Chapter 13

Ubiquitous Learning
Supporting Systems:
A Challenge for Computing
Software Designers

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ABSTRACT

Ubiquitous learning features intuitive ways of identifying appropriate learning collaborators and right learning contents and services at the right place and at the right time. Consequently, there are many aspects that must be considered in designing computing applications that support this kind of learning. In this chapter, ubiquitous learning is introduced and characterized, the challenges that must be faced by those in charge of designing and developing such applications are reviewed, and the state of the art of this recently initiated line of research at the Informatics and Information System Research Institute of the National University of Santiago del Estero are presented. The developments achieved to date as well as the future guidelines are also shown.

INTRODUCTION

The emergence on the web of new paradigms together with their corresponding applications in the educational field and the great development in the communicational technologies allow altogether to make a rich diversity of educational resources available for students, create new and varied training environments, personalize learning and facilitate that a set of training activities be performed from everywhere on every device. Such advancements have brought about the rise of the so called ubiquitous learning (u-learning) which is a new educational paradigm that occurs within a ubiquitous computing environment and let the learning of the right content occur at the proper place, at the right time and in the right way (Shih & Tseng, 2009)

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The networked mobile technology system supporting u-learning is made up of a complex set of multiple ways of mobility, diverse mobile technologies, diversity of transporters, a variety of students, a multiplicity of learning contexts, teachers with different levels of experience in u-learning and several approaches to content design and learning methods. Additionally, the development of u-learning environment requires the user needs being taken into account (i.e. different ways of operating, thinking, knowing that involve physical and cognitive capacities and limitations) so that they can utilize such an environment easily and fruitfully. These questions are mentioned in many papers published. Tackling them is posed as a challenge for those designing and developing u-learning supporting computing applications.

This chapter aims to introduce ubiquitous learning, its theoretical and technological foundations highlighting the differences as to other computer assisted learning models; review the questions made by other authors when designing u-learning environments; and to present the research line on “U-learning supporting Web systems” that is being developed at the Informatics and Information Systems Research Institute of the National University of Santiago del Estero since 2012 by defining its theoretical background, the developments achieved to date as well as the next lines of action.

THE UBIQUITOUS LEARNING

In this section the ubiquitous learning is defined and characterized, its theoretical and technological foundations introduced and the main differences as to the other computer assisted learning models highlighted.

Definition

Traditionally, learning has been seen as a process by which the learner comes into contact and acquires knowledge or skills from an authorized source. This definition is not longer enough to describe the way in which knowledge conditions convergence in the information society. The more advanced learning theories state that learners do not absorb personally significant knowledge passively but they rather create it actively out of their experience of the world. As asserted by Cope & Kalantzis (2009) nowadays, learning, through knowledge creation, goes beyond the design of comprehension within the limits of our head since from the very moment we use web technology to make sense of the world around us using blogs, wikis, mash-ups, podcasts, social software, virtual environments, free code and access media, and many other practices online already existing or emerging, the constructs of our own developing comprehension become information available publicly. Consequently, learning process and products are merging rapidly into a ubiquitous knowledge compromise. Ubiquitous learning represents a new educational paradigm mostly due to the new digital media. Particularly, it is the result of the convergence of e-learning and the ubiquitous computing (Shih & Tseng, 2009).

In relation to the definition of ubiquitous learning; in Saadiah et al. (2010) an interesting analysis of the definitions purposed by various authors is made. From this the one provided by Sakamura & Koshizuka (2005) asserts “… we learn anything, at anytime and at anyplace using ubiquitous information technology and infrastructure”.

However, Saadiah et al. (2010) state that the terms “anywhere and anytime learning” and “learning with ubiquitous computing technology” raise confusion between researchers. Therefore, they introduce the following definition: “U-learning is a learning paradigm which takes place in a ubiquitous computing environment that enables learning the right thing at the right place and time in the right way”. This definition avoids using the term “anything, anywhere and anytime”. This is due to the challenge of an information-rich world in providing what is right, at the proper moment.