

A Comparison of Learning Styles and its Relationship to Academic Achievement of Students in Shiraz University: Online Learning vs. Conventional Education

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Abstract: Factors affecting learning are broad and diverse and it is imperative to identify these factors with a view to proffering a panacea to the problems and failures in the education system. One of the identified factors is the individual's learning style. The general objective of this research is to study the learning styles of virtual and conventional education students in the University of Shiraz and its relationship to their academic attainment. This is a quantitative research study with an application that is in tandem with its objectives. It incorporates a descriptive, cross-sectional survey design as regards the method of data collection. The study population consists of all in-person and virtual students of the University of Shiraz. A total of 101 participants from the study population were selected using stratified random sampling technique. The instrument used in this study was Kolb learning style inventory. Data analysis was carried out using SPSS Software and descriptive and inferential statistical methods. The results revealed that the dominant learning style of learners were converging (59.8%), assimilating (25.5%), accommodating (6.9%) and diverging (7.8%), respectively. Furthermore, there was a significant difference between the learning styles of online education and traditional education students in Shiraz University ($p = 0.01$). The dominant learning style of the virtual education group was converging and that of the traditional education group was assimilating and converging. There was no significant relationship between learning styles and academic achievement of students who responded to the questionnaire. However, there was a significant relationship between learning styles and age of the study subjects ($p = 0.01$). It was observed that those who were younger mainly had assimilating style. There was no significant relationship between learning styles and other demographic variables. In general, instructors in universities should use various teaching techniques to furnish all students who have adopted disparate learning styles with learning experience opportunities.

Key words: Learning style, academic attainment, virtual education, traditional education, opportunities

INTRODUCTION

Learning is a term that is employed every day. This perception of learning makes it very difficult for it to be properly defined (Karamizadeh *et al.*, 2012). Learning refers to a change that can be measured and observed (Rezaee and Shokrpour, 2011). Individual differences in learning are very important. Just as many people have individual differences, they also have different learning styles. In other words, they hone their information through different filters and tend to manoeuvre the input

information using different techniques. The study of the effect of individual differences in learning has long been of interest to inquisitive researchers, theorists and specialists in the field of education. However, formal making of hypothesis on the differences in learning style began when Herbert Thelen proposed the term "learning styles" in 1954. The learning style refers to how the student learns and not how well he is able to carry on with the learning process. In other words, learning styles are individual's preferences and not his or her capabilities (Cameron *et al.*, 2015). Learning styles are one of the

principal factors for progress and academic attainment. The existence of different styles has made it possible for individuals to apply their abilities in different ways. Consequently, they are able to respond to demands in various situations and assignments differently. Coordination and consensus between the individual's style and the style of the situation/condition or duty which he or she has encountered is a principal factor in the individual's success. Non-correlation between individual's learning style and teaching style may be one of the causes of disability in learning. Consequently, it seems logical that student's style of education should be in consonance with their learning style in order to bolster their learning potential (Willingham *et al.*, 2015). There are different types of learning styles. They can generally be grouped into cognitive, emotional and physiological styles. Persons who are exposed to the cognitive learning style perceives and recollects information, ponder over stories and proffer remedies to issues. Emotional learning styles involve personality and emotional traits such as perseverance, individual work or group work as well as acceptance or rejection of an external amplifier. Physiological learning styles involves biological aspects that relates to the person's response to the physical environment that affects his or her learning such as the propensity to read at night or day or preference for study in warm or cold environments (Cheng, 2014). Differences in learning styles are swayed by cultural needs and values. For example, visual learning style is preferred in North American culture, auditory learning styles are preferred in Arab culture while Chinese culture has a penchant for visual learning style (Parra, 2016). Learning styles can be distinguished on the basis of gender. For example, men obtained higher score than women in the objective experience dimension of Kolb learning style inventory. There is copious evidence that women's learning styles concentrate on empathy, cooperation and careful listening. Considering the fact that development in information technology in recent years have made higher education accessible to people at any point in time and place through electronic learning tools, universities (Rezaee *et al.*, 2014) including Shiraz University which offers virtual education programs. However, the question that arises in this context is whether there is a disparity between the learning styles of students who choose e-Learning courses and the conventional education students. Therefore, this research aims to study the "learning styles of students engaged in online education and traditional education in Shiraz University and its relationship to their academic attainment".

MATERIALS AND METHODS

This research is a correlational descriptive analytic study. The study population was drawn from engineering students (undergraduate and graduate) in Shiraz University who were studying in-person as well as employing virtual techniques. A total of 101 subjects were selected using multistage stratified sampling technique. Inclusion criteria included students who have studied at the university for at least two semesters and desired to participate in the study. Exclusion criteria included students who were not willing to participate in the study and have studied at the university for less than two semesters. In this study, the following tools were used to measure the variables of interest.

Kolb learning style inventory: This inventory was developed by David Kolb in 1971 to estimate individual learning styles. This test consists of four parts, each of which measures capability. Learning style inventory is composed of 12 questions and each question has four sections which the subjects must respond to within a timeframe of 15 min. The subject is instructed to mark 4 of the items which correspond to their learning style the most and are asked to follow the same procedure in marking all the items numbered 4, 3, 2 and 1 relative to their correspondence. The different parts of the test include objective experience, reflective observation, abstract conceptualization and active experimentation. The horizontal and vertical axes for identification of learning styles are shaped by the subtraction of abstract conceptualization from objective experience and the subtraction of reflective observation from active experimentation, respectively. If the individual obtains higher scores when the objective experience is subtracted from the abstract conceptualization, it shows that he or she is more analytic and abstract naturally. This is the attribute of the people who have flair for mathematics and technical subjects, fundamental sciences and the English language majors.

A low or negative score when the objective experience is subtracted from the abstract conceptualization shows that the individual is holistic and social and is more successful in discipline such as nursing, psychology, political science, humanities and general disciplines that afford the individual the opportunity deal with the society, objects, computational and mathematical formulas (Demirbas and Demirkan, 2007). Content validity of the test was assessed by Willcoxon and Prosser (1996). This study demonstrates

that the test has an excellent validity and can measure learning styles appropriately. Wilcoxon performed the test reliability on 187 people using the alpha coefficient and obtained a high result (active experimentation = 0.87, abstract conceptualization = 0.83, reflection observation = 0.81, objective experience = 0.82).

In addition, the test validity approved (with high coefficient) was demonstrated in a research by Homayouni *et al.* (2009) on 300 second-year high-school students in three disciplines, including mathematics, sciences and humanities. Reliability coefficients obtained in this study include active experimentation = 0.63, abstract conceptualization = 0.73, reflective observation = 0.71 and objective experience = 0.69 (Homayouni *et al.*, 2009).

Achievement test: To evaluate the academic attainment, student's average scores in the last two semesters were used as a criterion for evaluating the academic attainment. Kolb's learning styles inventory was initially incorporated into the university's site which students were asked to complete with a view to collecting information through collaboration with officials of Shiraz University. Since the number of respondents was not enough, questionnaires were distributed and the rationale for the questionnaires was elucidated to the students on the first day of their resumption at the university. Questionnaires were answered by students and collected thereafter. The research method employed by the researchers included meeting individuals and simultaneously explaining the importance of the study and distributing the

questionnaire among the subjects. The following ethical considerations were given priority in the research.

- The necessary permissions were obtained from Shiraz University prior to commencement of the research
- All participant's information was handled confidentially during the project
- A consent form was given together with a questionnaire to students participating in the study to enable them give their informed consent of participation in the study

Being a small sample, an interval scale was used for measurement. Fisher exact probability and t-test were employed to carry out data analysis in order to evaluate the significance and correlation between the variables studied.

RESULTS AND DISCUSSION

In this study, 101 virtual and conventional education groups pooled from students of Shiraz University were selected employing random stratified sampling technique. A total of 59 (58.4%) and 42 (41.6%) of the subjects were female and male, respectively. Employed and unemployed participants accounted for 70 (69.3%) and 31 (30.7%), respectively. There were 28 (27.7%) and 73 (72.3%) virtual and conventional education groups, respectively. There were 66 (65.3%) and 35 (34.6%) participants who were studying at postgraduate and undergraduate levels. The aim of this study was to determine the learning styles of students participating in this study (Fig. 1).

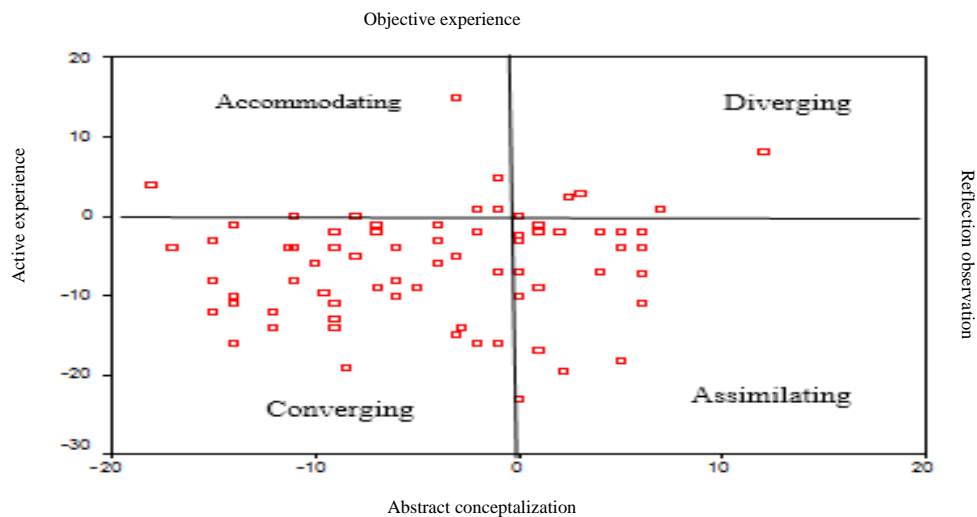


Fig. 1: The learning styles of research samples

The findings showed that the learning style with the highest percent of learners were converging (59.8%), assimilating (25.25%), accommodating (6.9%) and diverging (7.8%), respectively.

The second objective of the study was to determine the relationship between student's learning styles and the type of training (in-person and virtual). Considering the fact that most respondents had assimilating and converging learning styles and the number of people who have had two diverging and accommodating styles were very low, other computations and tests were conducted between the converging and assimilating styles (Table 1).

As seen in Table 2, the dominant styles of learning for the virtual and traditional education groups are converging and assimilating. Fisher's exact probability test showed that there was a significant difference between learning styles of students in the virtual and traditional education groups in Shiraz University at a level of $p = 0.01$. The relationship between student's learning styles and their academic success was also scrutinized. In order to determine the academic attainment of students, their average scores in the past two semesters were used (Table 2).

As evident in the table above, the calculated t-test revealed that there was no significant relationship between learning styles and academic attainment of students who responded to the questionnaires. The relationship between student's learning styles and their gratification with their academic disciplines was also studied (Table 3).

As evident from the table above, learning styles of 8.8, 26.4, 58.2 and 6.6 of students who were gratified with their disciplines were diverging, assimilating, converging

and accommodating, respectively. Converging and accommodating learning styles accounted for 85.7% and 14.3% students who were somewhat gratified with their disciplines. Fisher's test results showed that there was no significant relationship between gratification with the discipline and learning styles of participants. The relationship between learning styles and demographic variables was examined. Fisher's test only indicated the presence of a significant relationship between age and learning styles of participants and there was no significant relationship between learning styles and demographic variables in other cases (gender, marital and employment status, level of education, semester). Table 4 shows the relationship between learning styles and age of the respondents.

The computed t-test showed that there was a significant relationship between learning styles and age of the respondents at $p = 0.01$. Most of the younger people had assimilating learning styles.

Table 1: The relationship between learning styles of subjects and type of training (in-person and virtual)

Learning style	-----		
Type of Education	Assimilating	Converging	p-value
Virtual	2	22	0.01
Conventional	24	38	

Table 2: Relationship between learning styles of subjects and their academic attainment

Average	Statistical index	Frequency	Mean	SD	SME
Average in the last two semesters	Assimilating	20	15.65	1.379	0.308
	Converging	40	14.93	2.323	0.367
Average in the last two semesters	Assimilating	16	15.87	1.776	0.444
	Converging	39	15.43	2.123	0.340

Table 3: Learning styles of students responding to the questionnaires based on their gratification with their discipline

Learning style gratification with the discipline	Diverging		Assimilating		Converging		Accommodating		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Yes	8	8.8	24	26.4	53	2.58	6	6.6	91	100
Somewhat	0	0	0	0	6	7.85	1	3.14	7	100
No	0	0	1	100	0	0	0	0	1	100
Total	8	8.1	25	25.3	59	6.59	7	1.7	99	100

Table 4: Relationship between learning styles and age of the respondents

Statistical indices				
Learning style	Frequency	Mean	SD	SME
Assimilating	25	22.80	2.661	0.532
Converging	61	25.28	6.221	0.797

CONCLUSION

The results of the present study showed that most engineering students in the virtual and conventional training groups had converging learning style and assimilating learning styles, respectively. Converging learning style is based largely on abstract conceptualization and active experimentation. People with this learning style are good at problem solving, decision-making, practical use of ideas and intelligence tests. The research also indicated that most of the engineering students had converging learning style. In addition, the results showed that there was no significant relationship between learning styles and academic attainment of students. The results of this research are in consonance with the results of the studies by Yilmaz and Akkoyunlu (2009). In a study on student's learning styles and academic attainment at the University of Malaysia, Warn concluded that there was no significant relationship between student's learning style and their academic performance which is in consonance with the results of the present study for the virtual education group and does not tally with the results of the studies by Cook *et al.* (2010), Wong and Nunan (2011). West *et al.* (2006), Rezaee and Ebrahimi (2013) who conducted a study at the University of Minnesota scrutinized the effect of learning styles on e-Learning. They came to the conclusion that learning styles are highly efficacious in achieving success in online courses. There is need to design courses that will suit special habits or teach student's studying habits so that the e-Learning method can help students to successfully learn online courses (Hoseini *et al.*, 2013; Rezaei and Mehrabani, 2014). As can be seen, various studies showed different results. Several factors may have led to variation in these results. According to Kolb, differences in learning styles depends on learning related tasks, environment, time, learning emergency level and other factors. In addition, this lack of agreement may be due to the fact that academic success is only evaluated based on the averages obtained during the last two semesters and memorized materials and the potential of the students to recall are usually evaluated in the final exams. However, recent research cannot confirm definitively the educational approach with the best compatibility with any learning style. In addition, university instructors should explore various teaching methods to provide opportunities for learning experiences for all students. If possible, student's learning styles should be identified by instructors to aid the students in achieving progress in their education. The instructors should also adopt

teaching methods in relation to the learning styles of the students in order to obtain the highest educational efficiency.

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