Knowledge Places: Embedding Knowledge in the Space of the Classroom

Anthony Perritano, University of Illinois at Chicago, aperri3@uic.edu

Abstract: This research investigates a novel approach to supporting classroom learning communities through ubiquitous computing and embodied interaction. Specifically, this work embeds community knowledge within the physical space of the classroom, with the aim of mediating opportunistic inter-group interactions instigated through proximity.

Vision

In a learning community approach to education (Bielaczyc & Collins, 1999) the whole classroom of students assumes "collective cognitive responsibility" (Scardamalia, 2002) for its progress, often creating a community knowledge base consisting of user-contributed content, semantic tags, votes, and other social information. While some research has investigated knowledge building environments, most designs have adopted a cloud-based interaction paradigm for contributing to and accessing emerging community knowledge. Cloud-based designs can be successful in promoting learning (Slotta, 2013), however, getting young learners to attend to and leverage the community's knowledge can be challenging. There are many reasons cited for this, including lack of interest, lack of awareness of the potential value of community knowledge, difficulty in formulating queries to access knowledge contributions, the granularity of contributions, and the dominant role of peer discourse and collaboration in daily classroom activity, particularly for younger learners. While these scaffolds do complement students' individual interactions with the cloud-based knowledge base, they leave in place a somewhat monolithic cloud as the repository of their collective work. The goal of this research is to explore the potential for moving the knowledge base into the space of the classroom. Supporting the construction of an emergent knowledge base in which students' physical location within the classroom and co-location with other students serves to mediate the filtering, access to, and applications of community knowledge – through the technology paradigm of ubiquitous computing, in which physical objects, surfaces, and spaces embody digital information. This approach, "Knowledge Places" (KP), decomposes the community knowledge base into a collection of thematic (disciplinary) units which are semio-spatially mapped (Roschelle & Pea, 2002) onto demarcated locations distributed around the classroom. This necessitates students' physical movement among those KP sites in order to contribute knowledge or otherwise access their peers' contributions through a "performant query," analogous to the way the Embedded Phenomena designs (Moher, 2006) require movement to investigate shared objects of inquiry. Ultimately, Knowledge Places seeks to bring learners into close contact with the aggregated community knowledge associated with a particular topic at each KP site and to bring learners into physical proximity with peers who share an immediate interest in a given topic for the purpose of fostering productive disciplinary discourse (Engle & Conant, 2002).

References

Bielaczyc, K., & Collins, A. (1999). Learning communities in classrooms: A reconceptualization of educational practice. *Instructional-Design Theories and Models: A New Paradigm of Instructional Theory*, *2*, 269–292.

Engle, R. A., & Conant, F. R. (2002). Guiding Principles for Fostering Productive Disciplinary Engagement: Explaining an Emergent Argument in a Community of Learners Classroom. *Cognition and Instruction*, *20*(4), 399–483. http://doi.org/10.1207/s1532690xci2004_1

Moher, T. (2006). Embedded phenomena: supporting science learning with classroom-sized distributed simulations. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 691–700. http://doi.org/10.1145/1124772.1124875

Roschelle, J., & Pea, R. (2002). A walk on the WILD side: How wireless handhelds may change computer-supported collaborative learning. *International Journal of Cognition and Technology*, *1*(1), 145–168. http://doi.org/10.1075/ijct.1.1.09ros

Scardamalia, M. (2002). Collective cognitive responsibility for the advancement of knowledge. *Liberal Education in a Knowledge Society*, *97*, 67–98.

Slotta, J. D. (2013). Knowledge Community and Inquiry: New Opportunities for Scripting and Orchestration. *OISE-University of Toronto*, 1–15.