

Personalized Learning Environment: New Trend in Online Learning

Noor Dayana Abd Halim, Mohamad Bilal Ali, Prof Madya Dr., Noraffandy Yahaya, Dr.

ABSTRACT

Online learning has changed the ways in which education has been conducted. Unfortunately, many educational websites do not employ principles of effective learning (Cook and Dupras, 2004). Since learners move online, how can we attend to the basic human attraction for individualized attention? Learners have heterogeneous backgrounds and differ in traits such as skills, aptitude, and preferences for processing information, constructing meaning from information and applying it to real situations. Hence, this paper discusses the concept of Personalized Learning Environment (PLE) and describes how individual differences cater the personalized issue in the website.

Keyword : Personalized learning environment, individual differences, learner's need

Introduction

In recent years, the learning process has been moving towards the application of online learning (White and Weight, 2000; Alessi and Trollip, 2001; Liaw et al. 2007). What differentiates between online learning and traditional learning is the method used. However, the objectives, materials, books and syllabus are the same. Online learning as defined by Chang and Fisher (2003) is a system and process that connects learners with the materials and information that distributed online. According to Allan and Seaman (2010), online learning occurs when the content is obtained via online. Typically there are no face-to-face meetings in the classroom. Studies conducted by them showed up in 2008 about 4.8 million students are moving towards online learning.

One of the popular online applications has been for educational use is web-based learning. Many studies have shown a web-based learning benefits and the potential to enhance teaching and learning process (Mistler-Jackson and Songer, 2000; Linn et al. 2003; Clark, 2004). This is because, the use of the Web as an educational tool has provided learners a new learning experiences and educators an interesting teaching environments (Nam & Smith-Jackson, 2007). The popularity of the web base learning is due to the concept of learning "anywhere" and "anytime" (Neo *et al.* 2008). As mentioned by Killedar (2008), web can be globally distributed and has a high personalized media for delivery information. So, teaching process is no longer confined to a time and place. By using this medium, the students and teacher become spatially and temporally dispersed learners. The time and the

physical boundaries of the traditional classroom are no longer existed (Khalifa and Lam, 2002).

As is well known, the main advantage of learning via website is a non-linear interaction. This gives students the more control over their learning path. However, according to Alomyan (2004) this freedom may cause for some students problems such as disorientation, cognitive overload and control problems. Thus, in order to examine these problems, nowadays researchers shift towards finding on how web-based learning is used by learners with difference style and characteristic (Alomyan, 2004). The recognition of individual learning preferences is increasingly becoming an important consideration for designing and delivering course (McLouhlin, 1999; Brickell, 1999, Martinez, 2001; Foster and Lin, 2003; Magoulas et al., 2003; Inan and Grant, 2008; Inan *et al.* 2010).

Since online learning has different setting from the conventional classroom, educators need to use some special techniques to make students can learn best based on their preference. Therefore, educators require an understanding on the characteristics of the learners that might affect how they interact with the learning environment. This also helps educators to design an appropriate learning environment based on student's preferences. Alomyan (2004) was suggested the characteristics that must be concerned by educators such as the amount of prior knowledge of the learning domain, cognitive style, motivation, age, gender and so on. Once the profile of the learners is determined, the process of learning through hypermedia will be easily adapted with the student's needs (Alomyan, 2004).

In this day and age, a personal learning environment (PLE) has emerged in educational field around the world. PLE is a tool that allows for a learner (or anyone) to engage in a distributed environment consisting of a network of people, services and resources (Downes, 2006). PLE is a new concept in designing and developing an online learning. PLE is more focused on individual learning rather than the instructor, facilities, resources and tools. PLE has also played an active role in improving the effectiveness of learning (Li and Gu, 2009). According to Atwell (2006, 2007), PLE is an environment that constructs by individual. Individuals are responsible for their own learning process. They also need to manage the process of learning more effectively and takes a larger stake in the ownership of content. In general, personalize learning approach has the potential to meet the educational needs in the future as well as providing a new alternative to encourage students' learning (Bentley and Miller, 2004).

Personalized Learning Environment in Education

Personalization technologies are defined as approaches to adapt educational content, presentation, navigation support, and educational services so that they match the unique and specific needs, characteristics, preferences of each learner. (Magoulas and Chen, 2006). Alexander (2009) mentions that the term PLE describes the tool, communities and services that constitute the individual educational platforms learners use to direct their own learning and pursue educational goals. On the contrary to the conventional instruction system, at which students try to adapt themselves to the concept, personalized learning advocates that the concept has to be adapted to the individual student (Karagiannidis, Sampson, and Cardinali, 2001).

Personalization helps build a meaningful one-to-one relationship between learner/teacher and the learning environment by understanding the needs of individual and helps to reach a goal that efficiently and knowledgeably address each individual's need in a given context (Riecken, 2000). According to Magoulas and Chen (2006), in a personalized learning environment, learner modeling is the fundamental mechanism to personalize the interaction between the system and the learner. Learner model generation involves interpreting the information gathered during interaction in order to generate hypotheses about learner goals, plans, preferences, attitudes, knowledge, or beliefs.

Research shows that students taught in a personalized learning environment attain a good academic result and build up socially through personal growth (Clements and Douglas, 2008). These students tend to be increasingly self-directed and self-initiated with excellent problem-solving skills (Martinez, 1999; Allen & Seaman, 2006). As mentioned by Clements and Douglas (2008) in their article titled *Personalized Learning and Innovation in Education*, there are several features about PLE. There are :-

1. Engages students in the learning process, increases the responsibility and accountability of students. Students become a creator instead of a consumer of information.
2. Encourages student ownership of knowledge.
3. Imparts a level of autonomy students desire.
4. Provides real-life connections.
5. Promotes creativity among students.
6. Fosters critical thinking, deep learning and understanding.

7. Provides a forum for sharing of ideas
8. Develops an interdependence and mutual respect between the teacher and the student.

Why Personalized Learning Environment?

Online learning has changed the ways in which education has been conducted. Unfortunately, many educational websites do not employ principles of effective learning (Cook and Dupras, 2004). Since users are moving toward online learning, how to attract them individually? How to give them more motivation, independence and self-directed learning? How to design a website to match the individuals? How to convey information with different environments to a diverse set of personal types? How different individual learners interact with the web-based instruction? What kind of individual differences that our users have? (Martinez, 2001; Chen and Paul, 2003). All these kind of questions are the main key when developing an educational web site.

To address these questions, research into individual differences and needs has become an important issue in the past decade (Chen and Paul, 2003). As suggested by Magoulas et al., (2003), he stress on the importance to accommodating individual differences when designing web-based instructions. When the issue about individual differences arises, which we should support individuals to customize the learning environment according to their difference characteristics, hence what come up in the mind is what we called the personalization issue (Santally and Senteni, 2005)

According to Cristea (2004) and Rumetshofer and Wöß (2003) the main problem with online learning environment is the lack of personalization. Thus, one of the key issues concerning in today's learning is individualized learning (Wang, 2004). According to Wang (2004), individualized learning is a learning model that places student (learner) in the center of the learning process. Students are active participants in their learning which mean they learn at their own pace and use their own strategies; they are more motivated and their learning is more standardized. Else, individual learners will 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 (Jung, 2001). Therefore, more research on the relationships between learner characteristics and online learning content presentation modalities are needed. This kind of study will identify positive factors of online

learning delivery format that promote higher satisfaction and learning outcomes from online instruction (Oh and Lim, 2005).

Individual Differences in Personalized Learning Environment

Designing an appropriate learning environment requires an understanding of the learners. A large body of research has attempted to define individuals differences actually influence learning process. Among the differences, cognitive styles and prior knowledge are frequently addressed in previous work, which are discussed below.

Cognitive Style

Riding and Rayner (1998) define the cognitive style as how individual preferred and habitual approach to organize and represent information. Riding (2002) claim that cognitive style affects the ways in which events and ideas are viewed, affects how person may respond to, how person think about, and also how person make a decisions. According to Lee (2007) cognitive style is an individual's preferred and habitual mode of perception, imagery, organization, and elaboration during knowledge acquisition or problem solving process.

Field dependence versus field independence has become widespread in the dimension of cognitive style research. It is because these two cognitive style reflects how learner is able to perceive and restructure information based on the use o salient cues and field arrangement. The majority of empirical studies investigate:

- (a) whether cognitive styles will significantly influence learners' performance within web-based instruction;
- (b) whether different cognitive style groups will favour using different types of navigation strategies.

Witkin *et al.* (1977) used the term, field independence, to describe individuals who are individualistic, internally directed and accept ideas through analysis. On the other hand, field dependent individuals prefer working in groups, are externally directed, influenced by salient features and they accept ideas as presented. Research shows that field independent learners outperform field dependent learners in various conventional and web-based learning settings due to their different characteristics aforementioned (Ford and Chen, 2000).

Prior Knowledge

Prior knowledge is one of the variables that associated with individual differences. Individual's prior knowledge includes an understanding of the experience gained previously. Many studies have proved the influence of prior knowledge in web-base instruction (Chen and Paul, 2003). Disorientation problems and additional support are considered as an important issue in web-based instruction. Research has showed that the users with less knowledgeable and less experienced will face more disorientation problems in a web-based instruction (Last et al, 2001). This may be due to the new fact that they are unfamiliar with, so they cannot rely on prior knowledge to help structure the new information. In contrast, the more knowledgeable users will not have a problem to construct a new knowledge and able to relate with the prior knowledge with the new one. (McDonald and Stevenson, 1998).

Conclusion

As a conclusion, educators need to develop an educational environment that will appeal to the different learning styles of students. It is also vital that students have an understanding of their own learning styles to improve the speed and quality of their learning. It also demonstrate the importance of individual differences a factor in design the teaching and learning process especially in web based instruction.

References

- Alessi S. M. and Trollip S. R. (2001), *Multimedia for Learning*. MA : Allyn & Bacon
- Allen, E. and Seaman, J. (2006) Making the Grade: Online Education in the United States, 2006. Needham, The Sloan Consortium and Babson Survey Research.
- Allen A. and Seaman J. (2010). Learning on Demand Online Education in the United States, 2009, US : Babson Survey Research Group
- Alomyan H. (2004). Individual Differences: Implications for Web-based Learning Design. *International Education Journal*, 4(4)

Attwell, G. (2007). Personal Learning Environments The future of eLearning? *eLearning Papers*, 2(1), Retrieved Sept 2, 2010 from, <http://www.elearningeuropa.info/files/media/media11561.pdf>

Attwell, G. (2006). *The Wales-Wide Web*. Retrieved Sept 2, 2010 from, http://www.knownet.com/writing/weblogs/Graham_Attwell/entries/652181936

Bentley, T. and R. Miller (2004), "Personalisation; Creating the Ingredients for Systematic and Society-wide Change", a paper presented in Personalised Learning Conference, London, 17-18 May

Brickell, G. (1993). Navigation and learning style. *Australian Journal of Educational Technology*, 9(2), 103-114

Chang, V. and Fisher, D. (2003). The validation and application of a new learning environment instrument for online learning in higher education. In M. Khine & D. Fisher (Eds.), *Technology-rich learning environments: A future perspective* (pp. 1-20). Singapore: World Scientific

Chen, Y. S. and Paul, R. J. (2003) Individual differences in web-based instruction-an overview. *British Journal of Educational Technology*. 34(4), 385-392

Clark D. (2004). Hands-on investigation in Internet environments: Teaching thermal equilibrium. In: M.C. Linn, E.A. Davis, & P. Bell (Eds.), *Internet environments for science education*. Mahwah, NJ: Erlbaum.

Clements K. and Douglas C. (2008) *Personalized Learning and Innovation in Education*. Desire2Learn Incorporated. Retrieved Sept 4, 2010 http://www.desire2learn.com/media/docs/wp/Desire2Learn_whitepaper_personalized Learning.pdf

Cook, D. A. & Dupras D. M. (2004). A practical guide to developing effective web-based learning. *Journal of General Internal Medicine*, 19(6), 698-707

- Cristea A. (2004). Authoring of adaptive and adaptable educational hypermedia: Where are we now and where are we going? In *IASTED International Conference in Web-Based Education*, February 2004.
- Downes, S. (2006). *Learning Networks and Connective Knowledge*. Discussion Paper. [online document]: Instructional Technology Forum. Retrieved Okt 1, 2010 from <http://it.coe.uga.edu/itforum/paper92/paper92.html>
- Ford, N. and Chen, S.Y. (2000). Individual differences, hypermedia navigation and learning: An empirical study. *Journal of Educational Multimedia and Hypermedia*, 9(4), 281–312.
- Foster J. and Lin A. (2003). Individual differences in learning entrepreneurship and their implications for web-based instruction in e-business and e-commerce. *British Journal of Educational Technology*, 34(4), 455–465
- Gu X. and Li X.(2009). A Conceptual Model of Personal Learning Environment Based On Shanghai Lifelong Learning System. *Proceedings of the 17th International Conference on Computers in Education [CDROM]*. Hong Kong: Asia-Pacific Society for Computers in Education, 885
- Inan, F. A. & Grant, M.M. (2008). Individualized web-based instructional design. In Kidd, T. T., & Song, H. (Eds). *Handbook of Research on Instructional Systems and Technology*. Harrisburg, PA: Idea Group Publishing.
- Inan F. A., Flores R., Grant M. M. (2010). Perspectives on the Design and Evaluation of Adaptive Web Based Learning Environments. *Cotemporary Educational Technology*, 1(2), 148-159
- Jung, I. S. (2001). Building a theoretical framework of Web-based instruction in the context of distance education. *British Journal of Educational Technology*, 32(5).
- Karagiannidis, C., Sampson, D. and Cardinali, F. (2001). Integrating Adaptive Educational Content into Different Courses and Curricula. *Educational Technology and Society*,4
- Khalifa M. And R. Lam. (2002) Web based learning: effects on learning process and outcome. *IEEE Transactions on Education* 45pp.

- Killedar M. (2008). Effectiveness of learning process using "Web Technology" in distance learning system. *Turkish Online Journal of Distance Education*, 9(4).
- Last D. A., O'Donnell A. M. and Kelly A. E. (2001). The Effects of Prior Knowledge and Goal Strength on the use of Hypertext. *Journal of Educational Multimedia and Hypermedia* 10, (1) 3–25.
- Lee J. (2007). The effects of visual metaphor and cognitive style for mental modeling in a hypermedia-based environment. *Interacting with Computers* 19, 614–629
- Linn M.C, Clark D., and Slotta J.D. (2003) WISE design for knowledge integration, *Science Education*, 87, 517–538
- Liaw S. S., Huang H. M, and Chen G. D. (2007) Surveying instructor and learner attitudes toward e-learning. *Computers & Education*. 49, 1066-1080.
- Magoulas G. D. and Chen, S.Y. (2006). *Advances in Web-Based Education ; Personalized Learning Environment*. Information Science Publishing
- Magoulas G., Papanikolaou, K. & Grigoriadou, M. (2003). Adaptive web-based learning: accommodating individual differences through system's adaptation. *British Journal of Educational Technology*. 34(4).
<http://www.dcs.bbk.ac.uk/~gmagoulas/bjet.pdf>
- Martinez M. (2001). Key Design Considerations for Personalized Learning on the Web. *Educational Technology & Society* 4(1)
- Martinez, M. and Bunderson, C. V. (2001). Foundations for Personalized Web Learning Environments. *Journal of Asynchronous Learning Networks*, 4(2).
- Martinez, M.(1999). An Investigation into Successful Learning: Measuring the Impact of Learning Orientation, A Primary Learner-Difference Variable, on Learning. Dissertation (University Microfilms No. 992217).
- McDonald S. and Stevenson R. J. (1998). Effects of text structure and prior knowledge of the learner on navigation in hypertext *Human Factors* 40(1) 18–27.

- McLoughlin, C. (1999). The implications of the research literature on learning styles for design of instructional material. *Australian Journal of Educational Technology* ,15(3), 222-241
- Mistler-Jackson M., and Songer N.B. (2000). Student motivation and Internet technology: Are students empowered to learn science. *Journal of Research in Science Education*. 37, 459–479
- Nam, C.S. and Smith-Jackson, T. L. (2007) Web-Based Learning Environment: A Theory-Based Design Process for Development and Evaluation., *Journal of Information Technology Education*, 6.
- Neo, M., Neo T., and Yap W. (2008). Students' perceptions of interactive multimedia mediated web-based learning: A Malaysian perspective. Paper presented at the Ascilite 2008 Conference, Melbourne, 30 Nov - 3 Dec
- Oh. E. & Lim, D. (2005) Cross Relationships between Cognitive Styles and Learner Variables in Online Learning Environment. *Journal of Interactive Online Learning*, 4(1).
- Riding R. and Rayner S. (1998). *Cognitive styles and learning strategies: Understanding style differences in learning and behaviour*. London: David Fulton.
- Riding R. (2002). *School Learning and Cognitive Style*. London : David Fulton Publishers.
- Riecken D. (2000). Personalized views of personalization. *Communications of the ACM*, 43(8), 27-28
- Rumetshofer, H. & Wöß, W. (2003). XML-based adaptation framework for psychological driven e-learning systems. *Educational Technology & Society*, 6(4), 18-29.
- Santally M. I & Senteni A. (2005). Adaptation Models for Personalisation in Web-based Learning Environments. *Malaysian Online Journal of Instructional Technology*, 2(1)
- Wang, D. (2004). Enhancing Interactivity and individualized learning in online learning environment : A Literature Approach. *New Horizon in Web Based Learning*,

Proceeding of 3rd International Conference on Web-Based Learning. Beijing, 8-11 August

White K. W. and Weight B. H. (2000). *The Online Teaching Guide: A handbook of attitudes, strategies, and techniques for the virtual classroom*. MA: Allyn & Bacon,

Witkin, H.A., Moore, C.A., Goodenough, D.R. and Cox, P.W. (1977). Field dependent and field independent cognitive styles and their educational implications. *Review of Educational Research*, 47, 1-64