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The Relationship Between Learning Styles, Locus of Control, and Academic Achievement Among Virtual Learners at Shiraz University of Medical Sciences

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Abstract

Objectives: The general objective of this research was to study the learning styles and locus of control of virtual students at Shiraz University of Medical Sciences and its relationship with their academic attainment.

Methods: This was a descriptive study carried out during year 2017. One hundred virtual learners from Shiraz University of Medical Sciences were randomly selected as the participants of this study. The instrument used in this study was the Kolb Learning Style Inventory and Rotter locus of control scale (1996). Kolb Learning Style Inventory consists of 12 questions and four sections. Vilkaksn measured the reliability of the study by using Alpha, and reported on high reliability (active examination = 0.67, abstract understanding = 0.83 thinking observation = 0.87, objective experience = 0.82). The stability of Rotter's questionnaire was reported by franklin to be more than 82%. The quantitative data were analyzed using person product moment correlation, k2, analysis of variance (ANOVA), and independent samples *t* test. The questionnaires were analyzed using version 20 of SPSS software and the significance level was equal to 0.05.

Results: The results indicated that 80% of the students deployed a convergent style of learning. Also, it was found that there was no meaningful relationship between learning styles and academic success (P = 0.61). There was no significant relationship between locus of control and academic achievement (P = 0.51). However, the learners with internal locus of control were older than the ones with external locus of control (P = 0.04).

Conclusions: Because of the novelty of virtual education in Iran, it demands more research to specify the degree of success gained by this kind of educational system.

Keywords: Learning Style, Locus of Control, Virtual Education, Students, Academic Achievement

1. Background

Learning is a divine gift bestowed on man (1). It is a complex process that involves communications among students, teachers, educational texts, and other possible elements in an educational environment. The students' attention should be focused on the teachers' instructions, and the topics must be comprehensible. Provided that all these conditions are met, the question remains as to why some people learn better than others, or why learning is more effective in certain situations. A research about academic success and its relevant factors is multidimensional, and in order to conduct it, one should have extensive information about various elements of an educational system (2).

In this respect, a proper learning style is clearly one of the most important factors in academic performance. In the same way that the people display different preferences in their choice of personal properties, they may also explore different learning styles. This means that they leave out some information using different filters, and they like to change the information that they receive in different ways (Bull, 1999). In the learning process, learners might prefer one learning style to the other (3).

Since there are various learning styles, people may explore their learning skills differently. Thus, in different situations, they may take their own unique approach to a spe-

cific issue. Coordination and harmony between personal styles and situations that a person encounters are highly conducive to personal success. In order to improve a student's leaning ability, it seems logical to coordinate the teaching and learning methods (3).

Learning styles include the cognitive style, emotional learning style, and the physiology learning style. The cognitive learning style means understanding the subject, remembering the data, thinking about it, and solving the issue. A commonly used inventory of learning styles is Kolb's inventory, which was applied in this study. It divides learners to four groups, including divergent, convergent, absorptive, and adaptation. These learners have special personality traits, have their own perception of events, and each group shows an interest in a particular set of jobs (3).

In addition to learning styles, one should take account of the learners' personal characteristics as well. One of the factors that contribute to academic success is the locus of control (internal, external), as mentioned by Rotter in 1998. Rotter states that while some people believe their learning success is due to their own efforts, others think that it depends on other people. He defines this as "the Locus of control". The people, who are external on their locus of control orientation, believe that their failures and successes are based on chance and fortune or others' interference. On the contrary, students with an internal locus of control believe that the high praise and positive reinforcement that they receive, result from their own efforts and attitudes. Students with an external locus of control imagine that the praise that they receive are caused by chance.

In this respect, many studies show that students, who rely on an internal locus of control are more successful than ones, who are external on their locus of control orientation (4-9). Moreover, some other studies specifically indicate that in virtual education, students with an internal orientation are more successful than others (10-12).

Today electronic learning is rapidly developing, and has enabled the development of formal or informal systems of education in modern societies, in a way that citizens can use various traditional and normal methods of mutual and participatory learner-teacher styles (3). The ever-rising success of this modern learning style has stimulated extensive research with the aim of improving the quality of teaching and learning in cyber space. In this respect, scholars also need to conduct some research about special traits of students in order to maximize their progress during electronic education. It appears that both cognitive factors and motivational factors, which are closely related to learning style and locus of control, respectively, are crucial factors in the quality of learning. Therefore, the aim of this study was to analyze the relationship between learning styles, locus of control, and academic success among virtual learners at Shiraz University of Medical Sciences, during year 2017.

1.1. The Hypotheses of the Study

1- There is a significant relationship between (external and internal) locus of control, and academic achievement among virtual students.

2- There is a strong correlation between learning styles and academic success among virtual students.

3- There is a significant relationship between (external-internal) locus of control and learning styles among virtual students.

2. Methods

This is a descriptive analytic study. The population of this study included all virtual graduate students of Shiraz University of Medical Sciences. One hundred students participated in this research (their disciplines included medical education, electronic learning, medical society education, and community education in health and MPH). They were elected as a sample by the stratified random sampling method.

The number of samples in this study was calculated using the NCSS software (B = 0.2, a = 0.05, 100). People were selected by random sampling.

The participants were selected only from among those, who had completed a minimum of two terms, and they were all willing to actively participate in the study.

Guest students were also left out from this research. The university officials allowed the researchers to display the questionnaire on the university's website to facilitate data collection. The questions were distributed among the students at the beginning of the term. The researchers clarified the questions for the participants. Then, the questionnaires were answered and collected by the students themselves.

After the questionnaires were filled, the data were extracted from the study.

It is necessary to mention that the base on the code was 1396.s372. The participants were able to refuse participation whenever they desired.

2.1. The Instruments

A demography questionnaire, the Kolb's learning styles inventory, and Rotter's locus of control scale were deployed for data collection, and for academic success of students the average of the last two terms was considered.

1- The demography questionnaire covered the students' age, gender, academic profile, marital status, and place of residence.

2- Kolb learning style paper: This paper was prepared by Kolb in 1971 in order to evaluate personal learning styles. This questionnaire consists of four parts and the participants should fill it in within 15 minutes. For each question, four scores were given (1, 2, 3, and 4). If a question fully matched a participant's learning style, they should tick the highest score, which was four. Different parts of this test included objective experience, thinking observation, active examination, and abstract understanding; from subtraction abstract understanding from objective experience, vertical column for recognizing the style of learning , from horizontal column for recognizing the style of learning. If a person receives a high score in abstract understanding and observation experience, it shows that they are highly talented in technical fields, mathematics, fundamental sciences, and English.

On the other hand, if a person has a low score, it means that they are inclined towards social sciences, and would rather opt for nursing, psychology, political science, and humanities. In general, they communicate with other people better than the other group. They do not demonstrate the required skills in mathematics. The validity of this test was assessed by Vikaksn in 1995. His study showed that the test had a proper framework and was suitable for analyzing the learning style. Vilkaksn measured the reliability of the study by using alpha, which was tried on 18 students. It had a high level of reliability (active examination = 0.67, abstract understanding = 0.83, thinking observation = 0.87, and objective experience = 0.82). Similarly, the same scale displayed high reliability as measured by Homayoni in 2001. The participants of the study were 300 second-year high school students, who were studying in the fields of mathematics, experimental sciences, and human sciences. Reliability level in this study was as follows: Active examination = 0.63, abstract understanding = 0.73, thinking observation = 0.71, objective experience = 0.69 (13).

This questionnaire has been used in many research projects, including a study on virtual students at the University of Tehran, a research by Babadoğan (2010) and Can's study on nursery students at the Medical University of Rasht, a study by Simpson and Du study on effects of learning styles and class participation on student enjoyment level in distributed learning environments, and a research by Richmond and Liu (14-19).

3- Rotter locus of control scale is a means of self-evaluation, which is comprised of 29 statements. Every statement has two sentences, a and b. The participants should choose only one sentence. One of them represents the external locus of control and the other one shows the internal locus. Out of these 29 statements of the questionnaire, six statements are neutral (code: 8, 1, 14, 19, 24, 28). These statements are meant to conceal the aim of the test from the students. The scores and crosses in the other 23 pivotal codes are counted. The total amount of a person's scores indicate the degree of internal locus of control. The external locus of control is calculated by subtracting that total score from 23. In these 23 codes of the questionnaire, the score of one is assigned to A questions, and zero to B questions. The participants, who receive the total score of nine or more have the external locus of control, and those, who obtain a low score have the internal locus of control (20). The stability of Rotter's questionnaire is reported by franklin to be more than 82% (separate and Kuder-Richardson methods were applied) (14). The system is also believed to indicate a stability of more than 83% when the re-examination style is used (14).

This questionnaire has been applied to high school female students in Zahedan, a study by Severino et al. a study about comparison of locus of control among Muslim and Jewish school students in Iran, and also in a research regarding the locus of control and creativity in children educated at the Soviet Union, US, and Israel (14, 20-23).

2.2. Statistical Analysis

Central indices (percent and average) were used for descriptive analysis, and *t* test, analysts, K skor, and ANOVA were used at the illative level in order to analyze the data. The questionnaires were analyzed using the version 20 SPSS software and significance level was 0.05.

2.3. Ethical Considerations

Participation in this study was optional. The researchers explained the aims of the study to the students in advance, and received written informed consents from them. They also assured them that all the collected data will be treated as confidential.

This ethical code was approved by Shiraz University of Medical Sciences. All stages of the study were reported to the chancellor of the Virtual University, and all the final results were handed to this entity.

3. Results

The total number of samples in this study was 100. Demographic, Kolb's learning style, and Rotter's locus of control questionnaires were completed, and the collected data were entered in the charts. Of the 100 participants of the study, 68 were female, 32 male, 69 married, and 31 were single. All of the students were living in the city, and none of them were dormitory students.

According the findings of Table 1, the majority of the participants displayed the external locus of control (85%) and convergent learning (80%).

Table 1. The Distribution of Learning Styles, and Locus of Control of the Subjects

Variable	Affluence	Percentage
Locus of control		
Internal	15	15
External	85	85
Learning style		
Absorptive	15	15
Divergent	5	5
Convergent	80	80

According to Table 2, there was no strong correlation between learning style and demographic variables.

According to Table 3, the *t* test indicates a notable change in the people of different age groups in terms of their locus of control orientation (P = 0.04). The people with internal locus of control were older than those with an external locus of control. As a result, there was a significant relationship between age and the locus of control (external and internal), yet control was independent of gender and marital status.

Table 4 indicates that there was no significant correlation between learners' locus of control and their learning styles. Therefore, locus of control (external and internal) was independent of learning styles.

Based on the findings of the Table 5, academic success was statistically independent of locus of control and learning style.

4. Discussion

Researchers and scholars in educational systems have always paid special attention to learning styles, their outcomes, academic success in general, and factors that influence them.

Academic success is a major criterion for evaluating the overall achievements of an educational system.

The aim of this study was to shed light on the possible relationship between learning styles and the locus of control among virtual students at Shiraz University of Medical Science. Its results demonstrate that learning styles are independent of demographic variables (age, gender, and marital status).

There was no significant relationship between preferential learning style and gender among students at Erciyes Medical University (24).

There was also no strong correlation between learning style and academic success. Students' learning styles are independent of their achievements. Other studies in Iran and other countries highlight the same result. For instance, a similar study analyzed the relationship between learning styles, locus of control, and academic achievements among the students of Tehran University. That study, as well as the current research, revealed no major relationship between learning styles and academic success.

In other countries, there was no relationship between learning style and academic success (15,16). The research on midwifery and nursing students of Rasht showed that there was no relationship between learning styles and academic achievement (14, 17).

According to the results of this study there was no major relationship between the locus of control and learning styles. In a similar study on students of Zahedan, no relationship between learning styles and locus of control was observed. Therefore, the students' orientation on the locus of control (external and internal) is independent of their learning methods and strategies.

The results also indicate that there was no association between locus of control (internal and external) and academic success. Accordingly, academic success is independent of the locus of control (external and internal). Of course, a number of other studies indicate the opposite result. Among them, one could consider the research at Tehran University, Zahedan School, and the study of Severino et al. (20). These studies displayed a significant relationship between internal locus of control and the students' attainments (14, 21). Their results showed that the students with an internal orientation are more successful than those with external orientation (4-9).

Some studies indicate that virtual students, who have an internal locus of control orientation are more successful than the other group (10-12).

The comparison between locus of control (internal, external) and demographic variables show that the locus of control is independent of gender and marital status. However, one can observe a strong relationship between age, as

Table 2. The Distribution of the Affluence of Learning Style Based on Demographic Variables

Variable	Learning Style, Affluence (%)			χ^2	df	F	P Value
	Absorptive	Divergent	Convergent				
Marital status				2.1	2		0.32[a]
Single	4 (12.9)	3 (9.7)	24 (77.4)				
Married	11 (15.9)	2 (2.9)	56 (81.2)				
Age	36.6 (6.9)	36 (9.7)	38.2 (7.9)		99	0.4	0.62[b]
Gender				0.8	2		0.61[a]
Female	9 (13.2)	4 (5.9)	55 (80.9)				
Male	6 (18.8)	1 (3.1)	25 (78.1)				

[a] k2 (Fisher) test P < 0.05.
[b] ANOVA test P < 0.05.

Table 3. The Distribution of the Locus of Control of Affluence (Internal and External) Based on Demographic Variables

Variable	Locus of Control, Affluence (%)		χ^2	T	df	P Value
	Internal	External				
Gender			0.5		1	0.32[a]
Female	59 (86.8)	9 (13.2)				
Male	26 (81.2)	6 (18.8)				
Age	37.3 (7.5)	41.6 (8.9)		-1.7	98	0.04[b]
Marital status			0.9		1	0.33[a]
Single	28 (90.3)	3 (9.7)				
Married	57 (82.6)	12 (17.4)				

[a] *t* test: P < 0.05.
[b] k2 (Fisher) test P < 0.05.

Table 4. A Comparison Between the Distributions of Affluence of Locus of Control and Learning Styles Among the Samples of the Study

Locus of Control	Learning Styles, Affluence (%)			χ^2	df	P Value[a]
	Absorptive	Divergent	Convergent			
External	13 (15.3)	4 (4.7)	68 (80)	0.13	2	0.92
Internal	2 (13.3)	1 (6.7)	12 (80)			

[a] k2 (Fisher) test P < 0.05.

a demographic variable, and the locus of control. The people with an internal locus of control were generally older than those with an external locus (P = 0.04).

A study from the US investigated the relationship between the locus of control, exempt, and cheating among US students. In this study, it was shown that the locus of control in unsuccessful students cannot be used to forecast cheating among them (6).

In the research on the students of US, the results showed that the locus of control in unsuccessful students could not be regarded as a predictor for cheating at the university (20).

Of course in a survey about the comparison of locus of control of Jewish and Iranian students, there was no significant relationship between locus of control and religion (22).

Locus of control and creative thinking were studied in children aged 12 to 14 years in Israel, US, and the Soviet Union; the results showed that American and Israeli children were more internal in their feeling of locus of control (23).

The above discussion suggests that academic success, learning styles, and locus of control (internal and external) have been studied by several researchers. However, the re-

Table 5. A Comparison of Academic Achievements Based on Learning Style Variables and Locus of Control

Variable	Academic Success	F	T	df	P Value
Learning styles		0.3		99	0.61[a]
Absorptive	17.1 ± 0.9				
Divergent	16.6 ± 0.7				
Convergent	16.9 ± 1.2				
Locus of control			-0.5	98	0.51[b]
Internal	17.1 ± 1.3				
External	16.9 ± 1.1				

[a] ANOVA test: $P < 0.05$.
[b] *t* test $P < 0.05$.

sults appear to be entirely different; some studies suggest a significant relationship between academic success, demographic factors, learning styles, and locus of control, while others do not point out any notable relationships.

Academic performance is affected by personal, psychological, social, and even educational factors. Differences in achievements are definitely caused by all such factors. There by, in order to evaluate an educational system, it is important to study personal and social factors as well. In order to gain more valuable results, these studies can be conducted, not only within a single academic entity or a university, yet also among a number of universities, or even between traditional and virtual educational systems. Since virtual education is more economical than traditional education, and more convenient in terms of time and location, it can be deemed as a potential replacement for traditional education. Accordingly, it is highly critical to concentrate on virtual education, its goals, and the effective means of achieving these goals.

Any research in this area gains more significance in view of the fact that virtual education is a rather new phenomenon in Iran's educational system. These efforts help identify strengths and weaknesses in this system, and pave the way for redressing the weaknesses and improving the overall performance of virtual education. Of course, a systematic assessment of these studies and a meta-analytic evaluation could also guide us to better results in this area.

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Footnotes

Conflict of Interests: There was no conflict of interest in this study.

Ethical Considerations: Participation in this study was optional. We explained the aims of the study to the students in advance, and received written informed consent from them. We also assured them that all the collected data will be treated as confidential. This ethical code was approved by Shiraz University of Medical Sciences. All stages of the study were reported to the chancellor of the Virtual University, and all the final results were handed to this entity.

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