no conflicts of interest.

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