Exploration of Tensions in a Mobile-Technology Supported Fieldtrip: An Activity Theory Perspective

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ABSTRACT

The purpose of this study was to analyze how mobile technologies were incorporated and implemented in an outdoor learning activity. Two classes of primary school students participated in the experiment. Using activity theory as an analytical framework, it is found that underlying tensions provided rich insights into system dynamics and that technological affordances could be limited by mismatches between the Tools themselves, and between Tools and the ways that were used by learners or arranged by the instructor. The subtle human factors present in the use of technologies should be carefully considered. The influence of mobile devices on learner experiences in experiential learning is also thoroughly discussed.

Keywords: Activity Theory, Experiential Learning, Field-Trip, Mobile Technology, Tools

INTRODUCTION

As mobile devices are becoming increasingly commonplace on the modern society, researchers argued that mobile technologies have created many new exciting opportunities for learning (Liaw, Hatala, & Huang, 2010; Wu, Hwang, Su, & Huang, 2012). Mobile technologies, such as PDAs (Personal Digital Assistants) and cellular phones, may become an increasingly essential choice of technology for classrooms (Park, 2011) as they can construct an information-rich learning context which integrates learners, peers, the instructor, and the natural environment together with the technology. These learning contexts take advantage of emerging technologies to provide an environment for students that challenges, grounds, and, ultimately, extends their understanding (Barab, Barnett, & Squire, 2002). Mobile technologies afford real-time...
information whenever and wherever learners need it as well as a rapid access interface for note taking (Chao & Chen, 2009; Dai, Sears, & Goldman, 2009), such as photo-taking, and sound and video recording, which can aid in retention when out of the learning environment (Lai, Yang, Chen, Ho, & Chan, 2007).

So far, most research in the field of mobile technologies claims benefits to learning based on evidence of learning achievement (e.g., Hwang, Wu, Tseng, & Huang, 2011; Liu, Lin, Tsai, & Paas, 2012; Uluyol & Agca, 2012). However, the barriers of using mobile technologies were understudied. For example, from an activity theory perspective, learning occurs as a socio-cultural system, within which many learners interact to create a collective activity framed by cultural constraints and historical practices (Liaw, Hatala, & Huang, 2010). It is important to determine not only whether mobile technology is usable, but, more importantly, whether it serves to assist learners in achieving desired goals when performing tasks (Norman, 1998). It is therefore necessary to examine further the dynamics that exist among mobile technologies, the context within which they are implemented, and the participants themselves from the socio-cultural perspective.

In the past few decades, there has been much significant development related to field-trip learning. For example, in today’s classrooms there is an increased emphasis on authentic learning in the real world (Linn, 2006). Experiential learning (Kolb, 1984), which has also been widely applied to field-trip learning, emphasizes the process of having students undertake a program of discovery, whereby they develop their own concepts and understanding through experiencing and practicing activities (Abdulwahed & Nagy, 2009; Bergsteiner, Avery, & Neumann, 2010). The aim of the study was to examine the affordances and the constraints of mobile technologies. The authors developed a mobile learning system and a learning flow based on experiential learning to support field-trip activity. To be specific, experiential learning was borrowed as a theoretical framework in this study and mobile technologies were implemented to facilitate field-trip learning. To analyze the affordance and constraints of mobile technologies from a socio-cultural perspective, the analysis has twofold: Firstly, it compared the knowledge gain of two fifth-grade classes, one of which used mobile devices and the other did not, in order to explain the extent to which mobile technology benefited experiential learning. Secondly, it used activity theory as the methodological framework to analyze the inner contradictions revealed in this activity system. In other words, the study used activity theory as a lens to analyze how each component affects the affordances of mobile technology.

**LITERATURE REVIEW**

Activity is referred to as “a form of doing that is directed towards the fulfillment of an object” (Kuutti, 1996). Activity theory is “a psychological and multidisciplinary theory with a naturalistic emphasis that offers a framework for describing activity and provides a set of perspectives on practice that interlink individual and social levels” (Liaw et al., 2010). This framework uses ‘activity’ as the basic unit for studying human practices to help researchers understand the relationship between the human mind and activity (Engeström, 1987).

Vygotsky (1978) originally introduced the idea that human beings’ interactions with their environment are not direct, but are instead mediated through the use of tools and signs. This notion is usually portrayed by what has come to be known as the mediational model of human interactions with the environment (Mwanza, 2002). This model highlights the idea that the relationship between Subject and Object is not direct but is instead mediated through the use of tools. Engeström (1987) proposed the activity system and expanded the activity triangle model (See Figure 1), to extend Vygotsky’s original conceptualization for the mediated relationship between Subject and Object in order to reflect the collective and collaborative nature of human activity. Engeström’s expanded activity triangle model added social context and cultural aspects
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