Design of Personal Learning Environment Framework for Learner Autonomy

Salimah. Mokhtar, and Lim. Shen Huoy

Abstract— Personal Learning Environment (PLE) takes the advantages of the evolution of Web 2.0 technology. PLE aims to create a learning environment where each learner is in control of his or her own learning goal(s), activity(s) and experience. PLE promotes self-regulation and learning autonomy in a learner, eventually promoting lifelong learning that crosses the boundary of higher education institution. PLE can be viewed as a complement or an extension to the existing Learning Management System (LMS). LMS has its limitation in supporting learners’ diverse learning needs. In this paper, we proposed a framework for PLE to encourage learner autonomy. The framework is then applied on “Studious Network” which act as the platform for learners to explore the Web 2.0 applications in the learning process and to exercise learner autonomy in an informal learning environment. The findings show that users of Studious Network generally have positive user experience in using the system.

Keywords— Learner Autonomy, Personal Learning Environment (PLE), self-regulation, Informal Learning.

I. INTRODUCTION

Learning environment plays a crucial role in creating learning experiences which encourage students’ autonomy and stimulate self-determined learning that prepares them for lifelong learning. This place and space, the context in which learning occurs, in today’s interconnected and technology-driven world can be physical or virtually online.

Learning management system (LMS) has been widely practiced in managing teaching and learning process in higher educational institution. Practically, LMS is more of a coursework focus and supports management of teaching more than the learning itself [1], [2]. An educator controls the content or flow of coursework in LMS and in a way hoping to control the learner’s learning process. The effectiveness of learning (both formal and informal) in LMS is not guaranteed as different individual requires different set of learning needs. LMS cannot provide an effective learning environment that accommodates the diverse needs in different learners to enhance their learning process [3]. Furthermore, the following problems/limitations in learning are obvious within LMS in higher education that hinders the individual learning process:

i. Unidirectional knowledge creation – the content of LMS is usually created by the educators and learners have no ability to create their own knowledge in the system [2].
ii. Limited communication - although most LMS incorporates discussion board/forum facility for both educators and learners to discuss relevant topics but in reality, not many have been utilizing such facility due to lack of motivation and participation [2],[4]. Communication normally only occurs during physical lectures and seldom expand outside of them.
iii. Lack of collaboration - learners have no flexibility to collaborate with each other to create knowledge in LMS due to its closed and centralized design [1]. As collaboration learning is one of the effective ways of learning, the ability to collaborate within a learning system is essential.
iv. Learning ends with semester - most learners use LMS for the purpose to get educators’ teaching materials and to see due date of assignments. Once the semester ends, learning eventually ends as such system will not be frequented anymore. Mainly due to lack of update from the educators and learners feel there is no need to fulfill the institutional requirement to do so [1].

In order to remedy the limitations of the LMS, a new educational concept called Personal Learning Environment (PLE) has been actively researched to be extended from the institutional learning environment [5], [6], [7], [8], [4], [9]. PLE provides the essential quality for both educators and learners to be able to communicate, collaborate, create and search for knowledge and connect with one another where this relationship may not end as the semester ends.

This paper presents the design and evaluation of “Studious Network”, a prototype of PLE for learners to explore the Web 2.0 applications in the learning process and to exercise learner autonomy in an informal learning environment.

II. LITERATURE REVIEW

A. The Evolution of Web 2.0 and e-Learning 2.0

Social computing represents a collection of web applications or technologies which we usually refer as Web 2.0 or social software. Web 2.0 is a term made popular by Tim O’Reilly since 2004 [10], is defined to be the platform for the web, where people’s participation and collaboration will harness collective intelligence through the driving force of data. Web 2.0 promotes the wisdom of crowds through rich user experience where dynamic websites replace static ones.

Salimah. Mokhtar is with the Department of Information System, Faculty of Computer Science & Information Technology, University of Malaya, 50603 Kuala Lumpur, Malasia (e-mail: salimah@um.edu.my).
Shen Huoy. Lim is co-researcher for this project. (e-mail: liimshenhuoy@siswa.um.edu.my).
and syndication technology keeps people together. E-learning has evolved with Web 2.0 and has become E-learning 2.0 that utilizes the advantages of Web 2.0 applications in education [11]. Web 2.0 or social software can be categorized into four conceptual groups according to their usage in this Web era [12]. Table I shows the four categories of Web 2.0 applications with examples given for each groups chosen particularly for their potential usage in the higher education environment.

**TABLE I
CATEGORIES OF WEB 2.0 APPLICATIONS**

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Types of Application: Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collaboration</td>
<td>Applications that allow collaborative authoring content by multiple parties</td>
<td>Wikis: Wikipedia</td>
</tr>
<tr>
<td>Communication</td>
<td>Applications that allow synchronous or asynchronous interaction between multiple parties</td>
<td>Email: Gmail, Instant Messaging: MSN Live, Yahoo Messenger, Peer-to-peer: Skype</td>
</tr>
<tr>
<td>Relationship management</td>
<td>Applications that allow identity and relationship management via social network</td>
<td>Social network: Facebook, LinkedIn, Social citation: Mendeley</td>
</tr>
<tr>
<td>Information</td>
<td>Applications that allow collection or publishing or sharing of information and facilitating feedback input</td>
<td>Blog: Blogger, Wordpress, RSS Reader: Google Reader, Microblog: Twitter, Plurk, Media Sharing: Flickr, YouTube, Social Bookmarking: Del.ici.ous</td>
</tr>
</tbody>
</table>

B. Different Types of Learning Environments in Higher Education

Figure 1 shows the different forms of e-learning in higher education ranging from no use of e-learning to e-learning 1.0 (i.e. use of LMS and web-based learning) to e-learning 2.0 (i.e. the use of Web 2.0 in teaching and learning).

![Different forms of e-learning](image)

**Fig.1 Different forms of e-learning (adapted from [13] with modification)**

Face-to-face learning is categorized as no e-learning because most physical classroom learning does not require computer mediated technology to facilitate the learning process. Moving forward to e-learning 1.0, blending learning includes classroom aids such as projector to the use of computer labs and laptops in classroom. Crossover between blended learning and distributed learning is mixed mode learning where there may be less face-to-face but more e-learning use in the course. As e-learning technology becomes more available, distance education provides more flexibilities to learners in the learning process with the use of technology. Distance education plays a role in personal learning where learners generally have more control over when, where and how to learn. Ultimately, e-learning 2.0 facilitates self-regulated learning with the use of Web 2.0 technology in the learning process.

C. Personal Learning Environment & Learning Theory

PLE is introduced due to the disadvantages of LMS learning model which may not be sufficient to accommodate learners' needs today that are more socially and connectedly demanding. The idea for PLE was built upon the visualization of [14]'s "The VLE of the future", who believes that the VLE should not be institutional but personal to support both formal and informal learning needs of a learner today. The objective of PLE is to give learners autonomy in learning, where learners are free to choose the learning methods and tools based on their preference in constructing new knowledge, hence taking control of their own learning process, adapting more of the learning theory of humanism [15],[16]. The theory of humanism stress on learning is student centered and personalized. Holistic perspective combines experience, perception, cognition and behavior.

D. Fostering Learner Autonomy Through PLE

A autonomy is broadly defined as taking control of one's own learning and it is a combination of direct and indirect observable behaviors during the learning process (Benson, 2007). Being autonomous requires the learners' ability to become self regulated and their attitude in taking responsibility for their own learning, hence the more responsible the learners in taking charge of their learning, the higher their motivation in learning [17]. Self regulated learning prepares learners to make educational decision with their need and self-understanding in mind for them to take charge of their own learning experience [18], [3].

III. METHODOLOGY

This research adopt the Design Science Research for Information System (DSRIS) methodology. The goal of design science research is to develop an effective learning environment which is used as authentic setting for studying how learning and teaching are effectively achieved and further refined in the real-world environment [19]. Design science research [20], follows five simple phases that are usually in iterations. The phases are i. awareness of problem, ii. suggestion, iii. development, iv. evaluation and v. conclusion.

IV. PLE CONCEPTUAL FRAMEWORK FOR LEARNER AUTONOMY

This framework is designed in phase three of the design
In order to encourage learner autonomy through the use of Web 2.0 technology in PLE, the relationships between the learning environments, the learners’ learning process, learning tools available, and the need for control of the learning process in the higher education are discussed. Figure 2 shows how these are related in the PLE conceptual framework that encourages learner autonomy. Those highlighted in grey are the focus of this research.

Learner’s role becomes both producer and consumer of knowledge. Being autonomous empowered the learners to set their own learning goals and be accountable to achieve them. Better learning experience is achieved when learners are personally motivated in the learning process where they can choose what and how they prefer to learn. Learners generally perform these activities in the learning process: browse, collect, network, create, share, and communicate, regardless of learning environments. Many researchers [21], [22], [23], [24] believe that scaffolding is an effective teaching and learning method to promote self-regulated learning and ultimately to cultivate learner autonomy especially in today’s technology mediated learning environments. Scaffolding may come from peers and experts in the community of practice in the forms of social support and peer support or from the educator in the form of task support depending on the needs of the learners in the different learning environments.

V. ADOPTION OF FRAMEWORK FOR STUDIOUS NETWORK

Studious Network is designed to encourage learner autonomy while providing scaffolding in term of reading suggestion, discussion platform, and resources center, which are maintained by a facilitator in Studious Network. Studious Network is divided into 3 major functions: i. Reading enables users to browse articles (or information or knowledge) and eventually collect them for references. These aggregations of articles serve as reading suggestion to help users to kick-start their learning process. ii. Discussion enable users to leave comment(s) on article(s), ask and/or reply question(s), and making connections with other users (network). Discussion (communication) can be done outside of Studious Network through Twitter and these discussions can be aggregated and presented in Studious Network for more users to see. iii. Sharing enable users to create and share any information or knowledge found during their learning process to more users. Sharing of useful resources such as new articles that help in the learning process is beneficial to many users. Reflection or experience sharing by creating or writing articles is helpful too. These sharing contribute new knowledge for Reading for others to browse and collect. A snapshot of Studious Network is shown in Figure 3.

VI. EVALUATION OF STUDIOUS NETWORK

In the evaluation phase, a usability study is conducted to evaluate the usefulness, satisfaction, and ease of use of the implemented prototype called Studious Network, a personal learning environment that encourages learner autonomy. Usability study in the form of summative evaluation is important to measure the effectiveness and efficiency of the implemented design. A self reported metric called Usefulness, Satisfaction, and Ease of use (USE) questionnaire is used to collect users’ feedback according to the criteria: usefulness, ease of use, ease of learning, satisfaction, and learner autonomy. Overall, the findings show that users of Studious Network generally have positive user experience in using the system.
VII. Conclusion

The success of PLE implementation is highly dependent on learners’ competency and skillfulness in using Web 2.0 technology, their preferences in the learning process, and their ability to become autonomous. Hence, before a design of PLE is proposed, gathering data on learners’ competency and skill level in using Web 2.0 applications and their learning preferences in the learning process is both essential and informative. Analysis on what majority learners prefer to use. It is found most learners still choose the traditional way of learning instead of embracing new technology despite their self-assessment to be competent and skillful in using Web 2.0 applications. One of the possible reasons for such findings is that both learners and educators are hesitant to explore new techniques in the teaching and learning process due to lack of awareness of such technology that can be used. Another possible reason is learners are less confident in using technology in the learning system where assessment using this technology is still undefined. Scaffolding from the educator is found to be still essential to most learners in the learning process where most learners prefer to have clear learning instruction from the educator to achieve the learning goals.

The proposed design incorporates tools such as email, blogging, microblogging, social comment, and RSS on the findings and analysis done. The main purpose for Studious knowledge sharing among its community of practice. The findings have shown useful information about the relationship between what the learners are capable of and what the learners choose to use. It is found most learners still choose the traditional way of learning instead of embracing new technology despite their self-assessment to be competent and skillful in using Web 2.0 applications. One of the possible reasons for such findings is that both learners and educators are hesitant to explore new techniques in the teaching and learning process due to lack of awareness of such technology that can be used. Another possible reason is learners are less confident in using technology in the learning system where assessment using this technology is still undefined. Scaffolding from the educator is found to be still essential to most learners in the learning process where most learners prefer to have clear learning instruction from the educator to achieve the learning goals.

The idea of PLE and learner autonomy is still new to many learners and it is expected to take some time before the idea is fully adopted and practiced among learners. The implemented prototype is the initial step to introduce the idea and benefits for practicing PLE in the learning process. Although the implemented PLE is practiced in the context of informal learning, the idea of similar approach can be extended into formal learning which is not focused in this research. More iterations for improvement is required before the design and development of PLE to encourage learner autonomy can yield its ultimate purpose of improving learning experience and promoting lifelong learning among the learners. It is of utmost importance that the success of PLE depends highly on learners’ adoption and willingness to actively participate socially using various Web 2.0 applications. Educator plays an important role as facilitator and motivator, who promotes the use of Web 2.0 applications and provides essential scaffolding to the learners in the learning process.

Acknowledgment

The research is funded by Flagship research project (FL013-VI). 2012 under ICT and Computational Science Research Cluster, University of Malaya.

References


Salimah Mokhtar is an Associate Professor in the Department of Information System at Faculty of Computer Science & Information Technology, University of Malaya in Malaysia. Her research interests are in the area of Information System for education, blended learning, IS planning, social networking and most recent interest centers on fostering spirituality in tertiary learning.

Lim Shen Huoy obtained her Master of Computer Science degree from University of Malaya. Her research interests include e-learning, social networking and crowdsourcing.