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EFFECT OF LEARNING STYLES AND STUDY HABITS OF DISTANCE LEARNERS ON LEARNING PERFORMANCES

Shougrakpam Ibeyaima Devi
Research Scholar, Glocal School of Education,
The Glocal University, Mirzapur Pole, Saharanpur

Dr. Poonam Lata Middha
Professor, Glocal School of Education,

The Glocal University, Mirzapur Pole, Saharanpur

ABSTRACT
The development of a country is dependent on the capability of its human resources. The knowledge and technological advancement of society depend on the quality and preparation of manpower who have sound technical understanding, personal and interpersonal skills as scientists and technologist. As such, it is of utmost importance that the highest standards are set in defining the objectives, components, and processes. This study examines the relationship between learning styles, learning attitudes and learning performance in online language classes. Test results are used to assess their learning. Therefore, a significant relationship has emerged between learning styles, learning behavior and learning. The findings include some ideas about the learning style and learning behaviors of distance learners for teachers who want to integrate lessons and support students.
Keywords: Learning styles, ideas, teachers

INTRODUCTION
To respond to the diverse distance and time needs of today's learners, many institutions offer online courses to expand their teaching methods with distance learning courses. They work on specializing or adapting the courses according to learners' needs (Hamilton-Pennell, 2002). Learners' needs include different learning styles which can influence learning performance (Mitchell, 2000; Chen & Lin, 2002; Morris, Finnegan, & Sz-Shyan, 2005; Hummel, 2006).

Definitions of learning style generally focus on ways of learning. According to Fleming (2001) learning style is an individual's preferred way of gathering, organizing, and thinking about information. It is considered as the behaviors related to the psychological, cognitive, and affective domains of interaction with learning environments. Learning style involves learners' preferred ways to receive, process, and recall information during instruction which is related to learners' motivation and information-processing habits (Aragon, Johnson, & Shaik, 2002).

Research studies on learning styles have shown that learning can be enhanced through consideration of personal characteristics in design and delivery of the instruction (Dziuban, Moskal, & Hartman, 2004; Fearing & Riley, 2005). Because some learners tend to focus on facts, data, or procedures, engaging with theories and mathematical models is appropriate. Other learners use visual information like pictures, diagrams, and simulations to understand better, while others can get more from oral and written information. Researchers have argued that learning style also functions as a useful indicator for potential learning performance (Kolb & Kolb, 2005; Smith & Ragan, 1999; Sun et al., 2008). In this context, Dunn and Dunn (1978) stated that students with different learning styles have distinct preferences during different instructional activities. Thus, various models have been proposed by theoreticians and used by educators in order to measure learning styles, and various instruments have been used.

Coffield et al. (2012) provided an extensive report which involved at least 71 learning style models. The models have some components different from each other related to the extent that they may change over time for learners. Some popular instruments were various extensions of Jung's (1970) psychological types and Gardner's (1993) multiple intelligences. One of the widely used models in this area was developed by Gregorc and Butler (1984) which has four combinations of perceptual qualities and ordering abilities: concrete sequential, abstract random, abstract sequential, and concrete random. In this model it is considered that each individual can be strong in one or two of the four styles. As a contrast to Gregorc (1984), Felder and Silverman (1988) did not consider learning styles to be constant. According to them, learning preferences may change due to the time and situation. Fleming's (2001) VARK inventory, which includes visual, aural, read-write, and kinesthetic perceptual styles, and the specific inventory of Felder and Soloman (1997), which measures learning preferences across four bipolar preferences, active-reflective, sensing-intuitive, visual-verbal, and sequential-global, are well known examples derived from the models above.

One of the popular learning style inventories for determining adults' learning styles is Kolb's Learning Style Inventory (LSI). It includes four dimensions: concrete experience (feeling), reflective observation (watching), abstract conceptualization (thinking), and active experimentation (doing) (Kolb, 1985). Through four dimensions, Kolb determined four learning styles: accommodative, divergent, convergent, and assimilative.

Many research studies have been conducted using Kolb's inventory in order to determine learning styles. For example, Jonassen and Grabowski (1993) in their study suggested that the LSI was more suited to having students explore their learning styles than to predicting their ability to succeed. Terrell (2002) made a comparison of graduation rate by learning style of 216 students. He found most of the students were either convergers or assimilators and the comparison was not statistically significant. In addition, Fahy and Ally (2005) used Kolb's LSI for two online courses including asynchronous discussions. Akkoyunlu and Soylu (2008) revealed that students' views on the blended learning process, such as ease of use of the web environment, evaluation, face to face environment, and so on, differ according to their learning styles.

On the other hand, Honey and Mumford (1986) developed a self-development tool based on Kolb's model by inviting managers to address trainees' learning style preferences. They used the tool on a wide range of higher education students. In this instrument they identified four distinct learning styles: activists, theorists, pragmatists, and reflectors.

Learning Styles in Distance Learning

Some researchers focused on the learning styles of distance learners. In this sense, Allen et al. (2002) suggested delivering courses in a variety of formats to accommodate multiple learning styles. Benbunan-Fich and Hiltz (2003) deemed it necessary to conduct research into the relationship among learning styles, the chosen mode of delivery, and student success. In another study Liegle and Janicki (2006) investigated the effect of learning styles on the Internet navigation needs of web based learners, finding that students as explorers provided a higher number of visits to linked web pages, whereas observers tended to be more passive. Also a few of the studies focused on academic performances and learning styles. Akdemir and Koszalkab (2008) determined the relationships between instructional strategies and learning styles in an online graduate level course. In the study, although using different kinds of instructional strategies for various learning styles learners' performances were equivalent. In another study, Popescu (2010) studied relationships between web-based educational systems and learning styles and found that accommodators benefited more than others in the learning process. Also, Shaw (2012) found that different learning styles were associated with significantly different learning scores. In addition, Schellens and Valcke (2000) and Neuhauser (2002) did not find such relationships between learning style and learning performance in online learning.

Furthmore, some studies were conducted in the distance learning area using Kolb's inventory. In one of those studies, Wang et al. (2006) focused on the effects of formative assessment and learning style on student performances in a web-based learning environment. The results showed that both learning style and formative

assessment strategy were significant factors affecting student achievement in a web-based learning environment. Sun et al. (2008) used Kolb's inventory for investigating the learning outcomes related to different learning styles in a virtual science laboratory for elementary school students. Students who used the online virtual lab were not significantly different from students of different learning styles. Kolb's LSI was used in other online learning research studies to measure learners' preferences and learning styles (Dringus & Terrell, 2000; Federico, 2000; Fahy & Ally, 2005; Miller, 2005; Liegle & Janicki, 2006; Wang et al., 2006; Lu et al., 2007) .

Study Habits

Study habits act as another variable connected with distance learners' performances. Study habits reflect students' usual act of studying and also call forth and serve to direct the learner's cognitive processes during learning. Study habits includes a variety of activities: time management, setting appropriate goals, choosing an appropriate study environment, using appropriate note-taking strategies, choosing main ideas, and organization (Proctor et al., 2006).

An increasing number of college courses are delivered online, especially with the use of synchronous technologies, which provides an opportunity for educators to search for the most suitable learning environments for students' study habits. According to the technology used, online settings can meet learners' needs. A wide variety of videos, images, animations, texts, audio, and so on can be shared and virtual presentation media can be created. In this sense, Sharpe and Benfield (2005) reviewed the experiences and study habits of e-learners in higher education in order to identify areas worthy of future investigation. They found some connections among habits and performances and suggested deeper investigation into eliciting the experiences, habits, and strategies of effective e-learners. So, recent developments in DL technologies have grabbed the attention of researchers regarding how pedagogical approaches are required to function within this framework.

Thus, there emerges a need to gain an insight into the requirements, expectations, study habits, and learning styles of learners before new environments are included in online courses in higher education

STUDY FRAMEWORK

In this study Kolb's learning cycle model was used as a framework for determining learning styles (shown in Figure 1). These four learning cycles are associated with learning styles. For instance, a converger favors the learning cycle of abstract conceptualization and active experimentation. Healey and Jenkins (2000) and Manochehr (2006) worked on Kolb's learning cycle model and enhanced it with relationships among learning styles, learning conditions and conditions where learners can learn best. The learning styles and conditions are shown in Table 1.

Table 1
Learning Styles and Conditions

Learning style	They learn best through	Condition
Diverger	Feeling and watching	Learn when allowed to observe and gather a wide range of information
Assimilator	Thinking and watching	Learn when presented with sound logical theories to consider
Converger	Thinking and doing	Learn when provided with practical applications of concepts and theories
Accommodator	Feeling and doing	Learn when allowed to gain "hands on" applications

METHOD

Instruments

In order to meet the research questions, a Turkish version of Kolb's Learning Style Inventory (LSI-T), Study Habits Inventory (SHI), and Achievement Test (AT) were used in this study.

LSI-T: In this study LSI-T was administered before the intervention and after the final examination. The inventory is a 12 item questionnaire appropriate for teens and adults. Each item has four answers, which are ranked by the respondents in terms of best fit on a scale of 1 to 4 (4 = best). It was based on Kolb's learning styles: converging (abstract, active), diverging (concrete, reflective), assimilating (abstract, reflective), and accommodating (concrete, active). LSI was adapted into Turkish and validated by Aşkar and Akkoyunlu (1993) with the internal reliability high, Cronbach's alpha between .88 and .73. The LSI was administered to the participants in enough time by giving them the necessary explanations in advance. Responses were analyzed by organizing them into two bipolar concepts: concrete experience (CE) versus reflective observation (RO) and abstract conceptualization (AC) versus active experimentation (AE) (Aragon, Johnson, & Shaik, 2002). The given scores for CE, AC, RO, and AE were summed and then AE – RO and AC – CE were calculated to determine learners' ultimate learning styles. The scoring ranks of one dimension were dependent on how a participant was measured relative to scores from other dimensions.

SHI: Study habits of the learners were found with the opinions of students on a five- point Likert scale. James and Gardner (1995) addressed three important factors about selecting an instrument for determining learning styles: defining the intended use of the data to be collected, matching the instrument to the intended use, and selecting the most appropriate instrument. In the study habits dimension, frequently used inventories include Learning and Study Skills Inventory (Weinstein & Palmer, 2002) and Inventory of Learning Processes (Schmeck, Geisler-Brenstein, & Cercy, 1991). Though they have some common items, they deal with study habits from different dimensions. Thus with the help of previous studies a new inventory was developed for this study.

While developing the SHI, the studies (Crede & Kuncel, 2008; Göğüş & Güneş, 2011) taken as a basis included theoretical considerations, or qualitative analyses of the ways used by students study habits inventories. Eighty-one learners were asked to identify their study habits, such as which way of studying helped their understanding and their activities during the study process. The participants were different ages and from different socio-cultures. In order to build up the SHI, statements were chosen from the most commonly used ones. Then the items were classified in Patel's (1976) study habits categorization: planning work, reading, note taking, subject planning, concentration, exam preparation, typical habits, and typical school environment habits.

AT: AT was used for assessing the students' learning performances. It was conducted as pretests and posttests with respect to the content of an introductory programming course. In order to evaluate the students' achievement scores, mid-term exam scores and the final projects were graded and calculated. The mid-term score refers to an exam on the computer that tests the students' practical programming capability. The final exam included eight questions regarding introductory programming, including basic data structures, memory iteration, conditional statements, loops, recursive functions, procedures, and functions and problem solving. The achievement scores were calculated using the sum of 20% of the project scores as well as the scores for the mid-term examinations (30%), and the grades for the final project (50%). In addition, the author who was also the instructor interpreted his observations during the process in terms of learning styles and study habits.

Participants

Participants of the study included 66 sophomore students from a Turkish faculty of education, in a computer teacher training program. At the beginning of the study, LSI-T was used for categorizing learners' learning styles, shown in Table 2.

Table 2
Participant's Learning Style

Gender	Total	Converger		Assimilator		Accommodator		Diverger	
	n	n	%	n	%	n	%	n	%
Female	24	9	37.5	6	25	5	20.8	4	16.6
Male	42	16	38	13	30.9	7	16.6	6	14.3
Total	66	25	37.8	19	28.7	12	18.1	10	15.2

Process

The introductory programming language course was delivered online both in synchronous and asynchronous settings. The synchronous setting serves desktop sharing, video sharing, audio, verbal chat, presentation, whiteboard, online survey functions. Moreover, video records of the courses were saved in the system for participants to use asynchronously. The instructor presented the content during synchronous sessions, and discussed students' questions. Basic problems in the introductory programming course examples were discussed, and experts' sample programming codes were delivered to the students.

Learning Styles

The findings from descriptive statistics on average scores of the students with different learning styles are shown in Table 3.

Table 3
Average Scores of Four Learning Style Groups

Groups	n	X	sd
Convergers	25	45.32	24.77
Assimilators	19	48.1	22.86
Accommodators	12	67.25	18.78
Divergers	10	68.1	19.88

LEARNING STYLES OF DISTANCE LEARNERS

It can be suggested that the leading learning style was the convergers, where students typically choose to learn through practical applications, including solving problems, trying to make correct decisions, and preferring to work with technical works or problems, rather than working with social relations. Convergers were followed by the assimilators, who concentrate on abstract concepts, make reflective observations, and assimilate them into an integrated explanation. The accommodators and the divergers were close in that they rarely choose to learn through conducting experiments, taking risks (accommodators), and producing new ideas, observing the situations from different perspectives, and bringing different ideas together (divergers). Although the number of the divergers was the lowest, this group achieved the highest score of average scores. This is similar to Karademir and Tezel (2010), who found that Turkish university students are generally accommodators, and divergers are fewer in number than others.

CONCLUSION

The results of this study showed significant relationships between the students' learning styles, study habits, and performances in online learning, and have offered an insight into the mode of delivery. The design of effective courses for distance learners is most likely to be in connection with the characteristics and preferences of the learner, as it is in the classroom. It was seen that the learners usually show characteristics of assimilators in online synchronous settings. However, the results have shown that the "divergers and accommodators" styles were associated with higher learning scores in synchronous settings. Another common characteristic of the good students was "feeling" according to the results of this study. So I suggest this for programming language learning,

with online synchronous settings, and the students' active involvement to have positive feelings and to improve their learning performances. In conclusion, this study showed that matching learning styles and study habits with teaching methods will serve academic performance. Some inventories should be administered at the beginning of the course so that course design and structure may be designed and implemented accordingly. This study was mostly directed to learning styles and study habits individually. Future research may examine common effects of learning styles and study habits together on academic performances

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