

Supporting Collaborative Learning in Online Higher Education through Activity Awareness

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Abstract: Improving activity awareness, the ability to know what is going on around you in ways that are meaningful to your learning objectives and activities, in online learning has the potential to enhance the effectiveness of online learning for students and instructors. This paper introduces readers to the Context-aware Activity Notification System being developed for use within course management systems. [60]

Introduction

Online learning is becoming a pervasive part of higher education. However, while online learning plays a powerful role in broadening access within and beyond campus sites, there is a growing concern that it may be diminishing the quality of teaching and learning by forcing instructors and learners to view courses through the narrow pedagogical lens afforded by contemporary software systems. There is potential, however, for making the pedagogical aspects of online courses rich, effective and efficient, but this potential depends on improving online learning so it is active and social without making it more complex or technologically intrusive. Activity awareness, while a difficult objective to achieve, has great potential for supporting more active and social online learning. This paper briefly introduces the reader to the Context-aware Activity Notification System (CANS) being developed for the Sakai community and potentially for use within other course management systems, and to the objectives of a three-year project funded by the Fund for the Improvement of Post-Secondary Education (FIPSE).

The Need for Activity Awareness in Online Higher Education

Students learn in a variety of ways, including listening to lectures, writing papers, reading texts, undertaking projects, and discussing issues. Instruction provides explicit guidance for what to do and how to proceed. Given appropriate conditions and resources instructors can guide students to work individually or more collaboratively on their assignments. Additionally student motivation and tacit knowledge that comes from the instructional and social context also shape the “what to do and how to proceed” decisions that students make.

Today’s approach to online learning is encapsulated in course management systems (CMS) of which Blackboard, WebCT and Sakai represent popular applications. These CMS provide fairly effective ways for instructors to give and control access to information about a course (syllabus, assignments, grades) and about the subject matter (instructional resources). They also provide some facilities for direct interaction through discussion boards and chat rooms, and in various other ways try to support forms of interaction. These approaches help manage the course but are very limited in how they help teach the course or support learning. In many ways the CMS is a black veil between the instructor and students and among the students. Faculty and students are limited in their knowledge about what is happening in the course to the “words” spoken. Students do not see other students working; nor for the most part do they see each other’s products. Instructors do not see students working and can only influence them with words. The incidental learning that happens through working together, the social learning that happens through observing others, and the motivation to keep learning that happens because of a sense a shared social experience are greatly constrained. Instructors often impose artificial tasks such as requiring a number of postings to a discussion board to force some minimal level of engagement. Students quickly “learn” to only complete tasks that are directly related to course assessments and all too rarely become engaged in dialogue to enhance learning.

Learning in CMS does not provide attributes and cues that normally help motivate and tacitly shape face-to-face learning. Expert online instructors try to make up for these deficiencies with engaging tasks and emphasizing the social and collaborative nature of learning, but in general CMS are deficient in many of the cues that are important to motivation and for having activity help shape learning. By providing information about what others are doing (who is online, what are they doing, etc.) and what is happening (what documents are being read, what

activities have been completed, etc.), we predict that collaborative learning can be better supported in online higher education and will be viewed as substantially more effective, acceptable and sustainable for instructors and students.

INNOVATION

Awareness and Notification

Information systems need to attend to the social nature of knowledge building in order to support the accessing, processing and sharing of information (Brown and Duguid, 2000). Researchers and developers of knowledge building and sharing systems are finding that behavior in these systems is based on more than just the information stores of the systems and the explicit messaging of other members. Behavior is also based on the implicit messaging associated with behavior in these systems, such as being there, choosing actions, and ways of interacting. Researchers of computer supported collaborative environments have identified tacit aspects of communication, such as awareness, co-presence, social navigation, and social proxies, as fundamental to computer-mediated social interaction (Dourish, 2001, Erickson, et al., 2002, Fitzpatrick, et al., 1998). Harrison & Dourish (1996) argue for using the computer (1) as a medium to represent the explicit and tacit information to be shared in a social interaction, and (2) having forms of the medium that are appropriate and effective for the social practices of the “place.” Dourish argues that computation is a medium that communicates between social actors and that represents possibilities for action (participation in the world) (Dourish, 2001, Dourish, et al, 1996, Erickson, 1993, Neale, et al., 1998).

Dourish also stresses the notion of “accountability” (making actions observable and reportable) because it provides others with a means to understand and respond to the actions of others for mutually constructed sequences of action. Fitzpatrick et al. (2002) have taken similar notions of accountability in a social space (locale) as a foundation for designing collaborative systems. They note that the integration of functionality to produce, gather and redistribute information from everyday activities with facilities to make the information publicly available and easily accessible enables computer-mediated awareness to support the flow of interaction that happens easily when participants are co-located.

Context-aware Activity Notification System

Based on Strauss’s Theory of Action and Vygotsky’s Activity Theory, Fitzpatrick (1998) developed the Locales Framework to explain mutual activity in an online environment. Amelung (2005) has extended the Locales Framework by developing a Framework for Notification in online collaborative environments. The implementation of the framework uses a distributed architecture and is called CANS (Context-aware Activity Notification System). The CANS System includes the collaborative online system, such as a course management system, and the CANS Server, which provides communication and database services for notification. CANS supports capturing activity information by establishing a vocabulary of tools and action events, maintaining a history of activity, making notifications available based on the context of use, and allowing users to configure their notification preferences.

CANS works by observing activity in the CMS, such as when a member logs in, reads a discussion board item, uploads a document, or enters a chat message. The records of all these observations are stored in the CANS database and matched with profiles for access to awareness information set by the members. Matches lead CANS to send information to members who want the information in a form they have selected. For example, a student in a group may want to know when the instructor has posted an assignment and have that information immediately emailed or delivered via a desktop widget (a small application that can always be visible on one’s desktop). The student may want to see who has posted new messages or read existing messages, but only want that information when they enter the CMS. An instructor may want the same information but want it organized in a table to see who has contributed and how much to a discussion. Thus the awareness information is a resource for instructors and students in knowing when and how to act, and also a tool for an instructor to quickly make sense of what is going on in the course, how to assess what is going on, and identify appropriate next steps for the class or individual students.

CANS Development and Implementation

Over the past 2 years we have developed CANS to work with Sakai. Sakai is a CMS with a community source license that is rapidly emerging as a platform of choice in university environments. As well as being a software system, Sakai is also a community of educators, researchers and developers who are envisioning how software and information systems can substantially improve higher education teaching and learning experiences. The Sakai community, <http://sakaiproject.org>, includes over 80 institutions of higher education (IHE).

CANS is licensed under the Educational Community License (1.0) version of the open-source license and is designed to work with Sakai or any other network-based application capable of generating or receiving XML. CANS is being used at the University of Missouri-Columbia in online courses and notifications are provided via daily email digests that describe activity within a course context over the past 24 hours. New forms of digests are being developed to show social comparisons and test the influence of various strategies to visualize the activity data. The CANS Server and desktop widgets can be downloaded at <http://www.cansaware.com>.

FIPSE has funded a three-year project to enhance and extend CANS, test its potential to improve online teaching and learning, and examine the impact of providing more socially attuned course management systems on the acceptance of online learning in higher education. In the first phase of development CANS will be enhanced so as to provide online and customized management of notifications by instructors and students. This ability for customization along with new development to embed notifications within a notifier application on the home pages of course sites will be tested for its impact on the social nature of learning and technology appropriation. Phase 2 will continue the development of phase 1 and add new tools for visualizing course activity as well as integrating notification information into common Sakai tools, such as the discussion board and resources applications. Phase 2 will include testing the impact of notification on teaching practices and learning outcomes, and be undertaken with partners at the University of Michigan and Virginia Tech. In addition the CANS team is eager to find more partners who would like to try CANS and participate in collaborative research to test and extend the potential of activity awareness to improve the social nature of online courses and augment efforts for collaborative learning.

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