

Chapter 5

Situation-Based and Activity-Based Learning Strategies for Pervasive Learning Systems at Workplace

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ABSTRACT

The main topic of this chapter is about a pervasive learning at workplace, namely, work-based learning. The proposition is based on two complementary learning strategies: situation-based learning and activity-based learning to fulfill seamless learning across contexts and worked-based learning requirements. In situation-based learning, relevant activities and/or resources are recommended to the user. In activity-based learning, the user has to search and to select his/her activities and the corresponding resources. These strategies correspond to two different information dissemination approaches that can be distinguished, namely push and pull (Cheverst, Mitchell, & Davies, 1998). The authors of this chapter propose a pervasive learning environment where learners may follow different learning strategies. They may switch from one strategy to the other one according to their needs and/or the context change. These facilities are possible thanks to a set of models and adaptation processes developed for the P-LearNet project (Pervasive Learning Network). To illustrate this proposal, an example (or a use case) from this project is used.

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The chapter is organized as follows: the authors introduce some issues of technology-enhanced learning systems and define mobile, pervasive and ubiquitous learning and some closely related features: context, adaptation, situated learning, working and learning activities. Secondly, work-based learning features are described. Thirdly, situation-based and activity-based learning strategies are presented. Finally, the P-LearNet project is used to illustrate the proposal, and the conclusion summarizes the chapter and shows how and at which level this framework can be reused.

INTRODUCTION

Technology-Enhanced Learning (TEL) systems must have the capability to reuse learning resources and web services from large repositories, to take into account the context and to allow dynamic adaptation to different learners based on substantial advances in pedagogical theories and knowledge models (Balacheff, 2006). The computer-based reuse of learning resources and web services requires a precise information retrieval process by means of a search engine. A search engine based on a keyword approach has two main drawbacks: keywords are polysemic and the results are too numerous. Thus, it is impossible to select automatically the relevant resources and web services according to user's needs. A semantic web approach is able to prevent polysemy and to provide interoperability at semantic level. A semantic web search engine is based on common vocabularies or ontologies which are used to define a unique meaning for a given term or concept. Thus, it has the ability to select relevant resources and web services. Moreover, knowledge models and pedagogical theories can be fully represented by means of ontologies in a semantic web framework. The context-awareness and adaptation process is a refinement of the information retrieval process and it requires a very precise search engine provided by a semantic web. Context-awareness and adaptation are crucial issues in pervasive computing and learning.

In the "mobile learning" area, several expressions are used: mobile, pervasive and ubiquitous learning systems (Brodersen, Christensen, Gronboek, Dindler, & Sundararajah, 2005; Hundebol

& Helms, 2006; Sharples, 2005; Siobhan, 2007). In computer science, mobile computing is mainly about increasing our capability to physically move computing tools and services with us. The computer becomes an ever-present device that expands our capabilities - by reducing the device size and/or by providing access to computing capacity over the network (Lyytinen & Yoo, 2002). In mobile computing, an important limitation is that the computing model does not change while we move. This is because the device cannot obtain information about the context in which the computing takes place and adjust it accordingly. In pervasive computing, the computer has the capability to inquire, detect and explore its environment to obtain information and to dynamically build environment models. This process is reciprocal as the environment also does it and becomes "intelligent". In ubiquitous computing, the main goal is to integrate large-scale mobility with pervasive computing functionalities.

Mobile learning is not just about learning at anytime, at any place and in any form using lightweight devices, but learning in context and seamless learning across different contexts (Balacheff, 2006; Sharples, 2006; Vavoula & Sharples, 2008). It is best viewed as mediating tools in the learning process (Sharples, 2006). In mobile learning, TEL systems do not have the capability to inquire, detect and explore their environments. In other words, the context is implicit. On the contrary, pervasive and ubiquitous learning systems are context-aware. Thus, we consider that mobile, pervasive and ubiquitous learning systems have the properties of mobile, pervasive and ubiquitous computing systems, respectively. Many definitions

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