Synchronous and asynchronous e-learning styles and academic performance of e-learners

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Abstract

It is important to keep in mind that every individual is a unique learner. Educators have, for many years, realized that some learners prefer certain methods of learning. These methods, referred as learning preferences or learning styles. This study was aimed to ascertain the learning styles of students in mode of synchronous and asynchronous e-learning and to compare the learning styles of e-learners with their academic performance. Synchronous or asynchronies e-learner determiner test and the Kolb’s Learning Styles Inventory (KLSI 3.1) were conducted to identify differences in the learning styles among 731 e-learners from six virtual universities which were confined in Tehran and categorized in three different academic performance groups including low, mediocre and high. The sample was selected by multi-stage sampling based on Cochran formula and researchers conducted Kruskal-Wallis test to assess whether there is any significant difference within synchronous and asynchronous e-learners’ learning styles based on their academic performance groups. The results revealed that in synchronous e-learners while, synchronous e-learners in low, mediocre and high academic performance groups preferred Assimilating and Diverging styles. In contrast, the results demonstrated that asynchronous e-learners in low, mediocre and high academic performance groups preferred Assimilating and Converging styles. Researchers conducted Mann-Whitney U as Post Hoc and their effect size value was calculated for significant Post hoc tests.

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1. Introduction

The review of each one of the recent learning theories has shown an emphasis on the role of learners as major point of any learning process which has become popular among the educators. Basically, individual differences are effective on the process of learning among learners so, today this principle has become a natural reality as the ancient great philosophers believed it.

The approach of the learner-oriented in instruction has emphasized on the influence on the part of the learners about the content, activities, materials, and pace of learning. This approach is more popular than the other approaches which as four foci’s including knowledge-oriented, learner-oriented, assessment-oriented, and community-oriented. The concept of these approaches have considered the individual differences as the most concerned role for the learners (Froyd & Simpson, 2008). An example to practical development and necessity to improve and adapt the above mentioned approaches which are reflected to one of the major challenges, published in a report entitled “A Nation at Risk”.

Concurrent with stressing on recent advancements in educational technology, researchers believe that learning environment is one of the causes to satisfy the learners’ diverse requirements. The developed web systems particularly brought about a revolutionary phase in education by bringing an alternative “anytime and anywhere” learning delivery methods for online learners around the world (Zolfaghari, Shatar Sabran, & Zolfaghari, 2009). This kind of advancement in educational technology has produced many benefits for both individual learners and organizations in several ways. Individual learners take advantage of self-paced learning environments in which they have control over their pace of learning, information flow, selection of learning activities, and time management.

Personalization of learning environment is a phenomenon which emphasis on effective individual characteristics during a learning process. It has become important gradually when distance learning has become more electronically. It is a process that emphasis on learning-oriented process and learning style of the learners is a determinant factor in improvement of any learning process. Regarding the necessity to facilitate the learning process as ultimate purpose in any ICT-based environment, recent theories related to learning and educational psychology should be considered. It becomes more important when education has not any access to target e-learners. Virtual University and e-learning centers provide opportunities for e-learners to learn at their own paced and their learning style.

Unfortunately, quick developing of online learning environments and growing demand in the extension service for e-courses without research by researchers and educators being equipped with the necessary skills required for successful completion has created some issues which need comprehensive consideration. Undoubtedly, taking advantages of all research and researchers in case of learning styles of learners in online learning environment are impossible. Considering these issues of learning styles, the authors strive to focus on the above questions and answers via review of the theoretic frameworks and foundations.

1.1. Learning styles and effective factors

A literature review on learning styles introduced them as individual preferences which are as per the individual and differ from one learner to the others (Dunn, 2000; Felder, 1996; Honey & Mumford, 1999; Kolb & Kolb, 2005; Peter, Bacon, & Dastbaz, 2009; Ramayah, Sivanandan, & Nasrijal, 2009). Hence, learning styles of students are affected by some variables, study of these situations are necessary (Ally & Fahy, 2004; Garland & Martin, 2005; Honigsfeld & Dunn, 2003; Lau & Yuen, 2010; Sanders & Hausler, 2007; Shukr, Zainab, & Rana, 2013; Slater, Lujan, & DiCarlo, 2007; Smith, 2008; Terrell, 2002).

Review of definitions in learning styles show that one of the most effective factors in distinguishing the learning styles from other similar concepts such as cognitive styles or thinking styles is depends on relation between learning styles and learning environment (Dinn, 2009). Although, several theorists have described the learning style but Keefe’s definition is repeated due to its consideration on individual differences and its relation with learning environment as an indicator in distinguishing the learning styles from other concepts including cognitive styles or thinking styles.

Keefe (1979) defined learning styles as the “composite of characteristic cognitive, affective, and physiological factors that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment” (Keefe, 1979).

The major effective factors on learning styles have been considered in a long spectrum including several factors. Garner, Furnam, Jackson, and Miller believe that the behavior associated with the four basic learning styles are shaped by transactions between people and their environment at five different levels of personality, educational
specialization, professional career, current job role, and the adaptive competencies are most effective factors (Kolb & Kolb, 2005).

Although, the above mentioned researchers have considered on some factors while, others highlighted different factors which can influence on learning styles such as culture, school atmosphere, expectations, teaching style and classroom practices. Given and Reid (1999) have classified these factors into social variables, personality types, modality preference, cognitive processes, movement and later all and emotional factors. Dunn (2000) believes that four learning-style traits significantly differentiate between groups and among individuals within the same group. They differ by achievement level, gender, age and culture.

1.2. Kolb’s learning style theory
The authors used Kolb’s Learning Style Theory (KLSI) which is on the basis of Experiential Learning Theory (ELT) and that is built upon the idea that learning preferences can be described by using two continuums: active-reflective and abstract-concrete. It creates four types of learners: active-abstract (Converging), active-concrete (Accommodating), reflective-abstract (Assimilating), and reflective-concrete (Diverging). The LSI is designed to determine an individual’s learning preference (Esichaikul & Bechter, 2010).

1.3. Synchronous and asynchronous e-learning
Online learning due to the use of advanced and sensitive tools enables the e-learners to apply those tools which are adapt to their individual preferences. This (personalized the learning environment) is a process that any modern educational theories have emphasized on it. Today, the preferred learning style is as one of the most important criteria for recognizing any individual differences in learning process which have been considered for adaptability. Sabine Graf (2007) has mentioned this as a necessity and stated that adaptability includes all facilities to customize the system for the needs of the educational institutions (Graf, 2007).

Methods of providing e-content in an online classroom, instructors, learners, interactive tools, modes of interaction and many other factors in online learning modes are classified into two modes including synchronous and asynchronous e-learning. This part focuses on the mentioned modes and some concerned issues.

Synchronous e-learning have been expanded due to proven demands in various eras such as education. In the online educational environment, there is no physical meeting. Synchronous and Asynchronous learning tools, such as threaded discussions, instant messaging and blogs, play an important role in humanizing online courses by replicating the classroom experience of information exchange and social construct, not just between learners and instructors but among the learners as well.

People might just know it by reference to a particular vendor, tool or software program that enables the creation and delivery of synchronous e-Learning. Synchronous e-learning is live, real-time (and usually scheduled), facilitated instruction and learning-oriented interaction.

In this type of learning, learning experiences are live and real-time. The roots of synchronous e-learning are derived from three main influences: the classroom, the media, and the conference (Clark et al., 2007). Several
researchers provide a comprehensive definition of the synchronous e-learning which is unanimous and it must include two components. They are interactions and time. Khan (2006) on the basis of these components defines Synchronous e-learning as “Interact of participants with an instructor via the Web in real time” (Khan, 2006).

Asynchronous online learning is defined variously due to some components, its nature and facilities that are common in some characteristics. On the other hand, one of the popular definitions that focus on the components of asynchronous e-learning introduced it as “an interactive learning community that is not limited by time, place or the constraints of a classroom” (Mayadas, 1997).

Asynchronous e-learning is similar to synchronous e-learning which is a learner-centred process which uses online learning resources to facilitate information sharing regardless of the constraints of time and place among a network of people. Asynchronous e-learning takes advantage of computer-mediated communication (CMC) to achieve the promises of learning “anytime and anywhere” through asynchronous online discussions. Asynchronous e-learning is on the basis of constructivist theory, a learner-centred approach that emphasize on the importance of peer-to-peer interactions. This approach combines self-study with asynchronous interactions to promote learning, and it can be used to facilitate learning in traditional on-campus or regular education, distance education and continuing education. This combined network of learners and the electronic network in which they communicate are referred to as an asynchronous e-learning network.

The conditions and factors driving the Asynchronous e-learning are different so, this method is defined by another component. Khan (2006) on the basis of these components mentioned that “Asynchronous learning refers to instruction that is not constrained by geography or time” (Khan, 2005).

1.4. Academic performance

Academic performance is multidimensional variable which might be affected by internal and external classroom factors so the authors assumed the different learning style as a determiner of classroom factor in relation to the different academic performance groups.

In fact, this study follows an outcome-centric approach which has attempted to classify academic performance in terms of the learning outcomes that are designed to match, or the particular competencies that are designed to measure. Thus, the outcome-centric approach is a taxonomy process and then overall generality of the taxonomy can have advantages and disadvantages. The general nature of the taxonomy means that it is easily applicable across the different disciplines (Anderson, Krathwohl, & Bloom, 2001; Semper, 2008).

Researchers are eager to assess the learning styles of e-learners in different modes of e-learning and their academic performance. Thus, researchers based on above mentioned approach, and necessity to evaluate whether there is any significant difference between successful academic performance groups and particular learning styles in the mode of synchronous and asynchronous e-learning or not. On the basis of nature of academic performance and outcome-centric approach of the research and three existent groups of academic performance in educational system and higher education of Iran selected three different levels of academic performance for the study. The categories are on the basis of average marks of the last two semesters of the sample and the authors have transformed them to the Grade Point which has achieved by each one of the sample. They include low (0-13 out of 20 as the maximum marks which everybody can obtain from an exam), mediocre (14-17 out of 20 as the maximum marks which everybody can obtain from an exam) and high (18-20 out of 20 as the maximum marks which everybody can obtain from an exam). It should be noted that in a graduate degree, the students who obtain an average which is less than 12, are considered failed students while, in post graduate degree the fail criteria is 14. Researchers eliminate the students who have average marks less than 10 or very low academic performance.

1.5. Objectives of the study

x To determine learning styles of synchronous and asynchronous e-learners
x To compare learning styles of synchronous and asynchronous e-learners based on their academic performance groups
x To compare learning styles of synchronous and asynchronous e-learners

1.6. Research questions

x What are preferred learning styles of synchronous and asynchronous e-learners?

x Is there any significant difference in learning styles within different academic performance groups of synchronous e-learners?

x Is there any significant difference in learning styles within different academic performance groups of asynchronous e-learners?
• Is there any significant difference in learning styles of synchronous and asynchronous e-learners?

2. Methodology of the research

Regarding the objectives of the research, the authors have applied multi methods to interpret different research types based on research requirements. Researchers used survey method for description of the learning styles while; researchers used casual-comparative method in order to compare the learning styles of synchronous and asynchronous e-learners based on their academic performance.

2.1. Sampling and sample

Sample size: The researchers regarding the two modes of virtual learners (Synchronous & Asynchronous) and by Synchronous or Asynchronous e-learner test selected 388 Synchronous and 343 Asynchronous e-learners from six virtual campuses which were confined in Tehran. The total sample size for the study includes 731 e-learners. The authors conducted the sampling procedure within virtual universities by multistage sampling design as follow:

In the first stage, the authors selected all colleges and Universities which had presented their course in online mode. These Universities comprise of twenty e-learning centers and virtual Universities in Tehran. In the second stage the authors selected six universities out of twenty by simple random sampling. In the third stage, the authors selected all the students of these Universities and sent the e-questionnaires to all of them. In the last stage of sampling of e-learners, the authors selected the sample of the study by stratified random sampling from those who filled up the e-questionnaires in each of the online circumstances including synchronous and asynchronous e-learning environment. For this procedure, Universities have linked the e-questionnaire and students have filled up and duly submitted the same. Due to the large number of completed e-questionnaires Lottery Sampling technique was administrated.

2.2. Data collection tools

Synchronous or asynchronous e-learner test: a questionnaire for e-classes:

The authors developed an instrument which is suitable to determine the preferred or the most used mode of learning among e-learners in online learning environment. The instrument has focused on the measure being used by admitting students in synchronous e-learning classes in order to determine mode of learning environment. This questionnaire includes 22 questions and is related to the synchronous e-learning classroom (e-classroom), tools, preferred e-facilities, attending issues, trainers, and its affiliated modes that are synchronous or asynchronous learning. Questions were asked to the virtual students purposefully and indirectly about the preference types, available methods which are provided and commonly used instruments by the students through online environment. The main objective of the questionnaire was distinguishing synchronous from asynchronous learner. Likert scale is used and each question is rated on five-point scale of distress (1-5) ranging from “Strongly Disagreed” to “Strongly Agreed”.

Kolb's Learning Styles Inventory (KLSI V.3.1):

The authors have used Kolb’s Learning styles Inventory (KLSI V.3.1) as a main instrument of the study. This form of the Kolb's Learning styles Inventory (KLSI V.3.1) created by instruments of Google Docs in e-format. This form of the inventory is suitable for synchronous and asynchronous e-learners. The e-format of the instrument linked to website of selective virtual Universities that are as sample of the study after allowing by the Universities (Appendix-B certificate of the institutes). This instrument is consisted of twelve sentences, with a choice of endings. The respondents were asked to rank the four endings for each of the sentence according to their preferences about their learning.

2.3. Reliability of the research tools

Conducting a pilot study in this study was necessary because the authors have used different tools such as e-instrument. To assess the above mentioned purposes, doing a pilot study was essential. The researchers have conducted the instrument among 37 virtual students and Cronbach’s alpha through test-retest design during three weeks was found α= 0.752.

2.4. Statistical tools

The authors used nonparametric statistical tools considering some criterions. The obtained data from determiner Synchronous or Asynchronous e-learner test and Kolb’s Learning Styles Inventory were categorized in rank or ordinal scale and due to serious violation to the assumptions of parametric data, the authors used nonparametric tests(Pagano, 2013). The authors used Kruskal-Wallis H Test and the Mann-Whitney test used as Post Hoc test and their effect size value was calculated for significant Post hoc tests. effect size in some nonparametric tests such as Mann-Whitney U and Kruskal-Wallis which are used in this study are computed through division of Z on N square.
3. Results of the study

In order to examine the differences between learning styles of students based on variables of the study in two different modes of learning, the authors analysed the research questions in three parts. Based on this classification, researchers in first part determined learning styles of synchronous and asynchronous e-learners and second part was considering to the differences of learning styles within different academic performance groups. Finally, researchers compared preferred learning styles in mode of synchronous and asynchronous learning along with comparing on the basis of different academic performance groups.

1. What are preferred learning styles of synchronous and asynchronous e-learners?
This research question was relevant to the first objective of the research which is stated as follows: “To determine learning styles of synchronous and asynchronous e-learners”.

Table 1. Distribution of Learning Styles of students based on mode of e-learning

<table>
<thead>
<tr>
<th>Learning Style</th>
<th>Frequency</th>
<th>Diverging</th>
<th>Assimilating</th>
<th>Converging</th>
<th>Accommodating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synchronous</td>
<td>146</td>
<td>181</td>
<td>37</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Percent</td>
<td>37.6</td>
<td>46.6</td>
<td>9.5</td>
<td>6.2</td>
<td></td>
</tr>
<tr>
<td>Asynchronous</td>
<td>78</td>
<td>89</td>
<td>127</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>Percent</td>
<td>22.7</td>
<td>25.9</td>
<td>37.0</td>
<td>14.3</td>
<td></td>
</tr>
</tbody>
</table>

a. Mode = Synchronous Vs Asynchronous

Interpretation: Table and concerned figure show in mode of Synchronous e-learning, most of the students preferred Assimilating while, Diverging was preferred as the second learning style in Synchronous e-learning environment and Converging and Accommodating learning styles were preferred subsequently. In contrast, in mode of Asynchronous e-learning, e-learners mostly preferred Converging learning style while, Assimilating, Diverging and Accommodating were preferred as their learning style preferences subsequently.

2. Is there any significant difference in learning styles within different academic performance groups of synchronous and asynchronous e-learners?
This research question was relevant to first objective of the research which is stated as follows: “To compare learning styles of synchronous and asynchronous e-learners based on their academic performance groups”.

The authors in order to examine the differences in learning styles of students within different academic performance groups and in two different modes of learning, analysed data through Kruskal-Wallis Test for each mode of e-learning separately. These processes continue with conduct Mann-Whitney U test as Post Hoc for those results which were significant. Thus, due to above mentioned reasons, the first and the second research questions and based on differences in learning styles within Low, Mediocre and High academic performance groups in two mode of e-learning, conducted statistical analysis presented in following Ranks table and Kruskal-Wallis table.
The output of Kruskal-Wallis Test for each one of research questions based on differences in learning styles within three academic performance groups of the students in three different environments summarized in the following Kruskal-Wallis Test table.

Table 3. Output of Kruskal-Wallis Test based on Test statistics

<table>
<thead>
<tr>
<th>No.</th>
<th>Test</th>
<th>Chi-square</th>
<th>df</th>
<th>Asymp. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Synchronous e-learning</td>
<td>22.559</td>
<td>2</td>
<td>.000</td>
</tr>
<tr>
<td>3</td>
<td>Asynchronous e-learning</td>
<td>5.246</td>
<td>2</td>
<td>.073</td>
</tr>
</tbody>
</table>

a. Kruskal Wallis Test
b. Grouping Variable: Academic Performance

A Kruskal-Wallis test was conducted to determine whether statistically significant difference between learning styles in different academic performance groups in synchronous and asynchronous modes of learning separately. The results of the analysis interpreted in separate research questions as “2. Is there any significant difference in learning styles within academic performance of learners in synchronous e-learning environment in Tehran Universities?”

Interpretation: A Kruskal-Wallis test was conducted to determine whether statistically significant difference between learning styles of students and different academic performance in Synchronous e-learning environment. The results indicated that whether $\chi^2 = 22.559$ (df = 2, N = 388) is larger than the critical value of the Kruskal-Wallis (5.99) while, $p = .000 < 0.05 = \alpha$. The students of low academic performance recorded a higher median score (Md = 229.76, N = 122) than the other academic performance groups while, mediocre performance group recorded the second median (M = 182.60, N = 210) and high academic performance group recorded the last median (Md = 162.29, N = 56). Thus, there exists enough evidence to conclude that there was a significant difference in learning styles within academic performance of students in synchronous e-learning environment in Universities of Tehran.

The results of the analysis indicated in the third question as “3.Is there any significant difference in learning styles within academic performance of students in asynchronous e-learning environment in Universities of Tehran?” there was no any statistical significant difference in observed variables. The results demonstrated as follow:

Interpretation: A Kruskal-Wallis test was conducted to determine whether statistically significant difference between learning styles of students and different academic performance groups in asynchronous e-learning environment. The results indicated that whether $\chi^2 = 5.246$ (df = 2, N = 343) is less than the critical value of the Kruskal-Wallis (5.99) and $p = .073 > 0.05 = \alpha$. Mediocre performance group recorded a higher median score (Md = 180.66, N = 197) than the other groups while, students in high academic performance group recorded the second median (Md = 171.88, N = 58) and low academic performance group recorded the last median (Md = 152.69, N = 88). Thus, the authors found out that there was no significant difference in learning styles within academic performance of students in asynchronous e-learning environment in Tehran Universities.

A Post Hoc: Mann-Whitney U

Mann-Whitney U is a Post Hoc test which is applicable whenever the analysis of Kruskal-Wallis test is significant. In order to determine most effective factor in significance difference among three groups that were
including Low, Mediocre and High academic performance, the authors conducted Mann-Whitney U as Post Hoc test between each two academic performance groups and the results were categorized in the table 4. It should be noted that the authors have not done any Post Hoc analysis for asynchronous e-learning. Regarding the above mentioned, due to not having any significance in the results of Kruskal-Wallis Test so, conducted Mann-Whitney U as Post Hoc test in asynchronous e-learning environment was not required.

Table 4. Output of Mann-Whitney U Test as Post Hoc test within academic performance for synchronous e-learners

<table>
<thead>
<tr>
<th>Environment</th>
<th>Academic Performance</th>
<th>Mann-Whitney U</th>
<th>Wilcoxon W</th>
<th>Z</th>
<th>Asymp. Sig. (2-tailed)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synchronous e-learning</td>
<td>Low &amp; Mediocre</td>
<td>9723.500</td>
<td>31878.500</td>
<td>-3.997</td>
<td>.000*</td>
<td>332</td>
</tr>
<tr>
<td></td>
<td>Low &amp; High</td>
<td>2200.500</td>
<td>3796.500</td>
<td>-4.287</td>
<td>.000*</td>
<td>178</td>
</tr>
<tr>
<td></td>
<td>Mediocre &amp; High</td>
<td>5292.000</td>
<td>6888.000</td>
<td>-1.253</td>
<td>.210</td>
<td>266</td>
</tr>
</tbody>
</table>

A Mann-Whitney U test was conducted to evaluate and determine the research questions related to significant difference between learning styles and academic performance groups of students including low, mediocre and high academic performance groups. The results of the analysis show that the major and root causes of these differences in synchronous e-learning and regular learning were due to differences between learning styles of one academic performance group with another or others. The authors summarized them as follow:

**Interpretation:** A Mann-Whitney U Test was conducted and the results indicated that in Synchronous e-learning, analysis of differences between learning styles of students among low and mediocre academic performance groups was a significant while, U=9723.5 (N=332), z = -3.997>1.96 and p=.000<.05=α. The results show a mediocre ES of academic performance groups on learning styles (ES=0.22). At the same time, it repeated among Low and High academic performance groups while, U=2200.5(N=178), z = -4.287>1.96 and p=.000<.05=α. The results show mediocre ES of academic performance groups on learning styles (ES=0.32).

The results of the Mann-Whitney U test indicated in synchronous e-learning environment differences between learning styles of low and mediocre academic performance groups and low with high academic performance groups was a major reason for having the differences in learning styles of students.

It was necessary to compare the learning styles of learners in mode of Synchronous and Asynchronous. Thus, authors considered on a separate question to assess this research question as follow:

4. Is there any significant difference between learning styles of learners in mode of Synchronous and Asynchronous in Universities of Tehran?

This research question was relevant to third objective of the study which is “To compare learning styles of synchronous and asynchronous e-learners”.

Table 5. Output of Mann-Whitney U Test based on mean ranks

<table>
<thead>
<tr>
<th>No.</th>
<th>Academic Level</th>
<th>Frequency</th>
<th>Mean Rank</th>
<th>Sum of Ranks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Synchronous</td>
<td>388</td>
<td>329.67</td>
<td>127913.50</td>
</tr>
<tr>
<td>2</td>
<td>Asynchronous</td>
<td>343</td>
<td>407.09</td>
<td>139632.50</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>731</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6. Output of Mann-Whitney U Test in learning styles based on mode of learning

<table>
<thead>
<tr>
<th>Post Hoc: Test Statistics</th>
<th>Mann-Whitney</th>
<th>Wilcoxon W</th>
<th>Z</th>
<th>Asymp. Sig. (2-tailed)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>52447.500</td>
<td>127913.500</td>
<td>-5.401</td>
<td>.000</td>
<td>731</td>
</tr>
</tbody>
</table>

**Interpretation:** The Mann-Whitney U test conducted in order to evaluate the fourth research question and significant difference between learning styles in different modes of e-learning including synchronous, asynchronous. The results indicated that U=127913.500 (N=731) while, z = -5.401>1.96 and p=.000 < .05=α. The results show mediocre ES (ES=0.2). Thus, the results revealed a significant difference between learning styles of e-learners in mode of “synchronous-asynchronous”.
4. Discussion

Researchers based on the conducted analysis and comparisons within learning styles of learners demonstrated that there was a significant difference between learning styles and academic performance of students. Learners of the first academic performance group (10-13) preferred learning in Assimilating style while, the second (14-17) and the third (18-20) groups opted for Diverging style. In contrast, researchers found out that there was no significant difference between learning styles and Academic Performance of asynchronous e-learners. The results indicated that the first Academic Performance group (10-13) preferred learning through Assimilating style while, the second group (14-17) preferred Converging and the third academic performance group (18-20) went for Assimilating style.

These results are relevant to findings of Dunn, Beaudry, Lu, Jia, Gong and Clark (2008), and Klavas (1989) that demonstrated the academic performance of convergers and assimilators were higher than diverge and accommodators while, Akbari, Ghanbari and Ghanbari (2013) in their results concluded significant and positive relationship between the different learning styles and the academic performance of the sample.

In contrast, Zywno (2002) found out that there was no significance difference between learning style and academic achievement based on hyper media treatment. Marium Dinn (2010) found out the same results within regular learners while, Nick Zacharis (2011) studied the differences between learning styles among online and regular learners. The results indicated that there was no any effect on selected modes of learning, including online and regular and ability to successful complete of the courses.

5. Conclusion

As researchers reported, the first preferred style of students in asynchronous e-learning is Converging and Assimilating style; while Diverging and Accommodating styles followed subsequently. Converging and Assimilating styles are similar in dimension of abstract conceptualization thus; those students who preferred these styles may experience the asynchronous e-learning environment similarly. As reported by Kolb (2005), students who use the abstract conceptualization value scientific approaches in solving the problems instead of the artistic approach characteristics’ of the concrete experience dimension. Thus, preferring the abstract conceptualization is processing towards giving the meaning the contents which are relevant to the Converging and Assimilative learning styles. The most ability of Converging style which was selected by asynchronous students is in practical application of ideas and theories. Asynchronous students prefer solving their problem and finding solution for issues, the problems and deciding about them in decision making process. They prefer to be involved with technical issues rather than social and interpersonal issues. Individualized learning projects that allow for practical applications, online laboratory, listservs to provide information in various formats including text, video, graphic & sound, experimenting new, ideas, simulations, labs and practical application and doing individual assignment are some preferred and suitable methods of learning among asynchronous e-learners.

An individual with an Assimilating style as the most preferred one has included Abstract Conceptualization (AC) and Reflective Observation (RO) as the dominant learning abilities. Individuals with this learning styles preferred organizing information into logical & concise form, learn by watching and thinking, prefer reading, lectures and analytical models, prefer logic values, information and science careers and prefer personalize learning. Researchers recommend to facilitate learning process in mode of synchronous e-learning through providing interactive synchronous tutorials concepts, theory and analytical models, individualized learning projects that includes personal reflections on assigned readings, Synchronous chat tools, e-face to face communicate with instructors as coach or helper.

References


