Extending the Elgg Social Networking System to Enhance the Campus Conversation

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Abstract

This paper presents a design research project adapting Elgg, an open source social networking package, for use in graduate education. The modified software represents an alternative model to the traditional course management system, using blogs & wikis to support student collaboration and peer learning. Students found that the application helped them learn from each other, deepen their peer relationships, feel a sense of ownership over their posted content, and reflect on their class progress. They did not find that the application was particularly valuable for allowing them to customize their online profile or increasing student/professor interaction. The application, as used and evaluated, can be considered a preliminary model for how social networking software can be used to promote conversation in graduate education settings.

Overview

This research project was motivated by a belief that social software systems are a viable replacement for traditional course management systems in educational settings. While traditional systems are excellent at managing courses and learning, we believe that social software has better potential to deepen peer relationships and develop academic conversations and community. Our particular setting was a set of transdisciplinary courses at Claremont Graduate University. These courses attempt to help students to develop a scholarly voice and to engage with other disciplines. To a large extent, conversation with other fledgling community members enables a student’s transformation into a scholar. While conversation is only part of the experience, it has a central place in graduate education.

With this in mind, one can consider how well current online education tools are designed to support graduate education. Current applications provide features like discussion boards, grade books, and drop-boxes. These tools support conversation, but only in a very limited manner. Course communities in BlackBoard or Desire2Learn close at the end of a term. Students' work is scattered in multiple places, making it difficult to develop a consistent tone and style and difficult to share with friends, family, or peers. Many course management systems (CMS) limit peer conversation to prevent students from copying each other's work. As a result, the CMS remains an institutional tool, and prevents students from controlling the visibility, organization, or presentation of their online content.
Graduate education requires systems that support the development of students’ individual voices. Students should be able to choose what work is visible to whom, and what work should be prominently displayed. They should have the ability to connect with people in different courses and disciplines, and the possibility of interacting with classmates after a term ends. Systems should support peer interaction, viewing it not as a chance for plagiarism, but as a way to build the kind of academic conversation that resides at the heart of every university.

We conducted a design research project to advance understanding of what can be done to support conversation in a research-intensive graduate educational setting. Our primary research goal was to develop a working application to support online conversation among graduate students. Our secondary research goal was to extend existing open source social networking software in a way consistent with academic conversation and identity building.

We worked within a set of constraints imposed by practical issues of affordability, ease-of-use, usefulness, and compatibility with common computing platforms. Our resulting design artifact, a social networking tool tailored to graduate education, was used in a variety of graduate courses. The online activities and opinions of our users provide the basis for several important conclusions. The software itself provides a working model for how one should support online graduate education conversation.

While most appropriate for graduate education, this model can also be extended to upper-level undergraduate courses. Undergraduate students are also concerned with developing their personal voice and in becoming active members in a larger conversation. While the constraints of large class sizes and introductory courses may prevent some of the individualization for certain areas, there are a large number of additional spaces where it can be successfully applied.

**Literature Review**

The emergence of technology over the past two decades has radically changed the instructional options available in a college classroom (Brescia and Miller 2006). Classroom technology has radically improved, moving from overhead transparencies and film media to video-conferencing and immersive virtual worlds.

**Design Science**

This paper follows the design science paradigm. Aligning with Herb Simon’s *science of the artificial*, we are interested in using the design science paradigm to solve a specific and concrete problem. This is in opposition to *natural science*, with is interested in understanding reality. While natural science consists of two primary activities, discovery and justification, design science consists of the build and evaluate cycle. In this paradigm, researchers identify a problem, create an artifact, and evaluate its
effectiveness at alleviating the problem.

Hevner et al.’s influential MISQ 2004 article presents a framework for information systems research. To paraphrase their criteria for reviewing design science research, it is the creation of an innovative artifact yielding utility for a specific problem domain, whose thorough and rigorous evaluation is then communicated to a larger audience.

In this paper, the artifact is an implementation representing a class of social software systems. It is innovative in that it applies a new style of software to an existing domain, gaining research evidence from a diverse population of graduate students. The problem domain is graduate education. This implementation is evaluated through qualitative and quantitative techniques, and relies on our network access logs, an analysis of the posted coursework, and several surveys.

**Course Management Systems**

One major component of today’s technology-filled classrooms are course management systems (CMS). These systems are now used by over 96% of all institutions (Educational Marketer 2003). As pervasive features of the educational landscape, they have a major impact on students and faculty. In addition, recent consolidations and mergers have resulted in a single company, BlackBoard, controlling 60% of all course management installations (""Patent Fight in Online Academia" 2006). Additionally, BlackBoard looks to monopolize the industry, and has been using patents to sue its smaller rival Desire2Learn (Jaschik 2006).

Even so, there is much research looking into the next-generation CMS. A recent publication in Educause Quarterly (Jafari, McGee, and Carmean 2006a) and a privately-published whitepaper (Jafari, McGee, and Carmean 2006b) present how students are interested in a CMS that more closely matches the kinds of systems they use socially. Students want systems that place them at the epicenter, rather than being course-focused.

**Blogs**

The recent explosion in online content creation and networking cannot be overstated in importance. Over 57% of U.S. internet-using teens have created online content in the form of blogs, artwork, video, and content remixing (Lenhard & Madden 2005). 55% of all American teens have at least one online profile on a social networking site (Lenhart & Madden 2007).

One of the most common online content production activities is blogging. 19% of U.S. youth aged 12-17 have created a blog, and 38% of U.S. youth report reading them (Lenhart & Madden 2005). The blog search engine Technorati currently indexes 62.3 million international blogs ("Technorati: About Us" 2007), and records almost 100,000 blogs being created each day (Sifry 2007). Estimates suggest international blogging will peak at 100 million people before June 2007 ("Blogging May Peak in 2007" 2006).
There have been a number of academic research projects looking at the value of social media and blogging in the classroom. Many researchers are interested in using blogs to create informal student-centered spaces. Using a Delphi method, Brescia and Miller (2006) found that blog researchers believe the greatest benefits of blogs are in their ability to promote student reflection, engagement, portfolio, and high-level synthesizing activities. Barrett (2005) also promotes the use of blogs as a method for Digital Storytelling, a way for students to present themselves to others and to reflect on their learning.

**Social Presence**

One of the most important characteristics of blogs is their ability to project social presence. Social presence can be defined as “the salience of the other person in interpersonal interaction” (Short, Williams and Christie 1976). It was originally conceived as being a property of the underlying medium, similar to Daft & Lengel’s (1986) Media Richness Theory. However, later research found that individual people inside of the same course report different levels of social presence (Swan and Shih 2005).

Cameron and Anderson (2006) describe social presence as “the ability of participants in a community of inquiry to project themselves socially and emotionally as ‘real’ people.” This is a crucial aspect of creating a conversation; a participant must feel they are connecting to a real person for an enduring relationship to form. Cameron and Anderson separate social presence into focus, identity, safety, ownership, and style dimensions.

Focus relates to the ability of students to talk about subjects that interest them. As Cameron & Anderson (2006) put it, “[t]opics of discussion within a computer conference are typically course focused and instructor directed.” Blogs create the possibility for self-directed rumination and peer collaboration in addition to core course work. This is not possible in a traditional CMS.

The concepts of identity and style relate to the ability of a student to develop a personal voice. In contrast to threaded discussions (with work scattered throughout the system), students develop a personal style with their work collected in one location. Identity can also be developed through customization and personalization of a site, use of a formal or informal voice, and stylistic decisions.

Students must have a feeling of safety before they can project themselves online. This can be accomplished by allowing students to close off some of their work to a limited audience through permission settings.

The concept of ownership is also linked to social presence. Most blogging systems allow the users to control their environment and communication. Creating a sense of personal ownership is also thought to be crucial in constructivism, where learners are expected to learn in their own unique way.

“A tenet of constructivism is that learning is a personal idiosyncratic experience, characterised by individuals developing knowledge and
understanding by forming and refining concepts. The focus of constructivism is on learner control, with learners making decisions which match their own cognitive state and their own needs.” (Squires 1999)

Although we use survey instruments from a number of other articles, our central measurement was originally created to measure social presence in an online computer conference (Gunawardena and Zittle 1997). Social presence proved to be an important predictor in students’ satisfaction with the conference, predicting 60% of the variation in their satisfaction.

Richardson and Swan (2003) utilized a modified version of the original Gunawardena & Zittle (1997) survey, adding perceived learning and instructor satisfaction constructs. The resulting model was better able to describe students’ experiences in the course by recording how they felt about their learning, professor, and social interactions. The three constructs were significantly correlated, showing that students’ learning, community, and appreciation of their instructor were linked. Later research extended this model, separating professor’s and students’ social presence (Swan & Shih 2005).

Implementation

This study used the Elgg social networking system as the platform for creating online community. Elgg has been under development for over three years, and is currently being used across the world in a wide range of applications. It is supported and developed by Curverider, a small company offering hosting and custom development. It is also open source, which is preferred by the authors for both philosophical and practical reasons.

Traditional course management systems, like Angel or WebCT, focus on managing a student’s progress throughout a particular course. In contrast, Elgg brings the focus to the individual, providing users with complete control over their online profiles. Students maintain their own blog, file gallery, avatar, and personalized templates. Users also maintain full control over who can view their content, and can designate other members of the community as “friends.” Elgg also allows individuals to form academic and non-academic communities.

As part of making Elgg more usable for an academic course community, a lab member developed a wiki add-in component. The add-in uses namespaces local to each community or user so that multiple users can have pages of the same name. In a traditional wiki (such as MediaWiki), each page has to have a unique name. As a result, when two students each try to have a page titled “Introduction,” the system will only allow the first user to create their page.

The wiki add-in also uses WYSIWYG editing, as traditional wiki page markup languages can be intimidating for non-technical users. While formatting problems do occur, students can generally copy and paste from Microsoft Word. The only specialized wiki markup tags used were [page title] for automatic hyperlinks to other pages, and {youtube:videoindex} to embed YouTube videos.
The add-in also makes it easier to view recent activity by aggregating activity across communities. A custom template and several other small adjustments were made by another lab member to improve the ease of use.

When referring to Elgg in the later sections, this paper refers to the enhanced version used by our lab. Our add-in is also being used by a number of other installations, as evidenced by the author's personal communications with over 20 different site administrators requesting features or asking for assistance. The University of Brighton, with over 30,000 users, is one of the largest sites using our wiki plug-in.

Implementation Site

Over the past two years, all incoming doctoral students attending our university have enrolled in courses looking at significant real-life problems from a transdisciplinary perspective. While these courses have achieved a certain level of success in encouraging research across different disciplines, the courses have not resulted in as many collaborative research projects as hoped.

With funding from a small grant and the support of our university’s President, we were able to support three transdisciplinary courses. The topics of the courses were very different, including “Death & Dying,” “Rebuilding New Orleans,” and “Inductive Research.” An information systems research course and education class also ended up using the site, giving us a total of five classes participating in the research project.

The four professors came from a diverse set of backgrounds, including English, Education, and Information Systems. The Education professor taught a transdisciplinary course and the education course. Each of the three transdisciplinary courses also had a number of teaching assistants.

Our primary goal was to enhance community among the students taking the courses. While we were also interested in students’ perceived learning and instructor satisfaction, our sponsor was most interested in forming a true academic conversation. Because the central purpose of the courses was to create this academic conversation, the creation of peer relationships was crucial.

Methodology

With the diverse range of classes being supported, identifying what did and did not work proved challenging. With so many variables involved, we turned to the model used by Richardson and Swan (2003) to accurately describe each individual student’s experience.

Each of the five classes was given a pretest and posttest, as well as having their website activity recorded. The pretest contained several sections. It began with a basic demographic section that asked students for their age, gender, department, first language, and if they were an international student. Following were several sections not used for this paper, including software use, introversion/extroversion, and online
readiness. Lastly, a simple six-part index measured technical familiarity by asking students to rate their familiarity with Blogging, E-Profiles, File Sharing, RSS, Social Networks, and Wikis on a 1-3 scale. Although the pretest provided general information on our users, overall it proved less useful than the posttest.

The posttest contained a number of different sections. We built upon the questionnaire used in Richardson and Swan (2003), making several small changes to better align it with our software and implementation site. We also included a number of additional questions constructed to measure social networking, learning, and technology acceptance.

Usage Overview

Most of the classes ended up using Elgg extensively. However, there were significant differences in the way that classes used the site. In some courses, students posted to a single community blog and used the comment feature extensively. In another course, students only used their personal blogs for posting content. Several classes used the wiki feature to coordinate group projects. Professor participation varied from no online contributions to over 20 blog posts and comments.

Each of the courses also had dramatic differences in student population characteristics. For example, the inductive research class was cross-listed as an information science research course, leading to a high percentage of information science students being enrolled. Because the information systems department has a much higher proportion of international students and fewer female students than the other departments, those populations were over-sampled.

We were able to log 75 days of web access history. In this time, we averaged 3,605 page views and 67 visitors per day. We used 67 MBs of bandwidth a day, totaling almost 5 GB over 3 months. Almost all of this traffic was in page views.

The pretests were given at the beginning of the term along with a demonstration of the system. Although participation was optional, most of the students filled out the surveys. The information systems research class was not given the pretest, as they did not decide to use Elgg until several weeks into the term.

The posttest was also given in class for four of the five courses. Again, students were not required to fill out the posttest, but most did. Students were requested to give their name on the posttest and pretest, allowing us to link the two documents.

We also ran inquiries on the website to determine posting activity. These data were then linked with the survey data for further analysis.

Fifteen students who had taken the pretest did not complete the posttest. Twelve people who completed the posttest had not taken the pretest. Eight posttests did not have a name, making it impossible to link them to the pretest or online activity. This left a total of 42 results with both the pre- and posttest fully filled out. A number of the results did not require the pretest information or activity information, in which case all
62 completed posttests were used for the analysis. Overall, we achieved a 66% response rate, which varied heavily by course.

<table>
<thead>
<tr>
<th>Course</th>
<th>Personal Blogs</th>
<th>Comments</th>
<th>Group Blogs</th>
<th>Comments</th>
<th>Group Wiki Page</th>
<th>Edits</th>
<th>Users</th>
<th>Posttests Returned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>17</td>
<td>6</td>
<td>260</td>
<td>47</td>
<td>11</td>
<td>127</td>
<td>28</td>
<td>50%</td>
</tr>
<tr>
<td>2</td>
<td>19</td>
<td>0</td>
<td>175</td>
<td>70</td>
<td>70</td>
<td>158</td>
<td>17</td>
<td>100%</td>
</tr>
<tr>
<td>3</td>
<td>272</td>
<td>27</td>
<td>51</td>
<td>305</td>
<td>46</td>
<td>622</td>
<td>28*</td>
<td>64%</td>
</tr>
<tr>
<td>4</td>
<td>32</td>
<td>1</td>
<td>17</td>
<td>64</td>
<td>88</td>
<td>163</td>
<td>12</td>
<td>75%</td>
</tr>
<tr>
<td>5</td>
<td>266</td>
<td>481</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>11</td>
<td>36%</td>
</tr>
<tr>
<td>Total</td>
<td>606</td>
<td>515</td>
<td>503</td>
<td>486</td>
<td>216</td>
<td>1071</td>
<td>96</td>
<td>66%</td>
</tr>
</tbody>
</table>

* This class included two paper authors, noted in the user total, who did not fill out a survey.
* This table excludes users who were professors or TAs.
* Class 5 was taught by one of the authors. No pre-tests were filled out by this class, and post-tests were conducted through an e-mail request instead of in-class. This resulted in the lower response rate.

The above table shows the different levels of activity among the courses. Some courses barely used the tools, while others made it an integral part of their class. Differing patterns of use can also be seen: some courses had students post in their personal blogs, some used comments in public blogs, and some used the wiki tool to coordinate group projects.

**Overall Results**

Overall, students were quite satisfied using Elgg in their respective courses. 60% of people reported being satisfied or strongly satisfied using Elgg in their course, while only 10% reported having a negative experience.

<table>
<thead>
<tr>
<th>Disagree</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>CGU should have an online social learning site</td>
<td>13% 8% 16% 37% 26%</td>
</tr>
</tbody>
</table>

In addition, 63% felt that the university should have an online social learning site, showing that they were interested in a social platform even if they did not like the Elgg platform.

Disappointingly, students did not report an increased amount of interaction with their professors. Although we would have preferred for the tool to improve interaction with course instructors, our central research goal was to improve peer interaction and deepen their relationships.
47% of students returning a posttest reported more interaction with classmates than in a normal course. Furthermore, 67% said they strengthened relationships with classmates more than in other courses. While there were a fairly significant number of people disagreeing with both questions, the numbers indicate Elgg was able to support an environment conducive to peer engagement.

<table>
<thead>
<tr>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I had more interaction with my classmates in this class than in other classes</td>
<td>8%</td>
<td>14%</td>
</tr>
<tr>
<td>I have strengthened my relationships with students more in this class than in other classes</td>
<td>0%</td>
<td>3%</td>
</tr>
</tbody>
</table>

The posttest also showed that 46% of the students exhibited a preference for using Elgg over a traditional course management system. A significant portion of students (39%) reported neutral feelings on this question, suggesting that improving some of the design flaws could convert wavering adopters. Only 15% reported that they preferred using a traditional CMS.

Lastly, we asked students to report their general level of satisfaction with the course. There are a significant number of negative responses, many of which are probably due to the transdisciplinary course being a required class.

<table>
<thead>
<tr>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall, I would prefer using claremontconversation.org over a traditional course management system like Blackboard, Sakai, or WebCT.</td>
<td>0%</td>
<td>15%</td>
</tr>
<tr>
<td>Rate your overall satisfaction with the course.</td>
<td>24%</td>
<td>16%</td>
</tr>
</tbody>
</table>

All of these responses varied dramatically by course, which had wide variations in topics, professor backgrounds, and student populations. The following table shows the average for each of the summary variables by course. Strongly agree is coded as a 5, and strongly disagree as a 1. The first row also allows the reader to compare the activity of the average student in each course by showing the average student's contribution to overall system-wide activity.
On average, the percentage of system-wide activity accounted for by each member of the course.

<table>
<thead>
<tr>
<th>Class</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>How would you rate your overall experience of using ClaremontConversation.org in helping achieving your class objectives?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CGU should have an online social learning site</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rate your overall satisfaction with the course.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I had more interaction with my professor in this class than in other classes.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I had more interaction with my classmates in this class than in other classes.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have strengthened my relationships with students more in this class than in other classes.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall, I would prefer using claremontconversation.org over a traditional course management system like Blackboard, Sakai, or WebCT.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The above table clearly shows major differences between the courses. When two courses' classmate interaction average can vary almost 2 points on a five-point scale, it is obvious that there are significant factors affecting students' use of the software.

**Software Features**

We also asked students for information on the importance of various other software features. While not directly linked to our research goals, these questions provide some useful information on future design iterations of the software.

We asked several questions to determine differences between using Elgg and using a commercial social networking platform. We found that 82% of students prefer using an exclusively academic site for their coursework, and 73% prefer a .edu address.

<table>
<thead>
<tr>
<th>Disagree – Neutral – Agree</th>
<th>It is important to have CGU’s online courses/communities on an academic site (rather than on commercial ones like Yahoo Groups, Blogger, or Xanga)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>It is important that the website address end with “.edu” so people can identify it as being an academic site</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

72% of the returned surveys indicated that the ability to set access restrictions was an important feature. When looking at the activity statistics, over 40% of all blogs in the system were restricted in privacy to either logged-in users or a class group.
Eleven of the qualitative responses mentioned that the site navigation and layout should be improved. Students had difficulty finding content and knowing where to post. While there was a large initial learning curve, students were able to eventually figure it out. As a result, 65% of students reported that the website was easy to use.

<table>
<thead>
<tr>
<th>The ability to make blog posts, comments, files, and wiki pages private (or restricted to my class) was important to me.</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>2%  8%  19%  38%  33%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The website was easy to use</td>
<td>2%  10%  24%  43%  22%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Related to ease-of-use was the difficulty in tracking activity in the system. When combined with some groups’ lower levels of use, this meant that sometimes students would never receive responses to posts or queries. Future design iterations will need to better aggregate activity and keep users informed of peer activity.

"Also, my comments to others’ posts were invisible; no one seemed to take notice of comments."

There were also a number of comments relating to text formatting. Students frequently wrote their posts in Microsoft Word and expected to be able to copy and paste into Elgg without any problems. Unfortunately, this sometime caused problems, as Word’s proprietary format does not map exactly to html.

"In the ELGG site, I did not understand why text that I brought over from MS Word as one style became formatted differently."

The wiki add-in turned out to be a major addition to the course. It provided a place to synthesize and collaborate on group projects, as can be seen by the activity among various classes. Twelve people specifically mentioned the wiki as being one of the most beneficial aspects about the course. One class posted the following in their final report.

With regards to our findings about our group-work experience in profile writing, we all sang praises for the wiki. Using wiki pages to present our section of the project was extremely convenient and enhanced the effect of this combined effort... For some of us, it was our first time working on group projects through this technological medium.

However, a significant number of students asked for the wiki design to be improved. Several people found the tool somewhat rudimentary, and requested that it be refined before further classes.

The one thing I would like to see improved is the wiki... It was difficult to figure out who had written what, and where anything was. Admittedly, we would have needed either more discipline or a dedicated scribe for some of the groups to have any hope of keeping all the blurbs, missives and half baked writing straight... I cannot actually propose anything better than the wiki (unless the school springs for some of the expensive groupware we use at work !! ), but I think the wiki should only be utilized with a clear understanding of its limitations.
A number of the more technologically literate students who had used wikis elsewhere mentioned that they would have preferred using a tool with a wiki markup language. While recognizing that some users prefer the utility of this style of wiki markup, we still believe that the use of a rich text editor was an essential feature in user adoption.

In the end, Wiki adoption seemed to depend either upon previous technological familiarity, or on the group committing to use it for collaboration. As with any tool, no matter how easy to use, some time is required to learn how to apply it properly.

**Social Presence Model**

We use the previously mentioned constructs of social presence, instructor satisfaction, and perceived learning to understand the experiences of individual students in each course. Before breaking down the model and analyzing each individual component, we wanted to compare the overall model with prior research to make sure that the same relationships apply.

Our study was directly comparable with two other research reports through the use of almost identical research instruments. On average, our students reported lower mean values than those results reported in Richardson and Swann. However, the correlations and standard deviations are almost exactly the same across the three studies. This allows us to assume that the general theoretical model applies, meaning that we can use it to draw conclusions about the usefulness of our software.

<table>
<thead>
<tr>
<th></th>
<th>This Study</th>
<th>Richardson &amp; Swan (2003)</th>
<th>Swan &amp; Shih (2005)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Social Presence</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>3.53</td>
<td>4.39</td>
<td>NA</td>
</tr>
<tr>
<td>Std. Dev</td>
<td>0.85</td>
<td>1.00</td>
<td>NA</td>
</tr>
<tr>
<td>Correlation with perceived learning</td>
<td>0.634**</td>
<td>0.68*</td>
<td>SPP 0.70**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SPI 0.74**</td>
</tr>
<tr>
<td>Correlation with instructor satisfaction</td>
<td>0.605**</td>
<td>0.60*</td>
<td>SPP 0.56**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SPI 0.81**</td>
</tr>
<tr>
<td><strong>Perceived Learning</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>3.32</td>
<td>4.70</td>
<td>NA</td>
</tr>
<tr>
<td>Std. Dev</td>
<td>1.58</td>
<td>1.37</td>
<td>NA</td>
</tr>
<tr>
<td>Correlation with instructor satisfaction</td>
<td>0.803**</td>
<td>0.73*</td>
<td>0.74**</td>
</tr>
<tr>
<td><strong>Instructor Satisfaction</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>3.27</td>
<td>4.39</td>
<td>NA</td>
</tr>
<tr>
<td>Std. Dev</td>
<td>1.73</td>
<td>1.74</td>
<td>NA</td>
</tr>
<tr>
<td>Study n</td>
<td>62</td>
<td>95</td>
<td>51</td>
</tr>
</tbody>
</table>

*p < 0.05, ** p < 0.01
* For the Swan & Shih (2005) study, social presence (SP) was broken into 2 separate
categories. SPP represents peer social presence, and SPI represents instructor social
presence.

The Social Presence construct was created from the items relating to social presence
on the original survey instrument. Instructor Satisfaction was created by asking
students if the instructor met their expectations. Perceived Learning was created by
asking students how much they learned during the course.

This diagram shows how
each of the three constructs
relate to each other via
regression algorithms. As
an example, social presence
and perceived learning can
predict instructor satisfaction
with an adjusted $R^2 = 0.649$.
Social presence has a
weighted coefficient ($\beta$)
value of 0.160, and there is
a $p=0.109$ chance that the
relationship arose by
chance.

**Model Breakdown: Social Presence**

As mentioned before, our research goal was to
improve social presence among students through
the use of Elgg. The set of classes we supported
are largely intended to give students a perspective
beyond their core discipline.

We used regression analysis to verify that the core
variables we are interested in are related to
students’ social presence. We found that a
student’s opinions about ownership, peer work, and
personal relationships are strongly linked to their
perceived social presence. These four variables
were able to predict almost 60% of the variance in
students' social presence. This is a distinct
improvement over the core model, which only
accounts for 40% of the variation in social presence.

Although the peer work question has a $p$-value
greater than 0.1, the normal cutoff point, it is left in
the analysis due to our belief that the value is the
result of sample size. Removing this variable from
the regression equation reduces the Adjusted $R^2$ to 0.522 and does not significantly change the coefficients for the other three variables.

When attempting to use demographic prediction information, such as age, gender, international student, first language, department, and technical familiarity, the most significant variables are technical familiarity and age. However, the effect sizes are too small to be significant variables in a regression equation with the variables noted above. This is an encouraging result, as it demonstrates that the system works well with students from a wide variety of backgrounds.

As shown by the regression model, ownership proved to be important in predicting social presence. This result supports research showing that student-centered systems are better aligned with students’ underlying desires than course-centered systems. As shown by the following table, students felt a strong sense of personal ownership about the content that they placed online. 83% of students said that they felt a sense of ownership over their posted content. 83% said that this sense of ownership was important to them.

<table>
<thead>
<tr>
<th></th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I felt a sense of ownership over my posted content*</td>
<td>0%</td>
<td>5%</td>
<td>13%</td>
</tr>
<tr>
<td>Having a sense of ownership over my online content is important to me</td>
<td>0%</td>
<td>0%</td>
<td>17%</td>
</tr>
</tbody>
</table>

* The numbers add up to 101% due to rounding errors

78% of students reported that having their work accessible to classmates improved their motivation. This is a strong validation of the overall Elgg model, where students are not limited to only seeing activity in their own class, but see activities from other classes on the first log-on screen.

<table>
<thead>
<tr>
<th></th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Having my work accessible to classmates increased my motivation to do a good job</td>
<td>2%</td>
<td>8%</td>
<td>13%</td>
</tr>
<tr>
<td>Having my work accessible to people outside my class increased my motivation to do a good job</td>
<td>11%</td>
<td>15%</td>
<td>31%</td>
</tr>
</tbody>
</table>

Students reporting that peer work improved their own writing were also likely to report higher levels of social presence. While this is still an underlying characteristic of people rather than a system characteristic, it suggests that encouraging people to view each other's work and making that easier has the potential to improve social presence in a system.

“My favorite part of the website was that I could see other people's work, which, as a student, I have never been able to do. This allowed me to learn from them.”

Overall, these results support the underlying principles supporting the Elgg system. Helping students feel a sense of personal ownership and interaction with their peers’ work improved their social presence.
Model Breakdown: Perceived Learning

Along with being interested in social presence, we were also interested in students’ perceptions of learning in each course. Understanding related constructs can lead to suggestions for future design iterations. In addition, we are interested in helping professors understand which pedagogical and classroom management strategies can be successful when using Elgg.

Student’s opinions on the reflective value of the website and their belief that the course community improves their learning turn out to account for over 60% of the variation in perceived learning. Although slightly lower than the base model, which can predict 67% of the variation, it does so with a completely different set of constructs.

This has several implications. First, it is important to note that the strength of the community is not a learning predictor; rather, students are interested in the community’s pedagogical value. Students are concerned with true engagement, whether online or in class.

Second, students finding that the website helped them reflect upon their class progress reported higher levels of perceived learning. This has a strong design implication, suggesting that the website should be designed to encourage student reflection. Further, this has eportfolio research implications, showing that course management systems that are designed to collect student work have valuable learning characteristics.

One additional note in predicting perceived learning is that the overall level of student activity did not prove to be a predictor of perceived learning. Although this could be the result of requiring a certain level of activity from students, it also suggests that quantity may not be as important as quality.
Lastly, we wanted to find if there were any variables moderating the impact of perceived learning and social presence upon students’ satisfaction with instructors.

When including both perceived learning and social presence in the regression equation, either one or the other would not be statistically significant. As a result, we built two prediction equations, one with perceived learning and one with social presence. These can be compared to the prediction of instructor satisfaction solely from perceived learning and social presence with an adjusted R² = 0.649.

Gender also played a role in the above model, most likely as a result of skewed gender distributions in the courses. Male-dominated classes reported higher levels of perceived learning than female-dominated classes. Because this male variable essentially acted as an indicator for several of the courses, accounting for some of the differences between the courses, this model has a very high adjusted R² value.

Predicting instructor satisfaction from social presence leads to a slightly less accurate model, but still represents a significant improvement over the base model.

These two regression models lead to several conclusions and suggestions. First, we find that the level of professor interaction has a huge impact upon how satisfied students were with their instructors. If students felt that they had more interaction with the professor in this course than others, they were more satisfied with their instructors. In both models, this one variable had as much impact as all of the other variables combined.

Second, we found that the level of instructor activity online is not a significant predictor of instructor satisfaction. Validating the online component of the class was crucial, but professors developed different interaction strategies. One highly successful strategy employed by several professors was to refer to interesting posts during class. This strategy validated the importance of online posts, in addition to spurring discussions in the actual meetings.
Third, we found that a student’s interest in creating an online portfolio suggests that they will be more satisfied with their instructors. This has several possible explanations. One explanation is that Elgg supports the development of a personalized collection of coursework. Students whose interests are in line with the software design are more likely to be satisfied with an instructor requiring them to use that software. Another possible explanation is that a student interested in building a body of work is more interested in networking with other students, something supported by Elgg.

Limitations

The first major limitation in this study is the lack of a control group. This makes it difficult to determine which aspects of the professors’ styles, their technical skill, the pedagogy, or the software influenced outcomes. While using the 3-part theory and regression analysis helps us to separate the different influences, it is not as rigorous as having the same professor teach a course using a number of different formats.

The second major limitation is the use of graduate students as our only participants. Although we have a good representative sample of the students at Claremont Graduate University, they represent a biased subset of all PhD students. PhD students are also not representative of the entire graduate and undergraduate population.

Conclusions

Overall, the Elgg platform proved to be an appropriate way of facilitating conversation in a set of graduate courses. Students reported high levels of satisfaction with the tool, and only 15% of users preferred traditional course management systems. In the end, 60% of people reported being satisfied or strongly satisfied with the way that Elgg supported their course experience, while only 10% reported having a negative experience.

Our wiki add-in also proved crucial to the success of Elgg in these courses. The wiki supported higher-level synthesizing activities and supported several large collaborative projects. While the design still needs refinement, it was heavily used by both technical and non-technical users and mentioned by many users as being one of the best parts of Elgg.

Several aspects of Elgg proved to be important in promoting students’ social presence. Our analysis showed that students’ feeling of control over their posted content was positively related to improved social presence. 83% of students reported that this feeling of personal ownership was important to them, and 83% of students reported feeling a sense of ownership on Elgg. We also learned that 54% of students reported that viewing peer work improved their own writing, and 78% were motivated by having their work accessible to their classmates. Both of these attitudes also led to higher levels of social presence. Traditional course management systems are not designed to encourage these behaviors or feelings of control to the extent of social software.

Our analysis also reported that students’ feelings of community are not directly linked to perceived learning. Instead, students were concerned with the pedagogical value of
the community. If the perceived pedagogical value is high, students perceive higher levels of learning. We also learned that the ability of the website to support students’ reflection upon their learning improved their levels of perceived learning.

The primary determinant of students’ satisfaction with their professor proved to be interaction. While this interaction does not have to happen online, it still makes up approximately half of their satisfaction with the instructor.

One final point is that there are a number of ways Elgg can be used to support a course. As with most pedagogical research, we did not identify a single “right” way to implement the software. Instead, it was up to each professor to find the best way to integrate the software capabilities into their course.

In conclusion, this research supports our opinion that a social network style system is not only workable, but can be an effective alternative to the traditional CMS in certain courses. While our research is in its initial stages, it strongly supports the need for further work in this area, investigating the types of students and courses for which this tool is appropriate. We intend to continue refining the wiki tool, as well as looking at further ways to improve students’ perceived social presence, learning, and instructor satisfaction.

References


“Blogging may peak in 2007.” Associated Press. 14 December 2006


“Colleges Increase Use of Course Management Systems, Says MDR.” Educational Marketer. 10 March 2003


