Chapter 5
Mobile Devices as Support Rather than Distraction for Mobile Learners: Evaluating Guidelines for Design

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ABSTRACT
This article questions the design of mobile learning activities that lead students to spend time focusing on the mobile devices at the expense of interacting with other students or exploring the environment. This problem is approached from an interaction design perspective, designing and analysing geometry-learning activities. The authors present six guidelines for designing mobile learning activities, where mobile devices support rather than distract students from contents and contexts relevant to the learning goals. The guidelines are developed through video analysis of groups of middle school students doing learning activities outdoors and evaluated using the task model. The guidelines suggest that students (1) assume roles based on a different functionality of each device, (2) use devices as contextual tools, that the activities, (3) include physical interaction with the environment, (4) let teachers assume roles, (5) encourage face-to-face communication, and (6) introduce students to the mobile devices.

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INTRODUCTION

In formal learning activities outside the classroom, mobile devices are used, for example, in mathematical and scientific inquiry on field trips, for studying local history and for guidance on museum visits. In these kinds of activities, learners are mobile in the physical environment. The mobile devices are used for guiding students to places relevant for the learning goals or for exploring the environment by capturing aspects of it. Reasons for introducing mobile devices to learning outside the classroom may be that they enable new learning experiences in that the mobile devices can be used to support learning in authentic contexts, support peer collaboration and motivate learning (Wijers, Jonker, & Drijvers, 2010). However, the new technology might distract students from the new learning experiences (Figure 1). In viewing mobile learning activities outdoors from a socio-cultural perspective (Säljö, 1999, 2000), we consider a main visual focus on devices is a problem.

Against this background, we propose to investigate the following question: how do we design formal mobile learning tasks and activities outside the classroom so that students can balance their focus between the mobile devices and the contents and contexts relevant to the learning goals?

This article reports on the design and analysis of mobile geometry-learning activities in two iterations (the two iterations have previously been reported on separately as the projects Geo Math (GeM) (Eliasson, Spikol, Cerratto Pargman, & Ramberg, 2010) and Math edUcation and pLayful LEarning (MULLE) (Eliasson, Nouri, Ramberg, & Cerratto Pargman, 2010)). This article contributes (1) an analysis of students’ visual focus on devices and (2) guidelines for designing mobile learning activities allowing students to balance their focus between mobile devices and the learning tasks. The analysis of episodes of the activity observed were performed using the task model (Sharples, Taylor, & Vavoula, 2007). In comparison with other theoretical models, relevant to mobile learning research, the task model, we believe, is a powerful analytical tool that can be used to relate students’ focus on devices to individual aspects in the design of the learning activities.

In this article, we argue that the question of balancing visual focus on devices with the learning goals given by the task is fundamental to pedagogies using mobile devices from a socio-cultural perspective (Säljö, 1999, 2000). Furthermore we suggest that balancing visual focus on devices with the learning goals given by the task needs to be taken into account from a design perspective. From a socio-cultural perspective there is a need to search for solutions on how the design of mobile learning activities can help students balance their visual focus between devices and the educational task at hand.

Figure 1. Two pairs of students focusing on mobile devices rather than the environment
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