

## Chapter 7.17

# Contextualized Learning: Supporting Learning in Context

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### ABSTRACT

This chapter presents an overview of research work for contextualized learning, integrating the background of adaptive hypermedia, ubiquitous computing, and current research on mobile learning systems that enable support for contextualized learning. Several examples for new learning paradigms are analyzed on their potential for mobile learning and contextualization. In the second part, examples for systems that integrate mobile learning solutions in existing learning systems for schools and working context are presented. The RAFT project realizes application for computer-based field trip support and shows an integration of m-learning tools in an established teaching method of school field trips. The SMILES prototype shows the integration of e-learning services and its stakeholders with mobile learning technology.

### INTRODUCTION

New technology develops fast, and the reality of information and learning delivery everywhere is changing monthly. Nearly every week new devices and gadgets appear on the market and enable new ways of mobile access to information, mobile games, and online applications. Currently, the new research field of m-learning and a community working on that topic is establishing, and a variety of research groups work on new approaches supporting mobile learning. Those approaches mainly come from the background of collaborative learning, mobile information systems, adaptive hypermedia, and context-aware computing. From our point of view, adaptive educational hypermedia plays a central role in new models for m-learning and contextualized learning support. Applications from this area include a range of examples from personalized guiding systems for cities, art exhibition guides, and adaptive learning management systems.

In the field of adaptive hypermedia, several approaches have been doing work on the adaptation of interfaces and contextualized user interaction to specific devices and interaction modalities. Adaptations mostly have been based on the constraints of the devices used (mostly small screens) or network constraints like low bandwidth for mobile devices. From our point of view, there is more to contextualized computing than delivering content to small screens or converting it to new technical formats. By the variety of devices and the new possibilities of ubiquitous computing, information access gets embedded in the environment and gets contextualized to the current context of use (Oppermann & Specht, 2000).

For educational applications, this enables new possibilities for learning in context and understanding artifacts in the real world with the help of computers that can support the learning process in the current situation by adapting to a variety of context parameters. The underlying theoretical background of situated cognition and situated learning (Wenger & Lave, 1991) clearly states the target and motivation for contextualized learning support. Furthermore, it demonstrates the benefits for learners and authors that can be achieved by having information available in context. Mobile learning seems to be one of the fields where new paradigms for mobile cooperation and the integration of mobile and stationary activities are analyzed in most detail up to date. Most of the empirical studies currently looking at the usage of mobile devices in learning come from the classroom and learning situations related to field trips. The classroom in this sense seems to be a highly adequate field to introduce tools and services that allow a new way of learning and handling digital media for contextualized experiences.

This chapter will try to connect the theoretical foundations of situated learning and cognition and how those relate to new forms of computer supported contextualized learning.

In the first part, we will describe our view on adaptive hypermedia and the variations of adaptive methods. Based on this, we will give examples of how contextualized learning extends current approaches for personalization of learning processes and content delivery by taking into account additional parameters of the current context (environment, location, time, social context). On this background, some applications realized in Fraunhofer FIT and the European project RAFT<sup>1</sup> and the prototype SMILES will be presented and their usage of context information to adapt to users will be demonstrated. It will be shown that especially the combination of different context parameters with classical learner modeling approaches allows for information delivery tailored to the individual learner and his/her current situation in a very effective way.

## **SITUATED LEARNING AND ADAPTIVE METHODS**

In the following section, we will give the motivation and background for situated learning and describe current scenarios for contextualized learning applications and use of mobile devices in classroom learning.

### **Situated Learning and Blended Learning**

Situated learning as introduced by Wenger and Lave (1991) states the importance of knowledge acquisition in a cultural context and the integration in a community of practice. Learning in this sense must not only be planned structured by a curriculum, but also by the tasks and learning situations and the interaction with social environment of the learner. This is often contrasted with the classroom-based learning where most knowledge is out of context and presented de-contextualized. On the one hand, the process of contextualization

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