

Design of Personalized Knowledge Management in Web 2.0 Network

Malinka Ivanova

(Technical University – Sofia, Bulgaria)

m_ivanova@tu-sofia.bg

Ekaterina Vasilyeva

(University of Jyväskylä, Finland)

ekvasily@cc.jyu.fi

Inga Beleviciute

(Vilnius Gediminas Technical University, Lithuania)

inga@gama.vtu.lt

Abstract: The knowledge is defined as combination and organization of data and information in given context and Knowledge Management (KM) provides capturing, storing and reusing of knowledge objects. In Web 2.0 world the knowledge is represented in form of microcontent object and KM 2.0 proposes creation, sharing and leveraging the microknowledge in a collaborative way. The microknowledge in Web 2.0 network can be controlled through designing the instructional strategies that will provide user learning paths and activities and that will give possibilities for sharing of those same learning activities and microknowledge with others. The present paper is aimed to reflect of the research needs and the new challenges in the mentioned above three areas: KM, Web 2.0 technologies and Learning Design (LD). It is focused on designing of personalized learning using IMS LD elements. The paper analyzes the possibilities of applying Web 2.0 technologies for defining a broaden set of activities and creating the rich environments with microknowledge objects and web services in one successful scenario.

Keywords: Knowledge management, Web 2.0 technologies, IMS Learning Design, personalization, adaptation

Categories: H.5.1, H.5.2, H.5.3, H.5.4, H.3.5, H.1.2

1 Introduction

Knowledge includes both the experience and understanding of the people in the organization and the information artifacts, such as documents and reports, available within the organization and in the world outside [Marwick, 2001]. Polanyi divided knowledge into two types [Polanyi, 1996]: explicit knowledge, the knowledge included in documents or books and tacit knowledge, the knowledge that can be acquired by experience, communication.

Knowledge Management provides mechanisms for creating capturing, storing, transferring and reusing of knowledge objects. One of the most difficult tasks for the information technologies nowadays is to capture a tacit knowledge and to convert it

into explicit and searchable form. Web 2.0 technologies could be used to solve this problem.

In Web 2.0 world the knowledge and knowledge management have received the new meaning and dimension. The knowledge is named microknowledge and it is represented in form of microcontent object that has at least one unique identity with at least one unique address on the network, and that encapsulates no more than a small number of central ideas [www.mindingtheplanet.net, 2003]. KM 2.0 has appeared to support knowledge processing mechanisms in Web 2.0. KM 2.0 supports creation, sharing and leveraging the microknowledge in a collaborative way, through participation, dialogue, discussion, and observation. The Web 2.0 tools that are more frequently used in university and enterprise environments nowadays are: weblogs, wikis, social bookmarking, tagging, RSS/Atom syndication, podcasts, search engines, social networks, where the microcontent can be metadata, learning content, information content, instructions, comments, feedbacks [Leene, 2006], [Klamma, 2006]. Among the advantages of using the Web 2.0 technologies in the learning process there are: (1) facilitated process of knowledge objects creation by learners/educators, (2) knowledge objects enhanced by tagging and group use, (3) increased frequency of small communication/awareness knowledge objects, (4) multiple interventions over a period of time, (5) involve multiple learners/educators in the overall intervention, (6) reporting tools and (7) assessments tied directly to knowledge objects, integration of metrics and community use information to track utility.

The best way to use the most of these advantages and to improve learning process is to create instructional strategies that will control user learning paths and activities at using all of these different tools. The design of instructional strategies could also allow sharing the same learning activities and microknowledge with other professionals (Figure 1).

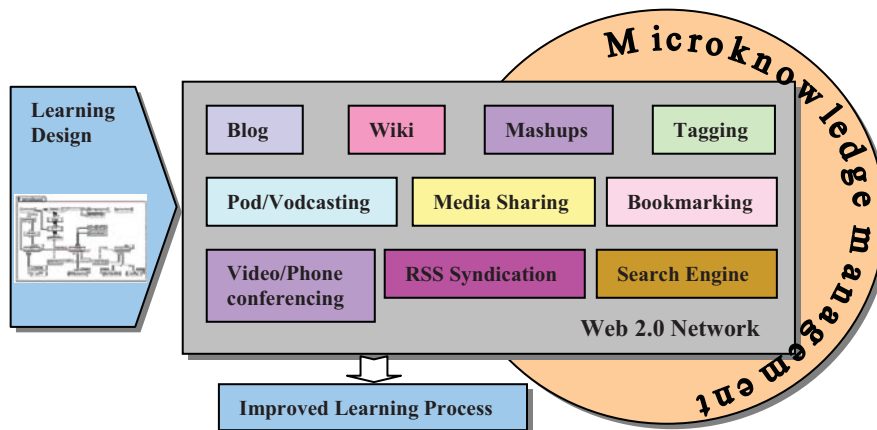


Figure 1: Microknowledge of Web 2.0 for Learning Design

Different instructional strategies can be designed for different learners to personalize their learning activities and learning content and to provide adapted services to them according their knowledge, personal interests and goals. IMS Learning Design specification provides a framework within which it is possible to describe the structure of tasks and activities, their assignment to roles, and the workflow of a Unit of Learning, and also provides a platform-independent notational convention to allow sharing and reuse of these designs [IMS Learning Design Specification, 2003].

This paper discusses the research needs and the new challenges in the mentioned above three areas: KM, Web 2.0 technologies and LD. It is mainly focused on personalized learning design task where IMS LD elements are used as well as on applying Web 2.0 technologies to define a broaden set of activities, and creating the rich environments with microknowledge objects and web services in one successful scenario. The rest of the paper is organized as follows. We discuss IMS learning design elements in section 2. Section 3 is dealt with Personalized Knowledge Management. We conclude with brief discussion in Section 4.

2 IMS Learning Design Elements

The objective of the IMS LD specification is to provide a containment framework of elements that can describe any design of a teaching-learning process in a formal way [Koper, 2006]. The first general idea behind learning design is an idea of active learning. It means that people learn better when actively involved in doing something (i.e. are engaged in a learning activity). The second idea is that learning activities may be sequenced or otherwise structured carefully and deliberately in a learning workflow to promote more effective learning. The third idea is that it would be useful to be able to record “learning designs” for sharing and reuse them in the future.

The LD elements are structured via conceptual models in three different levels – A, B, C. LD Level A includes the core vocabulary needed to support pedagogical diversity: Learning Objectives and Prerequisites, Roles, Activities, Activity Structures, Environment, Play, Act, and Method. LD Level B adds Properties and Conditions to level A, which enable personalization and more elaborate sequencing and interactions based on learner portfolios. LD Level C provides a notification capability. Every level is built on the previous one.

The core components of Learning Design identified by the IMS LD specification are based around the conceptual entity of a Unit of Learning. This is the smallest unit that satisfies one or more learning objectives (Figure 2) [Koper, 2004]. In practice this may be a course, a module, a lesson or single activity.

The next generation of the web has transformed the opportunities that are open to the Learning Designer. The Learning Designer can develop learning plans for using the existing and emerging Web 2.0 tools; as well as innovative programs that invite participation and provide transparency of the learning process.

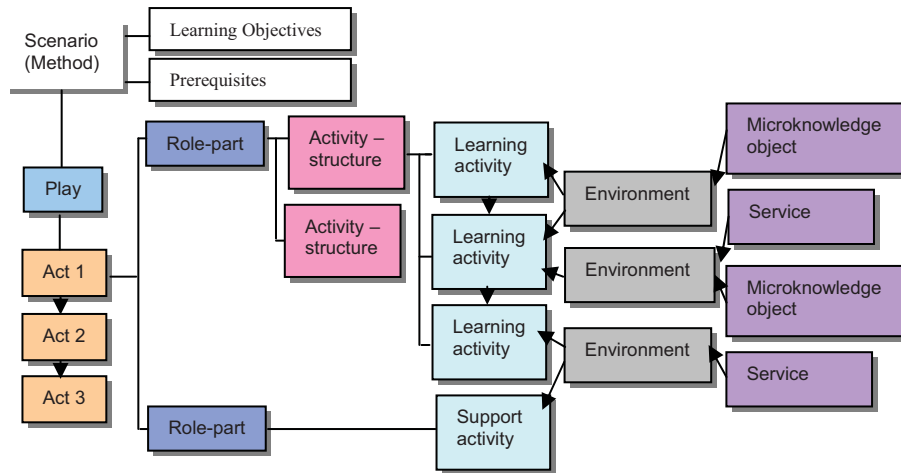


Figure 2: Conceptual View of Unit of Learning

3 Personalized Knowledge Management

Personalized support for learners becomes even more important, when eLearning takes place in open and dynamic learning and information networks like this based on Web 2.0 technologies. The pedagogical aspect of personalized learning using distributed information in dynamic and heterogeneous learning networks is still an unsolved problem in eLearning research.

The adaptive eLearning methods in context of IMS LD specification are discussed in [Burgos, 2006], [Specht, 2007]. IMS LD is able to support six main types of adaptation: learning flow based, content based, interactive problem solving support, adaptive user grouping, adaptive evaluation and changes in run-time.

In this paper is examined learning flow based adaptive method where learning process is dynamically adapted to explain the contents of the course in different ways.

Below is provided one example of Unit of Learning designed to demonstrated possibilities for personalized paths in Web 2.0 environment. The pedagogy of this Unit of Learning is presented as method (Table 3) which is successful only when the five learning objectives are achieved. Two main roles are described: the role of learner and educator. The learner actively participates in learning process and educator monitors and advices learner. Learning activities and activity structures perform in two environments (Table 2). The activities could be arranged in the way present in Table 1:

This example shows the learning flow of the learner based on her/his performance. Personalized learning paths are defined according to the learner's achievements. Personalization as the key element of the learning process offers possibilities to serve flexible, effective and efficient education, to adjust to various learning conditions and

needs. Web 2.0 networks have the potential to support collaborative microknowledge creation, to foster community building and to extend the traditional learning models. Applying Learning Design concepts to education in Web 2.0 networks led to organizing, controlling and exchanging learner's personal microknowledge.

<i>Learning Objectives</i>	<i>Activities</i>	<i>Activity Structures</i>
Learning Objective 1: Understand and summarize the problem	Activity 1: Study MK in Wiki, Blog Activity 2: Use Podcast for understanding and communication Activity 3: Search additional MK using tags Activity 4: Pass PreTest	Activity Structure 1: Activity 1,2,3,4
Learning Objective 2: Divide and define its main items	Activity 5: Divide problem of main items Activity 6: Describe each item using blog as personal MK management tool	Activity Structure 2: Activity 5,6,7,8,9,10,11
Learning Objective 3: Prepare analysis of studied MK and create document	Activity 7: Analyze studied MK and find bottlenecks Activity 8: Prepare and publish document	Activity Structure 3: Activity 7,8,9,10,11
Learning Objective 4: Discover solution/s of the problem and evaluate each solution	Activity 9: Discover and define possible solution/s Activity 10: Evaluate solution using social software	Activity Structure 4: Activity 9,10,11
Learning Objective 5: Make conclusions	Activity 11: Make and share conclusions Activity 12: Pass Test	Activity Structure 5: Activity 5,6,9,10,11

Table 1: Activity and Activity Structures

<i>Environment</i>	<i>Description</i>
Environment 1	Blog, Wiki, Podcast, Search Engine, Social Network Sites
Environment 2	eLearning System, analyzing and documenting software

Table 2: Environments

<i>Method (Scenario)</i>				
<i>Play 1</i>				
<i>Act №</i>	<i>Role</i>	<i>Activity</i>	<i>Activity Structure</i>	<i>Environment</i>
1	Learner	---	Activity Structure 1	Environment 1
2	Learner, Educator	---	Activity Structure 2	Environment 1 and 2
3	Learner	Activity 12 – achieve Objective 1 and 3	---	Environment 2
4	Learner, Educator	---	Activity Structure 5	Environment 1 and 2
5	Learner	Activity 12 – achieve Objective 1,2,3,4,5	---	Environment 2

Table 3: Method

4 Conclusions

Nowadays it is the challenge for educators and learning designers to systematically develop new patterns and strategies suitable for personalized learning in Web 2.0 environment. This makes it necessary to understand the evolving new kinds of learning experiences, and to further enhance and enable them with the right tools, applications and contents.

In this paper is presented one model of Unit of Learning for personalized learning where is specified the method including activities and environment related to Web 2.0 technologies.

We argue that there is necessity in the further research and development of new instructional strategies of eLearning personalization in Web 2.0.

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