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A Study of Learning Style Performances of Online Students

[1]Anamika Singh and [2]Dr. Seema Pandey

[1]*Research scholar Sri Satya Sai University, Sehore, Bhopal*
[2]*Research Supervisor Sri Satya Sai University, Sehore, Bhopal*

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ABSTRACT

In recent years, research works that aim to designate online learning environment based upon learning styles increase substantially. In our research work; we evaluated researches are concerned with both online learning environment and learning styles together in the last decade. We investigated research works are accessible on Internet and evaluated research works are carried out according to the years, countries, and education levels, preferred learning style models, online learning environments and commonly used research methods. In almost all of the research works are done; mostly cognitive learning style models have been used. However, there are two basic research approaches are conspicuous in the research works that are examined by us. According to first of this research approaches, some researchers have investigated that presentation of learning content and learning tools are designated based upon learning styles in the online learning environments is a factor which impacts academic achievements of the learner. In the other research approach, researchers have used learning styles as a supportive factor to design the online learning environments for personalized online learning. In our research, examples both of these research approaches have been examined. As a result, it is saw that, improving of the academic achievements in online learning not only learning styles by itself are utilized on online learning and also motivation of the learner, demographics factors, teaching strategies and teaching methods should be considered.

1. Introduction

Nowadays, rapidly developments on science and technology affect all fields and force to change and advancements of them. One of these fields is education is affected the respective advancements and obligated to continually renovate. Recently, in teaching-learning processes, a teacher's role is not rather than make information transfer, he (she) is became a situation such as an advisor or a guidance. In addition; learners try to construct your knowledge by themselves in a learning environment, in short they learn to learning. Learning ways or preferences which are usedto learn or remember a new knowledge by the learner are called as "Learning Style". Some learners can learn the knowledge in the act of interactive with her (his) friends and teachers together and active experiences by themselves, the others prefer to learn with visual materials. Also, some learners want to make use of written materials and they accept that verbal explanations are more effective for themselves (Felder, 1996).

Today's learners can use some different ways to learn. One of them is technology based environments is inclusive of using of computers and Internet. Online learning is one of these type environments. An attractive side of online learning is that education service to come to the learner itself and flexible usage of it. In online learning, to perform effective instructional design is being difficult because of the learners characteristics that are related to learning are not being known. As a matter of fact, to bring into existence of effective learning for the learners in online learning environments, needs and expectations of the learners that are in these environments are comprehended and development of convenient environments which are adequate for different learning styles are required. Technology density environments cause a change of learning styles of the learners and bring up a concept that is "online learning style" to the agenda. It is possible that researches is mentioned about the relations between online learning and learning styles are encountered with in our country or in the world

The main purpose of this research is that to summarize research works which are related to online learning styles are done in our country and the world, and to present suggestions about practicable researches on this field. In this paper, we investigated research works which are studied on the relations between online learning and learning styles, and also we tried to determinate disparateness among performed researches according to years, countries, and education levels, preferred learning style models, online learning environments and commonly used research methods. From this point of view, firstly, learning style and online learning have been explained and then theoretical and practical research works which are studied on the relations between online learning and learning styles have been evaluated.

2. Learning Style

Learning style concept has been used firstly by R. Dunn in 1960. Thereafter, Kolb has been developed researches on "Experiential Learning Theory". He made these assistive researches to support that concept.

Keefe (1979) explained learning style as signed indicators that how the students perceive, interact and response to learning environments.

Gregorc (1979) states that learning style composes of distinguish behaviors which shows how the student learns knowledge from environment and adopt to himself these knowledge.

Dunn & Dunn (1993) defined learning style as each student uses distinguish and personalized unique ways, while they proceed to learn and memorize a new knowledge.

Ursine (1995) expressed learning style as unchanged personal process group which guides for us while we take a knowledge from our near environment.

ùimúek (2001) clarified that learning style is group of factors which determines how the students psychologically perceive, interact and response to learning environments.

Previously mentioned definitions are reviewed, common expression in all of them is that learn learning speed, learning form and comprehension form for the information are different among the individuals.

Felder who is one of the researchers that are made researches are related to learning styles expressed that there are differences among the learners in the way of their learning, some learn by reflecting and acting, seeing and hearing, reasoning logically and intuitively or analyzing and visualizing (Felder, 1996).

It is considered that if learning styles of the learners can be determined and learning environments are designed according to that, academic achievements of the learners will be increased (Babado÷an, 2000). Learning styles aims personalization of the learning by finding of clues with regard to their learning and to establish a ground to each learner to study by individually or in small groups. Akkoyunlu (1995) is pointed out that determination of the learner's learning styles can assist to teachers for the matter is that a method how to develop in teaching process. Determination of the learner's learning styles is a benefit in terms of the learners, also. Therefore, if the learners have knowledge of their learning styles, in the learning process, they can see their weak and strong sides in regard to their learning and they can tend to suitable learning environment and learn knowledge easily and permanently, also.

Until today, a lot of research works has been done about learning styles and developed a good deal of learning style models. Some of them are Kolb Learning Style Model, Dunn & Dunn Learning Style Model, Gregorc LearningStyle Model, Butler Learning Style Model, McCarthy(4 MAT) Learning Style Model, Canfield Learning Style Model, Silver-Hanson Learning Style Model, Witkin (field-dependent, field-independent) Learning Style Model, Felder-Silverman Learning Style Model, etc.

3. Online Learning

In the literature, the explanation of the online learning has been used different terminologies. Because of this, makes it difficult to develop a generic definition. Terms that are commonly used include e-learning, Internet learning, distributed learning, networked learning, tele-learning, virtual learning, computer-assisted learning, Web based learning, and distance teaching (Anderson &Elloumi, 2004). In the literature, there are many definitions which are reflect the diversity of practice and associated technologies of online learning. For example, while some researchers define online learning as educational material that is presented on a computer, the others defines online instruction as an innovative approach for delivering instruction to a remote audience, using the Web as the medium (Anderson &Elloumi, 2004).

However, today's definition for online learning not involves just the presentation and delivery of the materials using the Web, also it involves the learner who use the Internet to access learning material, interacts with the content, instructor and other learners. In addition it involves the learning process which should be obtained support for the learner in order to acquire and construct knowledge and to grow from the learning experience (Anderson &Elloumi, 2004; Dietinger, 2003; Wentling, Waight, Gallaher, Fleur, Wang &Kanfer, 2000)

Briefly, we say that online learning can be defined as an approach to learning and teaching process that utilizes acquisition and usage of the knowledge in an educational context by using primarily Internet and communication technologies in collaboration.

We saw different classification of online learning in the literature. Solomon Negash and Marelene V. Wilcox (2008) make most comprehensive classifications of online learning according to presence and communication properties. It is defined as real-time presence where both the instructor and learner are present at the time of learning content delivery. In addition, physical and virtual presence terms are included by them. The other is communication, that is defined as the content delivery include whether electronic communication or not.

According to these classifications of online learning, online learning can be face-to-face. An example of face-toface online learning is a traditional class that utilizes PowerPoint slides, video clips, and multimedia to deliver content. Online learning can be designed for a self-learning approach. This type online learning is an example of hypermedia based learning. Learners receive the content media and learn on their own. It is content delivered on a specific subject or application using recorded media like a CD ROM, DVD or web based courses. Online learning can be in the asynchronous format. The communication between the instructor and the learner is occurred in the asynchronous format, especially over the internet. In this format, the instructor and learner do not meet at the time of content delivery. But, rich interaction is occurred by using e-learning technologies like threaded discussion boards and e-mail and instructors may post lecture notes for online access and schedule assignments online. Typical example of this type online learning environment is the Learning Management Systems. Online learning can be in synchronous format. In this format, the instructor and learner do not meet physically; however, they always meet virtually during content delivery. Typical example of this type online learning environment is the Video conferencing. Lastly, online learning can be blended or hybrid online learning format. This is a combination of faceto-face and asynchronous online learning. In this research, all of these types of online learning have been distinguished in the searched studies.

Recent developments of the online learning are also related to Adaptive educational Hypermedia Systems (AEHS). An AEHS aims to build a model of the goals, preferences and knowledge of each learner and use this model throughout the interaction with the leaner, in order to adapt learning content to the needs of that learner (Brusilovsky, 1996). For example, in an AEHS, learning content that is adapted specifically to the learner's knowledge of the subject is given to the learner. In addition, AEHS can support learners in their navigation by limiting browsing space, suggesting most relevant links to follow, or providing adaptive comments to visible links (Brusilovsky, 2003). Over the last five years, AEHS researches are centred on learning style based personalization researches (Brown, 2006; Paredes, 2004; Piombo, 2003; Shanghua Sun, 2005).

4. Learning Preferences And Learning Styles

Learning styles have really gained so much attention in recent years across different age groups and learning environments. Rayner (2006) also underlines this fact: 'a heady mix of metaphor, sound bites and polemic … an academic and political debate in which far more heat than light is generated'. Thus, "The area of learning styles is complex and many questions are still open, including a clear definition of learning styles, a comprehensive model which describes the most important learning style preferences, and the question about the stability of learning styles" (Kinshuk, Liu & Graf, 2009, p. 740). As stated by Felder and Silverman (1988), grouping students according to anumber of scales pertaining to the ways they receive and process information is defined as a learning style model. Similarly, according to Jonassen and Grabowski (1993), learning styles are tendencies for the preference to process information in certain ways.

In another definition, a learning style can be described as the composite of cognitive, affective, and psychological characteristics that serve as an indicator of how an individual interacts with and respond to the learning environment (Keefe, 1979; Duff, 2000). In other words, learning styles can be described as the means of perceiving, processing, storing, and recalling attempts in the learning process (James & Gardner, 1995). Various cognitive and learning style theories and models have been proposed over the course of many years, identifying and categorizing students' individual differences like Hill's Cognitive Style Mapping (1976), Dunn and Dunn Learning Styles (1978), Howard Gardner's Multiple Intelligence Theory (1983), Kolb's Learning Styles (1984), Gregorc Learning Styles (1985), FelderSilverman Learning Model (1988), Grasha-Reichmann Learning Style Scales (1996), and Hermann Brain Dominance Models (1996). These models of learning styles are currently being used to assess how students learn.

According to Kolb (1984), individuals learn in four stages or modes: Concrete Experience (CE, e.g. laboratories, field work, observations), Reflective Observation (RO, e.g. journals, logs, brainstorming), Abstract Conceptualization (AC, e.g. papers, lectures, analogies), and Active Experimentation (AE, e.g. simulations, case study, homework). However, the process of constructing knowledge in different learning situations involves a creative combination of the four learning modes that is responsive to contextual demands. The combination of learning modes used to establish the four quadrants reflect the four learning styles: Accommodators (favored CE and AE, i.e. feeling and doing), Divergers (favored CE and RO, i.e. feeling and watching), Assimilators (favored AC and RO, i.e. thinking and watching), and Convergers (favored AC and AE, i.e. thinking and doing).

5. Differentiating 'Face-To-Face' And 'Online Environments'

In their study, Paechter and Maier (2010) tried to reveal the aspects of e-learning courses that students experience as being favorable for learning, as well as students' preferences about online or face-to-face learning components. Their study indicated that students preferred online learning, "… for its potential in providing a clear and coherent structure of the learning material, in supporting self-regulated learning, and in distributing information" (p. 292), whereas, "They preferred face-to-face learning for communication purposes in which a shared understanding has to be derived or in which interpersonal relations are to be established" (p. 292). Since learners prefer different learning environments for different purposes, it is worth investigating the factors that may show diversity between different learning environments.

Heaton-Shrestha, Gipps, Edirisingha and Linsey (2007) conducted a study in order to address the issue of whether student learning style has an impact on the use of learning technologies such as a virtual learning environment (VLE). The researchers concluded that, "…with respect to the question of whether ICT use changes style or style changes ICT use, we found that style shaped use, as learners tended to use the VLE in a manner consistent with their preferred style. However, in some cases, students used the VLE to deliberately change their style and approach." (p. 461). Comparing student satisfaction in online vs. face-to-face instruction, the researchers postulated that learning style is influenced in distance education (e.g. Eastmond 2000; Soles & Moller 2001; Offir, Bezalel & Barth 2007; Mehlenbacher et al. 2000;Angeli&Valanides, 2004; Fahy & Ally, 2005; Manochehri& Young, 2006) . However, other researchers (see, e.g., Ahn&Ahn, 2000; DeTure, 2004; Dille &Mezack, 1991; Ingebritsen& Flickinger, 1998; Neuhauser, 2002) have not found such relationships between learning style and success in online learning (Battalio, 2009).

As recently as 2009, The Department of Education conducted a meta-analysis of research between 1996 and July of 2008. Their findings suggest that students who took all or part of their class online performed better, on average, than those taking the same course through traditional face-to-face instruction (Gebara, 2010). Summers, Waigandt and Whittaker (2005) similarly stated that students who may not have adopted proper strategies for self-regulation may be faced with obstacles and drop out of the course, which in the end results in higher rates of attrition than face-to-face courses.

6. The Importance of Learning Preferences and Learning Styles

Learning style has been shown to play an influential role in students' reactions to a Web-based instructional program, with students exhibiting different cognitive styles showing varying preferences with respect to the features of TML (Chen, Chen, & Xin, 2004). Hsieh and Dwyer (2009) examined the instructional effectiveness of different online reading strategies for students identified as possessing different learning styles, either internal or external locus of control styles, on tests measuring different learning objectives. The researchers concluded that, "... different reading strategies have different instructional structures and functions in facilitating student achievement of different types of learning objectives".

Battalio (2009) conducted a study in order to determine the extent to which student learning styles are associated with success in online learning environments, particularly when controlling the amount of collaboration available to students. As concluded by the researcher, "The results of this study have shown significant associations between students' learning styles and success in distance education and offer insight into the relationship between learning style and mode of delivery". Lightner, Doggett and Whisler (2010) also stated that, "Students in an online program must be more resourceful because they do not have immediate access to instructional and technical resources and are called upon to make decisions

without instant corroboration; hence, learning style inventories may be of value for measuring this attribute and predicting success in such an environment.".

Graf, Kinshuk and Liu (2009) proposed an automatic approach for identifying students' learning styles in the Learning Management System, which is based on inferring students' learning styles from their behavior in an online course. They concluded that the information about students' learning styles can be used for; (a) providing teachers with more information about their students, showing them that their students have different preferences and ways in which they learn, (b) helping teachers in understanding why and when students may have difficulties in learning, and (c) making students themselves aware of their own learning styles, helping them to better understand their strengths and weaknesses in the learning process. Topçu (2008) also conducted a research study which took into account the learning styles of the participants and verified the efficacy of the intentional repetition technique in improving interaction in asynchronous online discussions. Furthermore, this researcher stated that, "... instructors' awareness of the learning styles and cultural context may be helpful for increasing students' performance in web-based learning environments"

7. Possible Preferences In Online Environments

Li, Leh, Fu and Zhao (2009) conducted action research to reveal learners' preferences while using online resources and ended up with eight preferences. Their findings indicated that learners mostly preferred using resources from the course web site rather than other sites, preferred using online resources and online syllabus rather than printed ones, preferred text-based FAQs rather than those in video format, preferred a teaching sequence which conforms to their individual sequences and preferred the shared use of online resources. Kinshuk, Liu and Graf (2009) investigated the interactions between students' learning styles, behavior, and performance in an online course which did not match their learning styles. Their findings showed that, "… learners with strong preferences for a specific learning style have more difficulties in learning, in terms of achieving lower scores, than learners with mild learning style preferences".

Johnson (2007) investigated the impact of learning style on college student preference for and achievement under two specific web-based instructional conditions—quizzes and study groups. They found that different learners had different preferences, for instance active learners expressed a preference for face-to-face study groups rather than web based study groups, whereas visual learners expressed a preference for web-based quizzes rather than web-based study groups. The researcher also validated these preferences by indicating decreased academic achievement under the less preferred study condition. Hence, based on her findings, Johnson (2007) concluded that, "Instructional applications of web-based technology may provide mechanisms to accommodate student learning style more consistently in higher education."

Saeed, Yang and Sinnappan (2009) conducted action research to validate their research framework which, "… is based on the fact that learners' individual characteristics influence their preferences for using technology and that the use of appropriate technology positively influences the academic performance". The researchers finally underlined the significant relationships between students' learning styles and technology preferences and their impact on academic performance. Akkoyunlu and Soylu (2008) also revealed that, "... students' views on the blended learning process, such as ease of use of the web environment, evaluation, face-to-face environment, etc., differ according to their learning styles". Terrell and Dringus (2000) and Lippert, Radhakrishnam, Plank and Mitchell (2001) measured learning styles of online learning students with a high level of computer literacy, based on the Kolbs's LSI. Both studies showed that learning style had no effect on success in online learning but it determined the preference for this delivery format. For instance, students who fell into the Converge and Assimilator learning styles felt more comfortable taking distance learning courses.

8. Conclusions

Individual differences are important in learning environment design. When the findings have been analyzed, place of articulation of the research works that are related to both online learning and learning styles are using of different ways in learning of the learners and being of individual differences.

However, mostly as-build, learning style models that are developed by observing of the learners in the traditional learning environments have been implemented by empirical or survey methods to the learners who are learn in online learning environment. By this way, learning styles of the learner who learn in online learning environment have been tried to classify. Any research work is directly to observe the learners in online learning environment according to determination of the expectations and needs of the online learners has not been discovered. Most of the researchers have not explained the reason is related to why that learning style is selected to examine learning style variables in online learning environment. On the other hand, the relation has been brought into connection with between learning styles of the learners in online learning environments and academic achievements of them. But; there are some results of the research works indicate toward a weak relation which is come in view in this point.

In almost all of the research works are done about online learning and learning styles; mostly cognitive learning style models have been used. There are two basic research approaches are conspicuous in the research works. Firstof these approaches, some researchers have investigated that presentation of learning content and learning tools are designated based upon learning styles in the online learning environments is a factor which impacts academic achievements of the learner. In the other approach, researchers have used learning styles as a supportive factor to design the online learning environments for personalized online learning. In our research, examples both of these research approaches have been examined.

In conclusion, in the research works are done about online learning and learning styles, learning styles are not unique factor that affects to improve of the academic achievements in online learning environments. Also, some additional factors like as motivation of the learner, demographics factors, teaching strategies and teaching methods should be included in the researches and then doing of new researches should be beneficial.

References

[1] Akdemir, O., &Koszalka, T. A. Investigating the relationships among instructional strategies and learning styles in onlineenvironments. Computers and Education, 2008;50(4):1451-1461.

[2] Akkoyunlu, B., &Soylu, M. Y. A Study of Student's Perceptions in a Blended Learning Environment Based on DifferentLearning Styles. Educational Technology & Society, 2008;11(1):183-193.

[3] Angeli, C., & N. Valanides. Examining the effects of text-only and text-and-visual instructional materials on the achievementof fielddependent and field-independent learners during problem-solving with modeling software. Educational TechnologyResearch and Development, 2004;52(4):23-36.

[4] Arp, L. & Woodard, B. S. Accommodating Diverse Learning Styles in an Online Environment. Reference & User ServicesQuarterly, 2006;46(2):27-32.

[5] Battalio, J. Success in Distance Education: Do Learning Styles and Multiple Formats Matter? The American Journal ofDistance Education, 2009;23:71-87.

[6] Battalio, J. Success in Distance Education: Do Learning Styles and Multiple Formats Matter? American Journal of DistanceEducation, 2009;23(2):71-87.

[7] Beadles II, N. A. & Lowery, C. M. Self-selection into degree programs: Differences in preferred learning styles between onlinestudents and traditional students. Academy of Educational Leadership Journal, 2007;11(2):103-112.

[8] Bi,X. Instructional design Attributes of a web based course. Presented at WebNet 2000 World Conference on the WWW andInternet Proceedings, San Antonio, Texas; 2000;38-43.

[9] Butler, T. J. & Pinto-Zipp, G. Students' learning styles and their preferences for online instructional methods. Journal ofEducational Technology Systems, 2005;34(2):199-221.

[10] Butler, T. J. Students' learning styles and their preferences for online instructional methods. Unpublished Dissertation Thesis,Seton Hall University;2004.

[11] Chen, C. C., Chen, Y. R., & Xin, K. Guanxi practices and trust in management: A procedural justice perspective.Organization Science, 2004;15:200-209.

[12] Coole, H. & Watts, M. Communal e-learning styles in the online classroom. Research in Education, 2009;82:13-27.

[13] Cooze, M. & Barbour , M. Learning Styles: A Focus upon E-Learning Practices and their Implications for SuccessfulInstructional Design. Journal of Applied Educational Technology, 2007;4(1):7-20.

[14] Curry, L. Learning styles in secondary schools: A review of instruments and implications for their use. Madison: NationalCenter on Effective Secondary Schools, University of Wisconsin–Madison. (ERIC Document Reproduction Service No. ED317 283);1990.

[15] Duff , A. Approaches to learning: Academic performance and progression of first-year accounting and business economicsundergraduates. In W. C. Smith (Ed.), The 7th Annual ELSIN Conference. Ghent: Academia Press ScientificPublisher;2002:141-151.

[16] Eastmond, D. Enabling student accomplishment online: An overview of factors for success in Web-based distance education.Journal of Educational Computing Research, 2000; 23(4):343-358.

[17] Fahy, P. J., & M. Ally. Student learning style and asynchronous computer- mediated conferencing (CMC) interaction. TheAmerican Journal of Distance Education, 2005;19(1): 5–22.

[18] Felder, R. M., & Silverman, L. K.Learning and teaching styles in engineering education. Engineering Education,1988;78(7):674-681.

[19] Felder, R. M., &Soloman, B. A. Index of Learning Styles; 1991. Available at:http://www4.ncsu.edu/unity/lockers/users/f/felder/public/ILSpage.html Accessed July 28, 2007.

[20] Franzoni, A. L., & Assar, S. Student Learning Styles Adaptation Method Based on Teaching Strategies and Electronic Media.Educational Technology & Society, 2009;12(4):15-29.

[21] Gebara, Tammy, M.E.T.Comparing A Blended Learning Environment To A Distance Learning Environment For Teaching ALearning And Motivation Strategies Course. Unpublished Dissertation Thesis.The Ohio State University; 2010.

[22] Graf, S., Kinshuk, & Liu, T.-C. Supporting Teachers in Identifying Students' Learning Styles in Learning ManagementSystems: An Automatic Student Modelling Approach. Educational Technology & Society, 2009;12(4):3-14.

[23] Grasha, A. Teaching with style: a practical guide to enhancing learning by understanding teaching and learningstyles.Pittsburgh, PA:Alliance Publishers; 1996.

[24] Gülbahar, Y. ÖğrenmeStilleriveTeknoloji. EğitimveBilim, 2005a;30(138):10-17.

[25] Gülbahar, Y. Web-DestekliÖğretimOrtamındaBireyselTercihler. The Turkish Online Journal of Educational Technology –TOJET, 2005b;4(2):Article 9.Available at: http://www.tojet.net/articles/429.htm. Accessed April22,2005.

[26] Gulbahar, Y. & Yildirim, S. Assessment of Web-Based Courses: A Discussion and Analysis of Learners' IndividualDifferences and Teaching-Learning Process. International Journal of Instructional Media, 2006;33(4):367-378.

[27] Hamada, A. K., Rashad, M. Z. &Darwesh, M. G. Behavior Analysis in a learning Environment to Identify the SuitableLearning Style. International Journal of Computer Science & Information Technology (IJCSIT), 2011; 3(2):48-59.

[28] Heaton-Shrestha, C., Gipps, C, Edirisingha, P. & Linsey, T. Learning and e-learning in HE: the relationship between studentlearning style and VLE use. Research Papers in Education, 2007; 22(4):443-464.

[29] Hsieh, P.-H., & Dwyer, F. The Instructional Effect of Online Reading Strategies and Learning Styles on Student AcademicAchievement. Educational Technology & Society, 2009;12 (2):36-50.

[30] Jiang, M. & Ting, E. Course Design, Instruction, and Students' Behaviors: Study of Instructional Variables and Students'Perceptions of Learning, paper presented at the Annual Meeting of the American Medical Research Association, SanDiego,California; April 13–17, 1998.

[31] Johnson, G. M. Learning Style under Two Web-Based Study Conditions. Educational Psychology, 2007; 27(5):617-634.

[32] Jonassen, D. H. & Grabowski, B. L. (Eds) Handbook of individual differences. Hillsdale, NJ: Erlbaum; 1993.

[33] Keefe, J. W. Learning style: An overview. In National association of secondary school principals (Ed.), Student learningstyles: Diagnosing and prescribing programs, 1979;1-17.

[34] Kia, M. M., Aliapour, A., & Ghaderi, E. Study of learning styles and their roles in the academic achievement of the studentsof Payame Noor University. Turkish Online Journal of Distance Education, 2009;10 (2): 24-37. Available at:http://tojde.anadolu.edu.tr/tojde34/index.htm Accessed June15,2011.

[35] Kinshuk, Liu, T. & Graf, S. Coping with mismatched courses: students' behaviour and performance in courses mismatched totheir learning styles. Education Technology Research and Development, 2009; 57:739-752.

[36] Kolb, D. A. Experiential learning: Experience as the source of learning and development. Upper Saddle River, New Jersey:Prentice Hall; 1984.

[37] Kolb, D. A. Learning style inventory: Technical manual. Boston: McBer.; 1976.

