# Chapter 9
# A Platform for Actively Supporting e-Learning in Mobile Networks

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## ABSTRACT

*The ubiquitous availability of wireless networks has opened new possibilities for individuals to learn from each other in open learning spaces like cities. Therefore, the changed learning environment must be understood by e-learning systems and technological facilities must be provided for knowledge sharing and construction. Such systems need to be pedagogically sound, yet adaptive to altered modalities. The teacher who was once the central entity to fulfill the learner's needs may not always be available. Therefore, e-learning systems would fill the gap created by this teacher unavailability by actively participating in learning activities and performing some of the teacher's roles. This article proposes an architecture designed to meet such challenges in a city-wide context. The authors outline the main components and services needed to fulfill the new requirements and provide the learners with tools, services and educational support for learning activities.*

## INTRODUCTION

The availability of communications infrastructure alone is not enough to support mobile learning. There is also a need for well designed learning systems; these systems should take into account both technical and pedagogical aspects of such forms of learning. Such a system will provide the supporting services *(functional units)* and mechanisms *(intelligent decision making)* to conduct learning and collaborative activities. More importantly, a learning system needs to participate actively in the learning process. As more and

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more information becomes available "we urgently need techniques to help us make sense of all this, to find what we need to know and filter out the rest; to extract and summarize what is important" (Davies et al., 2007, p. 1). Therefore availability of infrastructure alone cannot be considered sufficient for learning; "Media is therefore a mere vehicle that delivers instruction but does not influence student achievement" (Clark, 1983). In our work we do not consider a learning system to be part of the communication medium, instead we consider it to be the part of learning process itself. Thus, such a system plays an active part in learning and collaborative activities while dealing with challenges such as open environments, heterogeneity and dynamism. In this way the system should not only act as a passive medium of pre-defined communication patterns, instead it should perform an active role to increase the learning outcome. It can do this by following and assisting the learner throughout the learning process, through recommendation and filtering of relevant learning material, by understanding and evaluating the contextual learning space of the learner and adjusting the system's behavior accordingly, and thereby personalizing the learning experience for each individual learner.

While looking at the design of currently existing learning systems it becomes apparent that much of the functionality is replicated among different systems; sometimes even the data is replicated among several systems. For instance, functionality to authenticate users, retrieve and manage data in the data source or functionality to manage user information is common among learning systems. It would therefore be wiser to develop common system functions as services and not as functionality locked into a single system. A service based approach towards the system design can result in interoperability (both syntactic and semantic), an open, extensible and cooperative system (Mason, 2004; Wilson, 2005); where each service is intended to fulfill a specific learning task. Figure 1 presents the idea of how three different 'single tone' systems (Wilson, 2005) can benefit from the services based approach.

Further, to reduce the complexity of the system, categorization and layering of system components (i.e. services) assists in paying due attention to particular aspects of learning supported by the system through its functionality. Such flexibility not only complements the technical aspects of a learning system, but also has a direct influence on the pedagogical features of the system. A system that is built in a modular fashion can adapt very easily to integrating new modules (i.e. modules supporting both technical and pedagogical aspects of the learning). Flexibility in the core system design also allows us to evaluate different pedagogical aspects of a learning system.

## INTRODUCTION TO THE FABULA SYSTEM

This article discusses project FABULA (FABULA-Con, 2007) (**F**remr**A**gende **B**y for **U**ndervisning og **LA**ering - Seamless networks for transforming the city into an arena for learning) as the main example of our designed system. Our learning system targets the technology enriched societies consisting of individuals who carry sophisticated mobile devices with them. Such individuals are also discussed as "*Cyborg"* by Løvlie (2006) and as "*Generation C"* by Bruns (2007). On the one hand our technical goal is to construct a (web-) services based e-learning system for mobile networks, while on the other hand, pedagogically, we aim to support informal collaborative mobile learning activities in a city wide context. A main consideration is to underline the fact that in such settings a teacher might not always be available to learners. Therefore, certain activities which a teacher might perform are delegated to the system and are programmed into the behaviors of the system. By considering both aspects at the same time we include the pedagogical dimensions in each phase of system design. All the theoretical