

The Comparative Study of Learning Styles Among Students in The Electronic and Traditional Courses in Payame Noor University and Its Relationship with the Satisfaction of the Quality of Learning Courses

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Abstract

This research aimed to study the relationship between learning styles among two groups of electronic and traditional students in PAYAM NOOR University and its relationship with the satisfaction. The research method was descriptive and co relational research. The study population included all male and female master students of electronic (virtual) (N=1400) and traditional (N=1600) courses of PNU in 1395-1396. Using Cochran formula, the estimated sample size of students for traditional and electronic courses were equal to 310 and 302 respectively (totaled 612). The sample size was selected by stratified random sampling method with proportional assignment. In order to collect data, Kolb (1999) learning styles questionnaire and Bahrani and Jokar (1378) critical student satisfaction questionnaire were used. For both, traditional and electronic groups, between learning styles (convergent, divergent, assimilator and accommodator) and satisfaction, there was a significant relationship. The results showed that in the traditional course converging, diverging, assimilator and accommodator styles have the highest relationship with the academic satisfaction. In electronic courses, divergent, assimilator, and convergent styles have the most relation to academic satisfaction. The study of the status of learning styles in the electronic group showed that the convergent learning style with (14.57%), has the least frequency, divergent with (30.79%) has the highest frequency, the assimilator style has (28.14%) and the accommodator has (26.49%) frequency. Regarding the status of learning styles in the traditional group, convergent and accommodator style have the least frequency and the assimilator learning style has the most frequency. In terms of quality assessment, most students were not satisfied with the traditional courses and in contrast, the electronic group had more academic satisfaction.

Keywords

Learning Styles, Academic Satisfaction, E-learning, Attendance course, Student.

Introduction

Nowadays the usage of teaching and learning tools, information technology and the internet are expanding extensively. E-learning is considered as one of the most prominent learning environments in the age of information. Therefore, the efforts and experiences associated with this type of learning have been taken into extra consideration around the world. In Iran, most universities are using this technology extensively. As some of them have proceeded to distance learning students' admission. [1]

E-learning is an educational innovation in the new century by which all individuals can learn throughout their lifetime in a dynamic and fast way without location and temporal constraints. [2]

E-learning refers to training that is provided through electronic communications such as the Internet, Intranet, Extranet and Hypertext, Govindasamy (2015). Reduce expensive training costs, has been always on the agenda of all officials and educational officers. [3]

Learning styles mean a coherent whole that student typically use them in his learning orientations and mental patterns in learning activities. Learning styles mean more broadly the concept in which shared cognitive and emotional learning activities, patterns of mind and direction are interconnected. However, learning styles are not irreplaceable personality traits, but

learning styles are the result of interaction between the individual and the environment. [4] In the Kolb's empirical learning style model, learning is a combination of experience, cognition, perception, and behavior. Kolb in his model classifies learning styles in four categories: Concrete experience, reflective observation, abstract conceptualization and active experimentation. Kolb (1984) assumed these four styles in two bipolar dimensions: one dimension is the collection of information which includes CE vs. AC and the next, the information processing dimension which is a combination of RO vs. AE. Learning occurs when an individual chooses one or more of the four styles to solve his problem. For example, people may be use CE more than AC or RO more than AE. These dimensions, form divergent, convergent, assimilator, and accommodator learning methods. [5]

Sociologists and researchers who are working in this field in their comparative studies of cultural similarities and differences among different societies have found that how different values and worldviews between societies have created different learning styles and methods. [6]

Considering that the performance of students in the learning environment (university) is influenced by their input behaviors, considering the concept of learning style as one of the main indicators of incoming behaviors whether by progenitors or by learners at all levels of education, including academic environments, is considered necessary and inevitable. [7]

In recent years, given the huge volume of youth demand for entry into higher education and the lack of adequate educational space, has provided the necessary conditions for implementation and performance of e-learning in Iran. Increasing productivity and teaching efficiency, time and space flexibility and creating fair educational opportunities are the e-learning features which can be mentioned. It seems that the unique feature of this educational method has led to a higher level of excellences in higher education every day [8]. Due to high level of ability of e-learning and its widespread ease of use, as well as the rapid growth of information technology and on the other hand, in the conditions that Iran is one of the youngest countries in the world and the increased desire of young people to college education in recent years and the inability of the current education system to responding, has made virtual training more urgent. Therefore, identifying the limiting factors of this type of training and providing the necessary suggestions for their elimination, can influences the smooth transition between this university and other universities, from the traditional education system to the virtual education system and extending this approach to the state level [9].

Academic life is one of the most important dimensions of individuals' life that affects other aspects of life a lot. In this regard, one of the main problems of the people educational life and the educational system of each country is the problem of academic drop-out and low level of academic performance of learners [10]. In the past, it was believed that each person's learning ability depends on his level of intelligence and talent. But in recent years, other non- Intrinsic factors have also been considered important in this relationship [11].

In order to resolve these issues, it is the creation of a structure for virtual education in a manner that incorporates appropriate levels of social attendance in line with content and individual's expectations abilities and differences that make learning high-level efficiency possible. [12]

The results of this research can help higher education institutions and universities to learn about the special characteristics of learners who use these tutorials to design courses that fit with different styles and forms of learning. E-learning provider organizations can utilize these results to develop social and emotional skills courses and repairing defects of these skills in previous courses. [13]

One of the most important factors that cause students interest and motivation in their field of study and also graduates satisfaction of their respective jobs are the degree of satisfaction with the title of the field of study and the related occupation, social status, income and the degree of

difficulty of the field and occupation.

Dascalu et al. (2016), in a research entitled "A suggestion based on learning styles for a better virtual participatory learning experience", showed that learning styles depend on the behavioral characteristics of users and their success and limitations. [14]

Truong (2015) in a research entitled "Combining learning and accommodator styles of the E-learning system: current developments, problems and opportunities" by reviewing and studying 51 articles, concluded that the choice of any type of the learning styles is in the electronic environment. [15]

Vasileva-Stojanovska and colleagues (2015) in a research entitled "The effect of satisfaction, personality and learning styles on educational outcomes in a combined learning environment" were used video conferencing learning and different teaching methods and results based on a prediction model showed that satisfaction, personality and learning styles were evaluated effective on the participants' learning outcomes. [16]

Deborah, Baskaran, and Kannan (2014) aimed at studying the work plan in learning style models and the criteria used to evaluate them, identified the Felder-Silverman learning style model as the appropriate model for e-learning and reported that using fuzzy rules to handle uncertainty in predicting learning styles could increase the performance of e-learning system. [17]

Akbulut Yaowoz and Cardak Sigdem Susan (2012) in a research entitled "Accommodator super media education with adaptation to learning styles: a content analysis of the Publications 2000-2011", showed that interconnected learning is not strong enough. However, various studies showed that learning styles are influenced by students' satisfaction and success. Current trend, scholarly development gap and outcomes were discussed. [18]

Huang, Linb and Huang (2012) in a research entitled "What types of learning styles lead to online collaboration in combinatorial environments?" reported that sensual and visual styles are indirect predictors of learning performance in online collaboration mediation. However, other learning styles do not affect academic performance. Sensual students had a higher level and visual students had a lower level of online collaboration. Previous knowledge plays an important role as a moderator between online collaboration and learning performance. [19]

Klasnja-Miljcevic et al. (2011) in a research entitled "Personal e-learning based on suggested strategies and identification of learning styles" showed that online activities cause appropriate use of proposed strategies. Students based on learning styles adjust their knowledge and performance. [2]

Panahandeh Maryam (1395), in a research entitled "The relationship between learning styles and educational burnout of female students in human sciences" reported that there is a significant relationship between the two variables of learning style and academic burnout. A closer look at the data in these variables shows that as the scales progress towards abstract conceptualization, whether in terms of reflective observation or in the direction of active experimentation, academic burnout is higher and as the scores progress toward concrete experience, especially in the context of active experimentation, less academic burnout occurs. Other results of surveys and statistical analysis also showed that: 1- There is no significant relationship between assimilator learning style and academic burnout. 2- As the use of divergent thinking styles and accommodator thinking styles increases, academic burnout also goes up. 3 -As the use of convergent thinking style increases in the learning process, decreases in academic burnout. 4 - Medical students suffer from emotional exhaustion, inattention, and educational inferiority more than human sciences students. 5- Frequency distribution of medical and human sciences students in the four assimilator, divergent, converging and accommodator learning styles have no significant difference. However, the current and prevailing thinking style among students is an assimilator learning style. And divergent, convergent, and accommodator styles are placed in the next ranks. [1]

Also, the research's results of Mohammadzadeh Ghamsar et al. (1395) showed that there is no significant difference between the learning styles of employees involved in e-learning courses and those who did not participated. [20]

Khorasani Abasalt and Hooman Doosti (1394) in a research assessed the satisfaction and importance of effective factors on the effectiveness of e-learning from the employees' viewpoint (case study: Saman bank). The purpose of this study was to evaluate the importance of four factors containing technology, content, lecturer and learning styles on the effectiveness of electronic courses and their satisfaction from the viewpoint of employees. The statistical population consisted of 110 employees of Saman bank throughout Iran who had participated in e- courses held in 1390. The results of the analysis showed that all four mentioned factors play a key role in the effectiveness of e- courses regarding the priorities as follows: quality and learning styles with a correlation coefficient of 0.699, technology type with a correlation coefficient of 0.654, the content of e- courses with a correlation coefficient of 573.0 and lecturer with a correlation coefficient of 0.398. [21]

In summary of studies, a meaningful relationship between learning styles and academic satisfaction can be observed in students. However, based on the findings of the researcher, there was no comparative study between the learning styles and the type of education (traditional and electronic) and academic satisfaction. This research is a comparative study of the learning styles and academic satisfaction among students of the electronic and traditional courses of Payame Noor University in Isfahan during the academic year 1395-96.

Research questions

Is there relationship between learning styles with academic satisfaction in traditional and e-course students?

What is the status of learning styles of traditional and e-course students at Payame Noor University?

What is the status of academic satisfaction of traditional and e-course students at Payame Noor University?

Method

The research method was descriptive correlation type research that in terms of goals, stands in category of practical patterns. The statistical population of this research includes all female and male students of the Master's degree in electronic (virtual) and Traditional Payame Noor University in Isfahan in 1393-1394. Based on statistics obtained from the management of Payame Noor University of Isfahan. This number consists of 1,400 and 1600 students for e-learning and traditional courses respectively, whom were selected in the fields of basic science, engineering, literature and the human sciences. Using the Cochran formula, the sample size of students in traditional courses is 310 students of which are in basic sciences 94 persons, engineering 58 persons, and human sciences 158 persons and the sample size of the e-course students group is 302 students of which are in basic sciences 57 persons, engineering 59 persons, and human sciences 186 persons and in total of 612 are assigned of which are 151 persons in basic sciences, 117 persons in engineering and 344 persons in human sciences. The sampling method was proportional to the randomized stratified sampling method, which means there were a proportional number of students of each field in the sample.

Kolb style learning standard questionnaire and Jokar (1378) critical academic satisfaction questionnaire (Alfa 0.92) were used to collect data.

In this research, along with using statistical software SPSS-20 for data analysis also statistical methods of contingency analysis table and data Chi-squared test were used.

Results

The first question

For a general overview "Are there any relationship between learning styles (convergent, divergent, assimilator and accommodator) with the students' satisfaction in the traditional and e-courses of Payame Noor University?" a bilateral contingency table has been used.

Table 1. observed and expected frequencies of academic satisfaction and learning styles of the traditional group in a bilateral contingency table

total	Learning styles				Traditional group		
	accommodator	assimilator	divergent	convergent			
129	32	40	28	21	Observed value	satisfied	Academic satisfaction
129	29.5	39.5	30.4	29	Expected value		
	2.5	8.5	2.4	8.5-	difference		
181	39	47	45	50	Observed value	Unsatisfied	
181	41.5	55.5	42.6	41.5	Expected value		
	2.5	-8.5	2.4	8.5	difference		
310	71	95	73	71	Observed value	total	
310	71	95	73	71	Expected value		

Table 1 shows the observed and expected frequency in learning styles and satisfaction and dissatisfaction. As stated above, since the relationship between two nominal variables is considered, therefore, a bilateral contingency coefficient is used to answer this question.

Table 2. contingency table statistics to determine the relationship between satisfaction and the learning style of the traditional group

significance	Degree of freedom	value	
0.04	3	8.01	Value of contingency coefficient
		310	number

Table 2 shows the value of this coefficient and its significance. As it is seen, since the value of the coefficient of significance is 0.04 and this value is less than the coefficient of the criterion, that is, 0.05, so the relationship between the two variables is confirmed. Therefore, it can be concluded that there is a relationship between learning styles and academic satisfaction in the traditional group.

Table 3. expected and observed frequency of academic satisfaction and learning styles in the electronic group in bilateral contingency table

total	Learning styles				Electronic group		
	accommodator	assimilator	divergent	convergent			
231	55	79	75	22	Observed value	satisfaction	Academic satisfaction
231	61.2	65	71.1	33.7	Expected value		
	-6.2	14	39.9	-11.7	difference		
71	25	6	18	22	Observed value	unsatisfied	
71	18.8	20	21.9	10.3	Expected value		
	6.2	-14	-3.9	11.7	difference		
302	80	85	93	41	Observed value	total	
302	80	85	93	44	Expected value		

Table 3 shows the observed and expected frequency in learning styles and satisfaction and dissatisfaction in the electronic group. As stated above, since the relationship between two variables is considered Therefore, a bilateral contingency coefficient is used to answer this question.

Table 4. contingency table statistics to determine the relationship between satisfaction and the learning style of the electronic group

significance	Degree of freedom	value	
0.001	3	33.52	Value of contingency coefficient
		302	number

Table 4 shows the value of this coefficient and its significance. As it is seen, since the value of the coefficient of significance is 0.001 and this value is less than the coefficient of the criterion, that is, 0.05, so the relationship between the two variables is confirmed. Therefore, it can be concluded that there is a relationship between learning styles and academic satisfaction in the electronic group.

In general, the analysis of this question showed that there is a significant relationship in the traditional group and also in the electronic group between learning styles (convergent, divergent, assimilator and accommodator) and satisfaction and a careful study showed that in traditional courses, convergent style, divergent, assimilator and accommodator style, respectively, had the most relationship with academic satisfaction. Divergent, assimilator, convergent, and convergent styles in electronic courses have the most relationship with academic satisfaction.

The second question

What is the status of learning styles of traditional and e-course students at Payam Noor University?

Table 5. Frequency of learning styles in the traditional group and their Chi-squared outcomes differences

P	χ^2	Percentage	Frequency	Learning styles
0.15	5.30	22.90	71	convergent
		23.55	73	divergent
		30.65	95	assimilator
		22.90	71	accommodator
		100	310	total

The study of the status of learning styles in the traditional group in Table 5 showed that, the assimilator style with 95 persons (30.65%), divergent with 73 persons (23.55%), converging with the frequency of 71 persons (22.9%) and accommodator with 71 persons (22.9%), respectively, use the related learning style. In the traditional group, the convergent and accommodator styles have the lowest frequency and the assimilator learning style had the most frequency. Although these styles are slightly different, but do not have statistically significant.

The study of the status of learning styles in the traditional group in Table 5 showed that of learning styles, assimilator style with 95 persons (30.65%), divergent with 73 persons (23.55%), convergent with 71 persons (22.9%) and matching with 71 persons (22.9%) are used respectively. In the traditional group, the convergent and accommodator styles have the lowest frequency and the assimilator learning style had the most one. These styles, although slightly different, but statistically have no significant difference.

Table 6. Frequency of learning styles in the electronic group and their Chi-squared outcomes differences

P	χ^2	Percentage	Frequency	Learning styles
0.001	18.66	14.57	44	convergent
		30.79	93	divergent
		28.14	85	assimilator
		26.49	80	accommodator
		100	302	total

As shown in Table 6, the study of the status of learning styles in the electronic group showed that the convergent learning style with the frequency of 44 persons (14.57%) the lowest frequency, divergence with 93 persons (30.79%) the most frequency, assimilator style with 85 persons (28.14%) and accommodator with 80 persons (26.49%) and the results of studying the difference between learning styles using one-way Chi-squared test in the electronic group showed that this difference was statistically significant in learning styles.

In general, students in the traditional group do not differ in their learning styles, but in electronic group the most and the less styles which are used are divergent and convergent styles respectively.

The third question

What is the status of academic satisfaction in traditional and electronic students of Payame Noor University?

Table 7. Frequency of learning styles in the traditional group and their Chi-squared outcomes differences

P	χ^2	percentage	Frequency	Academic satisfaction
0.001	8.72	41.46	129	satisfied
		58.39	181	unsatisfied
		100	310	total

As shown in Table 7, the study of academic satisfaction status in the traditional group showed that of the total 310 students, satisfied persons 129 (41.61%) and unsatisfied persons 181 (58.39%) indicates that in the traditional group, most students do not have high academic satisfaction. And the results of the study on the difference between academic satisfaction and dissatisfaction using one-way Chi-square test in the traditional group showed that this difference is statistically significant.

Table 8. Frequency of learning styles in the electronic group and their Chi-squared outcomes differences

P	χ^2	percentage	Frequency	Academic satisfaction
0.001	84.76	76.49	231	satisfied
		23.51	71	unsatisfied
		100	302	total

As you can see in Table 8, the study of satisfaction status in the electronic group showed that of the total 302 students 231 persons (76.49%) are satisfied and 71 persons (23.51%) are unsatisfied. The recent subject indicates that in the electronic group, most students have high academic satisfaction. And the results of the study on the difference between academic satisfaction and dissatisfaction by using one-way Chi-squared test in the electronic group showed that this difference is statistically significant.

In general, it can be concluded that in the traditional group most students had academic dissatisfaction and in contrast, in the electronic group, there was more academic satisfaction.

Discussion and Conclusion

In study the first question (Is there any relationship between learning styles with academic satisfaction in traditional and e-courses students?) analysis of the results of the bilateral contingency coefficient test reveals that the significance coefficient of this test in Table 2 and 4 of the traditional and electronic groups are 0.04 and 0.001, respectively, which are less than the value of the criterion coefficient, that is, 0.05. Therefore, it can be concluded that there is a general relationship between the two variables of students learning styles and their academic satisfaction. The results showed that in traditional courses, convergent style, divergent assimilator and accommodator style has the highest relationship with academic satisfaction, respectively. In e-courses, divergent, assimilator, accommodator, and convergent have the most relevance to academic satisfaction.

These results were consistent with the findings of some studies, including Baker's (2003) research at San Jose State Aviation University, California on aviation students, showed a significant relationship between learning styles and academic performance. Another study by Eliot (2006) at the University of Chaplault, Boston, Massachusetts state, the researcher achieved a meaningful relationship between the learning style and the academic achievement. Leo et al. (2007) from the International Association for Education and Sociology in their research in the context of the relationship between Kolb's learning styles and the consequences of online learning, found that there is a meaningful relationship between learning styles and learning outcomes.

Manouchehr (2007) from the University of Qatar in his research findings concluded that there is a significant relationship between learning styles and academic achievement of virtual learning learners. But, in traditional education, there was no significant relationship between the two variables mentioned above. In a research conducted by Renau (2008), the results

showed no significant relationship between learning styles and academic success. One of the possible causes of this finding is the lack of attention to the learning styles in traditional courses.

Based on the above findings, considering the importance of academic satisfaction and its relationship with academic success, the motivation for the progress of the design and development of training programs should be such that in traditional and traditional courses, they have the highest proportionality, in accordance with the convergent learning style, the divergent style, assimilator and accommodator, respectively, and with divergent, assimilator, accommodator and convergent in e- courses.

In study the second question of the research (What is the status of learning styles of traditional and e-course students at Payame Noor University?) by study the results of one-way Chi-squared test, in Table 5, the study of learning styles in the traditional group showed that none of the learning styles is superior to student use, and there is no difference between their use, because the coefficient of significance 0.15, is more than the coefficient significance of the criterion 0.05. In table 6 also the status of learning styles in electronic students showed divergence with 93 persons (30.79%) had the most frequency, assimilator style with 85 persons (28.14%) and accommodator with 80 persons (26.49%), respectively, placed after that and convergent learning style with the frequency of 44 persons (14.57%) the least frequent, were used among students. Since the coefficient of significance is 0.001 less than the significance of the criterion, that is, 0.05, therefore, it can be concluded that the traditional group is the same in using learning styles, but in the electronic group divergent style is more prevalent among students as a superior style.

Given that the learning style of most students was divergent and divergent learners learn through feeling and observation. These persons have great imagination and creativity shows that divergences are interested in communicating with people and are emotional and imaginative. They tend to be attracted in art sciences and often have a history of studying in the human sciences and free arts. Therefore, teaching methods and compilation of training courses should be rooted in this learning style.

Salehi et al. (1379) [22], Valizadeh et al. (1386) [23], Kalbasi et al. (1387) [24], and Meyari et al. (1388) [25], reported convergent as the superior learning style among the students of the medical sciences department. Also, Najafi et al. (2009) [26] have introduced convergent as the superior learning style among this group of students and then assimilator, respectively, and Rezaei et al. (2008) [28] also introduced assimilator and then convergent as the superior learning style.

The findings of Pouratishi et al. (1388) [28] also based on studying the effect of learning styles on the academic achievement of agricultural students showed this group of students has a more converging learning style. He also reports a meaningful statistical relationship between students' gender and their learning styles, so that, female students of this field have a more converging learning style and agricultural male students are introduced more accommodator learning style.

Yazdee (2009)[29] also showed in the study and comparison of students' stages and styles of learning at different faculties of Alzahra University, there are significant differences between students' learning styles in different fields of study, so that, students of the School of Art are more likely use the stage of concrete experience and divergent and accommodator styles, students of technical colleges use the stages of reflective observation and abstract conceptualization and assimilator style, students of the Faculty of Psychology have active experimentation steps and abstract conceptualization and convergent style and students of the Faculty of Basic Sciences use an inclusive conceptualization and convergent style. Also, many studies have shown the coordination of students learning styles with teaching styles

[16,17].

In the review of the third question (What is the status of academic satisfaction in traditional and electronic students of Payame Noor University?)

Studying the status of academic satisfaction of the traditional group in Table 7 showed that most students did not have academic satisfaction since the coefficient of significance 0.001 is less than the coefficient of the criterion significance, that is, 0.05. But the study of the satisfaction level of the electronic group in Table 8 showed that most of the students had academic satisfaction. Therefore, it can be said that electronic students are more satisfied with the education and field they are studying.

Regarding these results, it can be said that e-learning courses have succeeded in obtaining students' academic satisfaction and this indicates that the path of education has been correct. But students attended in traditional courses are not satisfied with their academic satisfaction and this reflects the fact that some of the e-learning training routines can be used to increase the satisfaction of this group. Therefore, in order to raise the quality of higher education, it is necessary to move towards combined education.

- According to the results of the study, it is suggested that the learning style of most of electronic students was divergent and divergent style has the most relationship with academic satisfaction. Therefore, educational programs and teaching methods should be led to this method to achieve more satisfaction among students.

- The design of e-learning courses, taking into account the learning styles of learners that were most divergent here, most of the teaching methods should be designed on this style.

- Since the students of the traditional courses had the least academic satisfaction, designing combined learning courses promote effective and satisfactory learning styles in traditional students and since the electronic courses had the most satisfaction, moving toward a combined learning should lead to achieve high quality of education and learning.

- According to the results of the research, it showed that students with convergent style had the least academic satisfaction; it can be suggested to increase their satisfaction by studying the causes of their dissatisfaction and revising the materials and curriculums.

- This conclusion that e-learning students have the highest level of academic satisfaction reflects the community's demand for change toward combined education direction. It can be suggested that the training centers utilize combined methods to improve the satisfaction of learners.

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