Chapter 17

A Perspective about the Application of Quality of Context in U-Learning Environments

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ABSTRACT

U-Learning environments collects context information relative to user’s preferences and needs, but this information is typically very volatile. For this reason, Quality of Context is aimed at treating this information by applying quality parameters. This chapter aims to help the reader understand how the quality of context information can be treated in U-Learning environments, which are the main theoretical bases, technologies that support them and what are the methods, advantages and disadvantages related to this approach. In addition, specific cases of development and application of technologies and strategies involving Quality of Context are presented to illustrate all the concepts described. The results of usability testing related to the SUS questionnaire showed that the developed environment described in the case of study operated satisfactorily, based on the assessments made by the group of users who tested the modules and their operation.

INTRODUCTION

Evolution of technology resources over the years resulted in the development and adaptation of new methods and paradigms, in the interest of attempt to meet the necessities that user’s require in order to facilitate their interaction with the applications. This has fostered the development and adaptation of new methods and applications relative to the educational area, allowing the introduction of new

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branches in this medium, such as the design of a new model called Ubiquitous Learning (U-Learning). Yahya, Ahmad, Jalil, and Mara (2010) defines U-Learning as a learning paradigm located in ubiquitous computing environments that enable proper learning in the right place and right time, and also in the right direction. U-Learning environments work with adjustments in the presentation of their contents and resources, as well as according to the preferences and needs of each user, in order to provide them with all the features mentioned in its definition.

In relation to the area of U-Learning, there are still several aspects involving concerns about the design of these types of educational settings and the way the related applications will work are still to be defined. One of these concerns relates to context information, which according to Dey (2001), can be defined as any information that can be used to characterize the situation of entities that are considered relevant to the interaction between a user and an application. The context can be constructed from different types of information such as speed of the network connection, location, user preferences, etc.

According to Baldauf, Dustdar, and Rosenberg (2007) and Zheng, Yan, and Wang (2011), the use of context information in U-learning environments have a high probability of imperfections or inconsistencies caused by inaccuracies in the context acquisition and maintenance. Manzoor, Truong, & Dustdar (2008) explain that existing systems rarely consider the quality of context information, which is an aspect ignored or treated in an incomplete form or improperly. To answer these questions, researchers have addressed the development also focused on the area of Quality of Context (QoC), which includes all data describing the quality of information that is used as context (Thomas Buchholz & Schiiffers, 2003).

Context quality does not require that context information should be perfect, accurate and timely, but must be a correct estimate of the quality of the information (Nazário, Dantas, & Todesco, 2012). So QoC area searches that the final reported result for users be valid and contributes significantly to their needs, providing an appropriate context for your situation.

Performed the basic assumptions about these topics, this chapter aims to help the reader understand how the quality of context information can be treated in U-Learning environments, which are the main theoretical bases, technologies that support them and what are the methods, advantages and disadvantages related to this approach. In addition, specific cases of development and application of technologies and strategies involving Quality of Context are presented to illustrate all the concepts described.

Will be presented in detail the adaptation made in a traditional Moodle environment, making it an Ubiquitous Environment, which collects context information related to the cognitive user profile and your connection speed through two modules. Based on the mode of operation of these two modules, the use of Adaptive Hypermedia aimed to make changes in the presentation of the content (e.g. slides, videos and images) and tools (e.g. chat and forum) in each subject of the environment.

Parameters and metrics of Quality of Context are detailed and applied on this information collected in the environment, in order to demonstrate how greater guarantees can be created, so that the context formulated in the environment is appropriate to the preferences and needs of the user. In addition, a study about the available technologies for the adaptation of the interface in Moodle to use in mobile devices is described and applied. An evaluation of all work done is also demonstrated in the chapter in order to provide greater assurance that the information elaborated upon in the project were analyzed and considered valid.

Thus, this chapter aims that the reader at the end of his analysis, has been able to understand the theoretical basis described referring to the topics of Quality of Context and their application in U-Learning