Online learning community development expectations: A science story

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Abstract: This paper describes the development challenges of an online learning community for teaching science as inquiry. Participation patterns of fourteen teachers within a cohort of seventeen teachers were examined via activity logs. Though teachers were diligent in the work assigned to them and participated regularly in the assigned activities, patterns of activity were not conclusive to indicate success of the designed online learning community although the best practices identified by research were employed (community building among participants, use of an online facilitator, and blending work and training). Work is still ongoing with suggestions towards analyzing member types, and tools, and considering controlled content and discussion.

Introduction

In higher education settings, distributed or distance learning opportunities have increased (Allen & Seaman, 2007) where technology integration and digital access is identified in almost all strategic goal statements. The World Wide Web has grown tremendously since Tim Berners-Lee first came up with its concept in 1989. In Berners-Lee's proposal at the *Conseil Européen pour la Recherche Nucléaire*, now referred to as CERN, he stated that a universal linked information system would "allow a place to be found for any information or reference which one felt was important, and a way of finding it afterwards" (1989, p.1).

Improving student access and appealing to non-traditional students is often cited by institutions of higher education as reasons for offering online courses (Allen & Seaman, 2007). In schools of education, these students are often in-service teacher enrolled in professional development coursework. These teachers have relied historically on printed information, but now also on information from the Internet (Kuiper, Volman, & Terwel, 2005). Relying on the World Wide Web for content and reference are all too common with our society in the 21st century, whether it is for formal and informal education, personal interests or recreation. With the abundance of personal computers and the emerging mobile devices, reliance on the Internet is relatively easy.

The issue of access in schools (Bolt & Crawford, 2000) recognized as the digital divide has decreased, allowing teachers the ability to themselves rely more on the Internet for classroom instruction as well as for student projects. In fall of 2005, 94% of public schools had access to the Internet compared to 35% in 1994, with 94% of instructional rooms also having direct access (Wells & Lewis, 2006). 97% of those schools with access had broadband access. Forty-five percent have wireless access also, 15% of which is in instructional classrooms too. About 50% of teachers used computers/Internet during class time in 1999 (Smerdon et al, 2000). Additionally, there are over 1 million K-12 students taking online courses (Picciano, Seaman, Shea, & Swan, 2011).

Background

The Curriculum Research & Development Group (CRDG) is an organized research unit in the College of Education at the University of Hawai'i. Since 1966, CRDG has served the educational community locally, nationally, and internationally by conducting research and creating, evaluating, disseminating, and supporting educational programs

that serve students, teachers, parents, and other educators in grades preK–12; and contributing to the body of professional knowledge and practice in teaching and learning, curriculum development, program dissemination and implementation, evaluation and assessment, and school improvement. Recently, CRDG has delved into developing online learning communities within professional development research and have encountered various issues technology in K-12 teaching and learning including teacher experience, comfort in online environments, integration of technology into teaching, and expectations of technology. CRDG's online work is guided by research that has shown that effectiveness of online learning communities are increased by factors such as community building among participants, use of an online facilitator, and blending work and training (Palloff & Pratt, 2011).

The Study

The purpose of this study is to consider how to design an online learning community in which science teachers trained in various science curricula of CRDG can interact and support each other without CRDG faculty and staff continuously present. The experiment was first attempted in a course management system (Gray, Nguyen, Speitel, 2005) of the University of Hawaii where teachers were all given very specific assignments in a course structure. The course was not presented as a community of practice or learning, but as a course in itself. In this current project called Teaching Science as Inquiry-Aquatic Science (TSI-A), an online learning community has been designed outside of a course management system tied to the structure of the university. Instead, the course management system is its own entity and is not blocked by the extensive firewalls at K-12 schools. The development of the online learning community was part of a larger project whose purpose was to promote teaching science as inquiry (TSI). The online learning community (OLC) was designed to enhance communication and collaboration amongst the participating teachers, as well as provide a mechanism by which resources could be shared.

Data Sources

Participant teachers were administered a general demographics survey, a introductory computer use survey, and a online motivation survey. We also analyzed data available via the analytics tool on the online learning community software backbone, vBulletin v.4.15. We will compare the usage data against that of the TSI-A expectations.

Fifteen teachers were part of our OLC analysis. All are science teachers who are part of an inquiry science professional development series. Teachers already possess high levels of motivation to better their own science teaching. They were selected to be part of the program through an application process. Seven men and eight teachers. One teacher has withdrawn from cohort 1 of the program. Of the remaining fourteen teachers, seven use Internet resources daily for instruction, while three use it 2–3 times a week, and one uses the Internet only once a week for instruction. Our teachers had a high comfort level with technology (M=8.33, SD=.07) and all indicated that they use the Internet on a daily basis and use it for work purposes. One teacher indicated that they did not have a personal email address, only one assigned by work. Three teachers are not members of any online group for personal reasons (e.g. hobby) and eight teachers are part of a professional online group that is not a requirement by their schools. Three teachers run their own blog, none listen to RSS feeds, and five watch videos online for work purposes on a regular basis.

To better understand our teacher participants, we adapted a survey from Ying Hu (2008) called the *Motivation, Usability, and their interrelationships in a self-paced online learning environment* of the Virginia Polytech Institute and State University. Results are seen in Table 1. From this survey we learned that all the teachers have read research articles online and searched for course information online. However, not all had experience posting discussions or completing online tutorials. In addition, even fewer had participated in semester-long online courses.

Table 1

Teacher participant experience with online features

Feature	N
Read research article or book online.	14
Search course or research related information online.	14

Access course related information or documents from course mgmt sys	13
Post messages to online course-related discussion groups	11
Complete asynchronous online tutorial	9
Have live/synchronous online class session	11
Complete semester-long online asynchronous course	6
Complete semester-long online synchronous course	5
Complete semester-long online blended course containing both synchronous and asynchronous sessions	5
Complete an online academic program consisting number of courses and earn degree or certificate	4
Other online experiences	14

In the OLC, we tracked the number of times a participant posted items to the site or participated in other discussions as seen in Figure 1. We found an average of about 13 posts per person (M=12.69, SD=4.03) over a span of 10 months. Thought we agree that the number of posts is not the best metric to use for determining success of an OLC (Fung, 2004), we do consider it to be one metric that we cannot overlook.
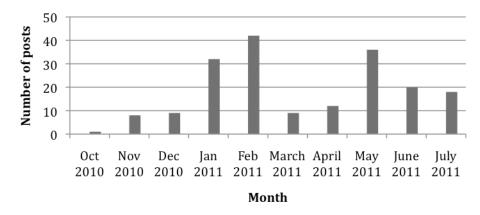

Figure 1. Total posts in OLC from October 2010 to July 2011.

Discussion and Future Direction

As we continue our work, some next questions for our development team is to consider if our low posting numbers are due to excellent workshop instruction and retention, thereby negating the need reference back to the OLC for support. Or, perhaps the materials being provided in a full color binder has also influenced the need to rely on the OLC. Also, we will consider if spikes in usage were in Jan 2011, Feb 2011, and March 2011 correlated to workshop face-to-face meetings times.

Since we have a high comfort level (M=8.33 out of 9 possible) and high frequency use (100% are daily users) of the Internet in the participant group, we are entertaining a hypothesis that our OLC does not provide for anything new or novel, but reinforces what our participants have already learned face to face. We may need to look to incorporate more Web 2.0 technologies.

As we continue our development, we will address how to make the OLC more engaging and interactive? Some research has already shown that one way to do it is to make the OLC modifiable by the end users. This means, teachers can build apps for it, manage the flow and topics, and create their own discussion lines and such. The teachers have given the OLC a positive rating in terms of retaining their interest (M=6.6 out of 9) and being a worthwhile of their time (M=6.8). We will try to continue our development to increase interaction and instill the sense of community and not course.

This project
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