

## Chapter 3.5

# Using a Process–Aware Information System to Support Collaboration in Mobile Learning Management Systems

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### ABSTRACT

*This chapter deals with the support of collaboration in mobile Learning Management Systems. The authors propose a collaborative game, to be taken place in an enhanced reality environment, as an example of collaboration. Several alternatives to support this scenario are analyzed, and the proposed architecture to integrate process-based collaboration in mobile Learning Management Systems is discussed in detail. Finally, an implementation of this scenario using open-source technologies is detailed.*

### INTRODUCTION

The interest in Information and Communication Technology (ICT) to support learning activities both in industry and academia has had a dramatic increase in recent years. Companies and universities are using Learning Management Systems

(LMSs) to deliver courses to employees and students respectively.

Mobile learning presents some particularities because of two factors: the most important one is the mobility, the other one is the hardware itself. Modern mobile devices are provided with a digital camera, video player, microphone, GPS, internet connectivity, etc. And they can be used in mobile learning scenarios. The usual approach to the design of mobile LMSs is not to treat the mobile

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built-in devices as first-class objects. Therefore, a participant in a mobile learning course may have to take, for example, a picture using the camera app, and later to upload the picture to the LMS. When the built-in camera is treated as a first-class object, participants can take photos that are immediately accessible to their partners in a collaborative graphical environment. In a similar way, the GPS position of a participant may be public for all group members. So, data acquisition and data flow require to be automated as first-class objects to minimize the cognitive load and error.

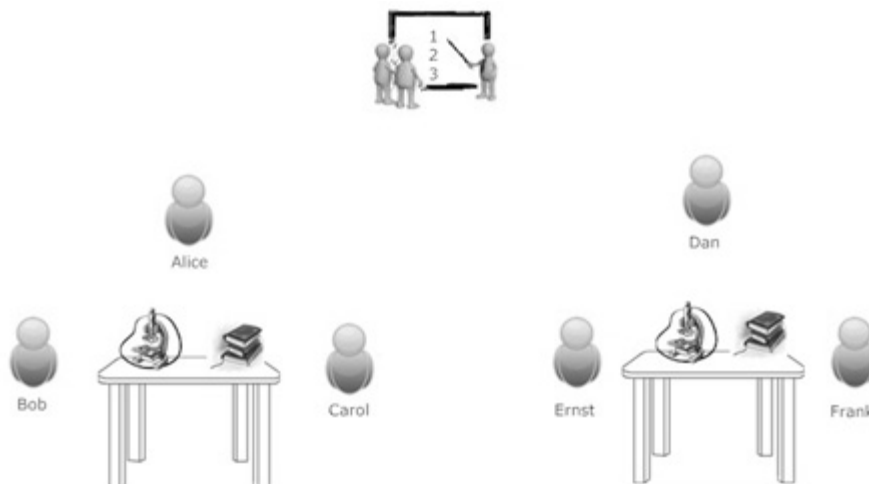
LMSs provide functionalities for the control of the learning process such as user management, storage of learning materials, communication facilities, assessment activities, notification, and more. Traditionally, commercial LMSs such as Blackboard (Blackboard Website), and Claroline (Claroline Website) have been used to carry on the learning process. Recently, a great shift towards open-source has taken place both in industry and academia. There are popular web-based Learning Management Systems such as Moodle (Cole, 2005), dotLRN (Santos, Boticario, Raffenne, & Pastor, 2007), Sakai (Farmer & Dolphin, 2005), and OLAT (Fisler & Schneider, 2008) which support online courses in companies and universities.

In respect with mobile environments, mobile front-ends to LMSs, such as MLE for Moodle, represent the most outstanding trend nowadays.

These LMSs are used to support learning experiences in accordance with different styles and contexts, including collaborative practices. In the literature, there are a number of works addressing common metaphors for collaboration, such as the one by Sanderson (1997). Figure 1 shows collaboration in the classroom, typically viewed as people sitting around a table, over which objects are placed. This type of collaboration is not of an informal kind, but it is framed and structured to achieve a group goal. Therefore, interactions among participants as well as the information they interchange have to be structured (Hernandez-Leo, Asensio-Perez, & Dimitriadis, 2005). If the collaboration has an explicit purpose, such as to carry on an augmented reality game, typically a roadmap serves as a guide to divide and assign work among all participants.

In the Information Technology field, there are a group of systems that are classified as *process-aware*. Dumas, van der Aalst and Ter Hofstede (2005) classify Process-Aware Information Systems (PAISs). PAISs have been suggested to support collaboration in Learning Technology

Figure 1. A collaborative educational game in the classroom



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