Chapter XI

Situated Learning with SketchMap

Sosuke Miura
University of Tokyo, Japan

Pamela Ravasio
University of Tokyo, Japan

Masanori Sugimoto
University of Tokyo, Japan

ABSTRACT

This chapter presents the SketchMap system, which supports children’s situated learning by their experience of creating maps. In an outdoor environment, each child creates a map in the region of his or her school using a SketchMap client. The map is uploaded to the SketchMap server to be shared with other children who have created maps of different areas. Children can add new information to the maps or can edit them in their classrooms or in their homes. The goal of the SketchMap project is to investigate whether it the integration of outdoor and classroom activities, and the sharing of the children’s experiences through the maps, can actually promote collaborative learning. This system has been used in the classes “safety map” and “nature exploration” in a Japanese elementary school, and an evaluation of the system has also been performed. Some issues that were identified during the educational activities are also described here.

INTRODUCTION

In this chapter, the SketchMap system (Enjoji, Ravasio, & Sugimoto, 2006; Ravasio, Tschelter, & Sugimoto, 2006; Sugimoto, Ravasio, & Enjoji, 2006) that supports children’s situated learning activities through the creation of maps is presented. A key function of SketchMap is the enhancement of the children’s learning experiences (Sugimoto, 2005). To make children’s learning situated and contextual, SketchMap supports their outdoor fieldwork by providing a technologically enhanced
learning environment. It also integrates the children’s fieldwork in an outdoor environment and advances their reflection and further learning processes in a classroom, which is important for reaching a deeper understanding (Ackermann, 1996). SketchMap is used (1) to allow children to easily record what they have found during their fieldwork, (2) to reflect their learning experiences and enhance further learning while using their maps, and (3) to support knowledge sharing and construction processes by sharing individual children’s experiences through the maps.

In SketchMap, children are asked to create a map of the neighborhood of their school. They use a tablet PC to retain the natural feeling of a sketch with pen and paper, while avoiding the difficulties of pen and paper based sketches. For example, using a tablet PC simplifies changing, or modifying, the scale of a map. The child draws a street with a stylus pen or places an icon, representing a landmark, by selecting from the icon list. A SketchMap tablet PC is augmented by a GPS receiver and a USB camera. The child can capture an image, a sound, or a video using the attached camera, and easily position it anywhere on the tablet PC display. During the map creation task, all the child’s activities on the tablet PC, with time and location data captured through the GPS receiver, are logged. As the tablet PC is always connected to the Internet via its wireless Internet card, a map being created by a child can be uploaded automatically to the SketchMap server. After the children have returned to their schools or their homes, they can access the server and browse the uploaded maps. Then the children can edit their own maps or add new information to other children’s maps.

Even while the SketchMap project was underway, evaluation of the use of the system was conducted in collaboration with a Japanese elementary school. This chapter describes some findings gained, lessons learned through this practice, and suggests some future work.

**RELATED WORK**

The use of a mobile device, such as a PDA, to individualize tuition in educational environments has rapidly led to the transfer of widely known, effective pedagogical methods to this novel medium. Examples are the MapIt and PicoMap applications for concept mapping (Chan & Sharples, 2002) and Cooties (Soloway, Norris, Blumenfeld et al., 2001) projects for science classes. A mobile butterfly-watching system (Chen, Kao, Yu, & Sheu, 2004) uses content-based image retrieval and allows individual learners to retrieve information on a butterfly whose image is captured using a camera built into the handheld device in an outdoor environment.

The range of existing collaborative educational systems covers topics as diverse as participatory simulations (Benford, Rowland, Flintham et al., 2005; Colella, 2000; Wilensky & Stroup, 1999), classroom communication systems (Dufresne et al., 1996), and problem based learning (Cuartielles, Malmborg, & Schlaucher, 2003).

Individual and collaborative practices can be integrated into a single system. Ishizuka et al. (2004) compared the achievements of pupils using Web-based training systems in combination with PDAs in the “integrated study” classroom, outdoors, and in a social education facility. Deguchi et al. (2006) described a system for use in an integrated study class, whose aim was to make pupils collaborate in the design of a town and experience the relevant environmental implications. Yatani, Sugimoto, & kusonoki (2004) developed a system in which pairs of pupils collaborated to solve a knowledge quiz about the individual insights they gained from the science exhibition they were visiting, while Takenaka et al. (2006) proposed a system that allows elementary school children to collaboratively create and share a virtual botanical garden by using a mobile phone equipped with a camera. Finally, the purpose of the Ad Hoc Classroom project (Chang & Sheu,