

Chapter IX

Promoting Mediated Collaborative Inquiry in Primary and Secondary Science Settings: Sociotechnical Prescriptions for and Challenges to Curricular Reform

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ABSTRACT

Mediated collaborative inquiry within communities of practice is proposed as a critical educational goal for the 21st century. Mediated collaborative inquiry promotes the process of participation in search of understanding via mobile, wireless devices and social software. Communities of practice provide sociotechnical scaffolding to define and legitimate inquiry. In this chapter we present a collaborative, collective perspective of learning and practice to demonstrate how we design to support communities of practice for scientific inquiry. The first project, the Mobile Malawi Project, was an exploratory proof-of-concept attempt to facilitate learning and communication among geographically and socially distributed participants in Malawi, Africa using mobile smart phones and social software. The second project, Kids for Change, is a rigorous design-based research project building from the former that encourages middle school students in after school settings to use 3D digital modeling software (Google SketchUp) in socially relevant and civically engaging activities. Both endeavors are designed to provide primary and secondary students opportunities to learn and apply important scientific processes and mathematical ideas to real world situations while interacting with key constituents, including teachers, parents, teacher educators, and community experts. The authors conclude by noting cautions toward an approach of promoting collaboration and community with ICTs. Traditional institutions, pedagogies, and ways of knowing might preclude or hamper smooth transitions to a participatory, network-based educational system built on a Web 2.0 infrastructure and services.

INTRODUCTION

Collaboration is driven by discourse where knowledge is seen as the objective of a process of inquiry. Mediated collaborative inquiry is a sociotechnical phenomenon that cannot occur without intent, or without result. The social concept of inquiry is further refined by Etienne Wenger (1998), who states, “learning is, in its essence, a fundamentally social phenomenon” (p. 3). A learning environment that focuses on developing the greater collective intelligence and not merely individual knowledge is characteristic of a participatory learning environment. By its very nature this type of learning involves a social group, or community (Wenger, 1998). This social group’s relationship to itself, its situational context and the learning activities it engages in is how knowledge and knowing is defined. A defining aspect of this relationship is how the group relates to each other. Lave & Wenger (1991) call this a community of practice (CoP) in which a common interest is the catalyst for participation in learning where the novice works to become an expert, or insider, through interaction with community partners. This socially negotiated aspect of learning is what gives the individual and the community an identity. Negotiation as a form of discourse is collaboration, and it is in collaboration that the group becomes defined and individuals find identity within the group (Schneider & Evans, 2008).

The goal of this chapter is to briefly review current literature on mediated collaborative inquiry and communities of practice. The two constructs maintain mutually constitutive relationships as collaborative inquiry provides activities for group members while the community of practice defines, values, and legitimates proper forms of inquiry. Next, we review the devices and software that comprise our definition of Web 2.0. The term Web 2.0 is overused and thus elusive if not properly contextualized. Moreover, the type collaboration and interaction we envision is primarily mediated

via advanced ICTs. Afterward, we introduce a series of design evolutions of development on two projects (one international, one domestic) that demonstrate how collaborative inquiry and communities of practice guide instructional development and instructional technology in our stated view (Evans & Johri, 2008). We conclude by highlighting the challenges to using mediated collaborative inquiry and communities of practice as metaphors for design. On the one hand, collaboration is not the default in most instructionist-based (Sawyer, 2006) classroom settings creating tension among teachers, students, and designers. On the other hand, the communities-of-practice metaphor is still under-specified as a reference for design and thus demands thoughtful application. As several cases have demonstrated (see Schwen & Hara, 2001), members of organizations often resist explicit efforts to instill features that promote more communal learning atmospheres.

MEDIATED COLLABORATIVE INQUIRY AND COMMUNITIES OF PRACTICE

The concept of learning has shifted from recitation and recall from short-term memory, to a process of constructively using information in project-based settings to create new knowledge. Many current reform plans call for embedding the learning of basic skills in projects that engage students in critical thinking and problem solving in-group settings (Sawyer, 2006). Thus, the collaborative inquiry classroom provides a means to incorporate group settings into instructional strategies. According to Vygotsky’s sociocultural theory of learning (1986), these social settings are pivotal to the participation process. One of the key components of this new emphasis on social learning is collaborative inquiry (Roschelle, 1996).

First, what exactly is collaboration? Collaboration is an effort of students to work together in a social context to create a knowledge artifact, a

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