The Construction of Personal Learning Network Environment in the Perspective of Knowledge Management

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Abstract. This paper analyzes the objects, processes and strategies of knowledge management and their enlightenment in PLNE (personal learning network environment), proposes a PLNE construction method which use browser as the portal and aggregation platform to integrate and mashup online learning contents, online tools, online services, and online relationships. A pretest-posttest design with nonequivalent groups of both experiment group and control group was conducted in the 2011 class in Department of information technology in Guangdong Teachers College of Foreign Language and Arts. The result of the anonymous survey shows that PLNE can effectively improve the learner's autonomous learning ability and knowledge management ability, and provide a continuously developing virtual learning environment to help learners to enjoy a success lifelong learning.

Introduction

Lifelong learning is an important means for the survival and development of individuals in twenty-first Century. In the history of human education, lifelong education has never been identified as such important thing. Also, science and technology has never been connecting with human educational activities such closely and promoting each other such strongly. It is generally believed that lifelong learning and the learning by means of information technology became the new learning style in twenty-first Century [1]. Lifelong learning is the general requirement of the information age and the normal form of individual development in knowledge economy society.

Personal knowledge management is an important means to enhance the core competence of individuals. Knowledge is recognized as the main source of wealth and the accelerator in the era of knowledge economy. It is an extremely important resource for individuals and organizations. All learning activities are organized around knowledge. The process of learning is actually the process of the generation, storage, dissemination and application of personal knowledge and organization knowledge. Bill Gates once said that" How you gather, manage and use information will determine whether you win or lose. [2]" Knowledge management can help individuals to establish a professional knowledge system, improve the personal knowledge structure, and lay a solid foundation for the sustainable development of the individual. Therefore, the ability of personal knowledge management is one of the core competences of individuals in twenty-first Century.

The personal network learning environment for lifelong learning under the guidance of the theory of personal knowledge management. Most of the learning techniques were designed to promote the interaction between public knowledge and personal knowledge [3]. Social learning network is the core element of learning. Every individual is facing an uncertain learning environment with varieties of network. But the certain thing is to establish individuals’ own learning environment which is the personal learning network environment (PLE) [4]. The China National Long-term Education Reform and Development Plan (2010-2020) which publish by Chinese Ministry of Education clearly pointed out that: "To provide personalized information environment for lifelong learning and the cultivation of every student and every learner are the need of future national competition and innovative talents. [5]"
Personal knowledge management emphasizes on the acquisition, storage, learning and innovation of personal knowledge. It provides learners with theoretical guidance for the construction of personal learning environment in the rapid development information society, helps learners to construct a self-centered, personalized and sustainable learning environment, establish, control and manage their learning system, and promote their critical thinking, knowledge management ability and lifelong learning ability.

In this paper, PLNE refers to the abbreviation of personal learning network environment. It serves as the virtual network learning environment for autonomous learning, lifelong learning, and informal learning, which supports learners to establish their own learning objectives, integrate online learning contents, online tools, online services, and online relationships according to the learning objects, and realize their personal learning and lifelong development.

**Personal Knowledge Management in PLNE**

The process of personal knowledge management could be simplified and classified as knowledge acquisition and knowledge reorganization process, knowledge sharing and diffusion process, knowledge application and innovation process which interconnect together closely [6,7,8,9].

**Knowledge classification in PLNE.** Knowledge is the reflection of human knowledge of the world, and the summary of the practical experience in the production and social life [10]. From the literal composition of the word knowledge in Chinese, it consists of two words. The first word means the entity knowledge. The second word means the process of obtaining and managing knowledge.

**Knowledge management objects in PLNE from the perspective of SECI.** In 1950s, M. Polanni divided knowledge into explicit knowledge and tacit knowledge. Based on this classification, Nonaka Fujiro put forward SECI model to explain the transformation between explicit knowledge and tacit knowledge. It includes four Ba, the socialization process from tacit knowledge to tacit knowledge, the externalization process from tacit knowledge to explicit knowledge, the combination process from explicit knowledge to explicit knowledge, and the internalization from explicit knowledge to tacit knowledge [11]. From the perspective of epistemology, knowledge flow through the whole process of knowledge management in a dynamic and progressive way. It is the innovation diffusion from personal knowledge to social knowledge.

There are four knowledge management objects in PLNE, explicit knowledge, tacit knowledge, the transform process between the explicit knowledge and tacit knowledge, and learning community. PLNE should integrate online services, online tools, online resources, and online relationships which help to build the connection of explicit knowledge and tacit knowledge between learners and partners, make explicit knowledge more systematic, well-organized and well-ordered, and improve the efficiency of knowledge extraction and application. For example, Wiki can integrate groups which have common themes or in the same tag groups, help them to reorganize their explicit knowledge under the help of collective wisdom. Social bookmarking web service, like Delicious, QQ bookmark, can search, store, and share web bookmarks which belong to explicit knowledge. Knowledge management tools, like blog, online communities, and online forums, also should be integrated in PLNE. Open education resource (OER), like massive open online courses (MOOCs), Ted Talk, Khan Academy, are high-quality teaching, learning and research materials. All of these kinds of tools, resources, services and relationships which help to socialize and internalize tacit knowledge, externalize and combine explicit knowledge should be mashuped in PLNE in ways of hyperlink, bookmark, plug-in, etc.

**Two kinds of ideas of knowledge management in PLNE.** Some knowledge management experts believe that there are two kinds of ideas about the classification of knowledge in knowledge management [12]. The first idea was proposed by the experts with information technology background. That is knowledge equals objects that can be managed and supported in information system. Then, knowledge management is IT-track knowledge management which means the management of information. The second idea was proposed by the experts with philosophy, educational psychology and business background. That is knowledge equals process or knowledge
is a process. Knowledge management is the evaluation, change and promotion of personal knowledge management behavior. Then, knowledge management is the management of people which means people-track knowledge management. Both of these two ideas are reasonable and should be combined together according to the previous explanation.

Therefore, PLNE provides Ba for knowledge creation, flow and sharing, build portal for two types of connection, the connection between people and knowledge which known as knowledge database and the connection between people which known as network relationship database.

The Essential Elements and Structure of PLNE

According to D. Kooper’s R-A-E model of learning system, there are three parts in learning system. They are role, activity and environment [13]. The essential elements and structure of PLNE could be explained in the following table.

<table>
<thead>
<tr>
<th>Structure</th>
<th>Essential elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Role</td>
<td>Learning community with learners themselves, learning partners, etc.</td>
</tr>
<tr>
<td>Activity</td>
<td>Knowledge management activity which include knowledge acquisition and knowledge reorganization process, knowledge sharing and diffusion process, knowledge application and innovation process.</td>
</tr>
<tr>
<td>Environment</td>
<td>Online tools, online resources and online relationships which need for learning.</td>
</tr>
</tbody>
</table>

The Learning Process in PLNE

Xiuli Zhuang stated that learner’s learning activities can be divided into three mutual-related phases, tool learning phase, content learning phase and partner learning phase [14].

PLNE is the learning outcome of tool learning phase. Learners discover their personality and demand for learning, integrate online tools, online resources and online services into the aggregation platform, and get familiar with PLNE. In content learning phase, learners use PLNE to initialize knowledge, and gradually build up their own knowledge database which is the learning outcome of this phase. In partner learning phase, learners have deep interaction with PLNE. Their identity is gradually diversified, such as learners, helper, etc. They build up their social relationship and set up personal learning network.

The Construction and Application of PLNE Based on Browser

Quasi-experimental study was conducted to demonstrate the feasibility and validity of PLNE in 2011 class which major in modern educational technology in Department of information technology in Guangdong Teachers College of Foreign Language and Arts. A pretest-posttest design with nonequivalent groups of experiment group and control group study design was utilized and a self-developed structured questionnaire was used for data collection.

The aggregation platform gradually mashups learning content and social interaction and acts as the portal to the Internet service. There are various ways to construct PLNE, such as based on a single application, like LMS, social software, social aggregation platform, browser, cloud
computing operating system, or multiple applications which integrate with single application, and so on [15].

The result of the anonymous survey of the class in the first lesson shows that 100% students take browser as the most frequently use program along with QQ, and Maxthon owns the highest utilization rate. Also, the project team members and teaching teams all take browser as the most convenient way to build PLNE, and use Maxthon as the aggregation platform and portal to integrate and mashup online tools, online resources online services and online relationships. The construction model in the following chart was introduced to students as an example PLNE.

![Figure 2. The PLNE Construction Model which Use Browser as the Portal and Aggregation Platform.](image)

Autonomous learning ability scale and knowledge management ability scale were used at the beginning and the end of the semester as the pretest-posttest in experiment group which construct their own PLNE and used them as the portal to learning and control group which didn’t set up PLNE. The collecting data in the following table showed that there was significant difference between these two groups, and PLNE can effectively improve the learner's autonomous learning ability and knowledge management ability.

<table>
<thead>
<tr>
<th>abilities</th>
<th>experimental group</th>
<th>control group</th>
<th>Sig. (bilateral)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>average value</td>
<td>standard deviation</td>
<td>average value</td>
</tr>
<tr>
<td>autonomous learning ability</td>
<td>73.93</td>
<td>12.81</td>
<td>63.11</td>
</tr>
<tr>
<td>knowledge management ability</td>
<td>62.34</td>
<td>1.71</td>
<td>39.64</td>
</tr>
</tbody>
</table>

**Summary**

Based on the study and results, we concluded that browser can be used as the aggregation platform for individuals to mashup and integrate learning online resources, online tools, online services and online relationships, and form their personal learning network environment. Browser can greatly enhance the learners’ stickiness to PLNE, and help them to concentrate on the learning activities.

PLNE is not subject to formal learning. It can record and display the informal learning achievement of learners, accumulate learners’ learning experience, and accompany and support the process of lifelong learning. Digital learning in the information age is changing very quickly. Just like Heraclitus said that “The only thing that is constant is change”. Learners construct their own personal learning network environment, continuously develop and improve it during their lifelong learning, and enjoy a success lifelong learning.
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