Using Web Technology to Teach Students about Their Digital World

Lynn M. Braender
The School of Business
The College of New Jersey
2000 Pennington Avenue
Ewing, NJ 08628
braender@tcnj.edu

Craig M. Kapp
User Support Services
The College of New Jersey
2000 Pennington Avenue
Ewing, NJ 08628
kapp@tcnj.edu

Jeddel Yeras
The School of Business
The College of New Jersey
2000 Pennington Avenue
Ewing, NJ 08628
yeras@tcnj.edu

ABSTRACT

In the School of Business at The College of New Jersey, students are required to take two courses in Management Information Technology (MIT). All students enroll in the same first course. This course focuses on Emerging Technologies and intermediate level data analysis skills. Students are then free to choose their second course. Each MIT course requires that we spend time discussing the social, ethical, and legal issues surrounding technology. This is often a difficult lecture because students think that we are preaching rather than educating them. We also face an expanding curriculum due to the explosion in technology but our core curriculum remains limited to these two classes. To help us overcome our challenges, we turned to Web 2.0 technology to create an interactive learning platform where faculty and students could write and comment about emerging social issues surrounding the Web. In the learning environment that we created, students were provided the opportunity to work with many Web 2.0 tools to learn, interact with fellow students, and express their opinions and ideas. Our team employed the open source content management system Wordpress to build, manage, and monitor this site. In addition, we used Google Analytics to gather usage information. This paper will discuss the process we took to build and use the site and some of the lessons we learned along the way.

Keywords: IT Education, Web 2.0, Wordpress, Blog, Internet, Teaching Social Issues

1. INTRODUCTION

In the Spring of 2008, The College of New Jersey awarded a grant to our team to develop an interactive and collaborative learning environment for business students enrolled in our Management Information Technology (MIT) courses. This grant provided funding for student services from our Interactive Multimedia program and assistance from the User Support Service (USS) department to help with building a blog that took advantage of Web 2.0 technology. This technology not only allowed us to create an environment where students could learn about cyberspace and its potential

effects on them but also allowed our students to influence their peers and shape the culture they lived in.

The Website provided our students with articles that were written by our team of faculty, staff, and students, as well as videos and links to outside stories about Cyberspace and the social issues surrounding it. We centered our discussion on a series of six broad topics that focused on how people could affect change through the Internet or be affected by the changes the Internet created. While reading articles or watching videos on the site, students were able to rate articles and comment on them. Students were also able to respond to their peers' comments by providing responses to these comments and/or by giving them a "thumbs up" or "thumbs down" rating. Students answered polls to gain insights to how their Internet activities compared to their peers, they were asked to contribute articles and/or ideas and to share with us their thoughts about how technology should and should not be used in our culture.

This article will describe our vision for this interactive learning environment built on Web 2.0 technology. We will discuss the process we undertook to develop it, the technology we employed, the implementation and assessment process, and, some of our initial findings regarding student feedback and student learning. We will also share some of the lessons we learned along the way and our strategy for the second phase of this project.

2. DEVELOPING AN INTERACTIVE LEARNING ENVIRONMENT

2.1 The Vision

It has never been more important to teach students about ethics, security, and responsibility relating to our digital world; not only for their sakes, but for the safety of our own communities. Without knowledge and good IT practices, we leave our systems and the systems we work with open to threats. Our college and our accrediting agency are recognizing the potential of these threats. In addition, we can't open a paper or turn on a news station without learning about some imminent threat to the Internet, our personal computers, or some organization.

Our team believes that we need to develop responsible citizens; those who can work and play sensibly in the cyberspaces we have created. Our vision was to build a Website to address this educational need in a manner that is interesting, self-perpetuating, and cost efficient. In addition, we needed to support the accreditation efforts of our school.

2.1.1 The Accreditation Need: The School of Business requires that we develop socially responsible citizens who are able to assume positions of leadership in a complex and technological world (The School of Business, 2008). This mission is aligned with TCNJ's core beliefs, which states that "we prepare our students to be successful, ethical, and visionary leaders in a multicultural, highly technological, and increasingly global world" (The College of New Jersey, 2008). We also support the school's efforts to maintain accreditation through AACSB by not only teaching our students how to use technology but also teaching them how technology may affect the world we work in (AACSB International, 2008). We address these ideals in our MIT core courses by teaching students some of the ethical

behaviors that are expected of them in both their professional and educational careers. Finally, a secondary, but equally important, benefit of teaching students about ethics, security, and responsibility with technology is that we support the efforts of our IT department to secure campus resources. If we can teach students about threats from the Internet and methods of self-protection, than we may reduce the number of successful attacks on the campus.

2.1.2 Previous Teaching Efforts: We have been teaching students about the social and legal issues surrounding computers and the Internet since our first Data Processing course. We consistently lecture students about copyright and Fair Use laws, and we teach them about the dangers they may encounter on the Internet, through Email, Social Networking and file sharing. But, whenever we bring up these or similar topics, students tend to roll their eyes, tune out, and prepare for another sermon. They've heard this all before and that it's not a discussion they wish to participate in. But, the legal, social and security issues they need to understand grow daily.

2.1.3 Facilitation Uses: With limited curriculum resources and an expanding knowledge base, we decided to create a learning environment that resided outside of the traditional classroom that directly involved and engaged our students. But, in addition to teaching students through this site about the social, legal and ethical effects of the Internet on our society, we wanted to learn from them. Since they grew up in our digital world and probably know more about some of the social applications that we discuss, we wanted them to teach us about their experiences. The site needed to support students meeting and creating their own knowledge; we needed to create an environment where students could also affect the behaviors and knowledge of their peers and of us. We call the site iSmack.org to reflect the goal of Students Meeting and Creating Knowledge. We thought it a bit fun too, for students to be able to say iSmack@TCNJ. The next section will describe the site that we created to meet our vision.

2.2 The New Direction

We used contemporary Web 2.0 resources to build an environment that facilitated student learning and discussions about a continuously emerging digital culture. We employed tools that made the site easy to use and maintain, involved students throughout the learning process, and provided both a rating and polling system so that we could discover how the content appealed to them. We also used this rating and polling system to determine future content; if an article wasn't working, we wanted to improve it or get rid of it. If a comment did not appeal to the masses, we wanted to dim it until it would experience a gradual death. We built the site so that students could leave comments on their reactions and their fellow students' reactions to the ideas presented to them. If they wished, they could also contribute to it by writing a piece; however, no one took us up on this offer. Finally, we added a "smack down" and a "smack up" area to the site. The "smack down" allowed students to vent about the ill behavior of people around them who were using technology in ways they felt were annoying. Here, students were encouraged to complain. On the opposite spectrum,

students were also encouraged to "smack up" behaviors they felt were worthy. The ultimate goal for the smack down and smack up was to provide a mechanism for students to mold and influence their culture; to shape the way they live their lives.

2.2.1 Example Screen: Figure 1 provides an example of the site we created. The page that you see is the beginning of the highest rated article/video that is available at this time. Our vision and the Web 2.0 technology that we employed allowed us to present students with multimedia-enhanced content coupled with commentary and discussion of some of the problems and opportunities we create through the advancement of technology. Visualization is a powerful learning mechanism and, paired with peer reactions, ratings, and polls, it allows our students to learn about our world in a compelling manner. More will be discussed about the site in section 4. For now, we will continue the discussion about the project team and their responsibilities, the structure of the course, the subject matter that we focused on, and the Web format that we employed.

Figure 1: The Electronic Wasteland

2.2.2 The Project Team: Our team consisted of faculty, technical support, and students. Each team member could contribute to the content, design, and management of the site but each had a primary responsibility toward the project. The faculty provided direction and guidance, assessment materials, and content for the Website. Technical support provided guidance and expertise with developing the Website and structural ideas for the project. The students developed the initial prototype, found relevant videos and links, and wrote articles. In addition, our second student contributor became the student editor for the semester. In this position, he monitored the site and responded to student comments. Even though it is possible that one faculty could hold the technical and domain knowledge needed to develop and maintain this type of site, students enriched the program with the experiences that are unique to their generation and the insights they provided directly or indirectly from conversations they had with their peers.

Each member of the team was assigned his or her own username and password for the site. This identity allowed us to keep track of the work completed by each team member and it allowed us to assign appropriate-level access rights to different people and to remove those rights once they left the project.

2.2.3 The Courses: We chose two courses for this study. The first is our MIT 201, Information Systems class. This sophomore-level course introduces students to the concepts of business information systems. It devotes class time each week to emerging technologies and their effects on society. Time is also devoted to copyright laws and the ethical use of information. We offer about six sections of this course each semester and enroll about 350 students per year. For the first phase of this project, we employed two sections of MIT 201 with a total of about 50 students. In the future, we hope to use the site for all sections of this course.

We also had an opportunity to use this site in our Business Freshmen Seminar. This non-credit course meets once per week for half a semester and exposes students to people and concepts that help shape their understanding of business. We chose to use this course because it added 254 students to Phase 1 of the project and provided us an opportunity to compare students who earn grades to those who simply pass or fail a course. While it would be expected that each cohort would represent slightly different groups of students, we did not find any indicators that would substantiate this assumption. Instead, both groups were very similar in terms of their responses to the course exams and with student feedback.

At the beginning of the semester, the student editor and a faculty member introduced the Website and the course expectations to our students. Students were required to complete a pre-assessment test and then spend a two to six week period reading the articles. Posting comments and rating were not required of the students; their participation was purely voluntary. The students were also given compensatory time of one class from the traditional classroom. This may not seem like much time but, coupled with our fall break, students had one week to focus solely on this work. To test their learning, students were given a post assessment test. In the MIT 201 course, their test grade counted towards their final grade. In the Freshmen Seminar course, students were required to pass the test. Once students were finished with the test, they were asked to complete a survey.

Each test contained survey questions that targeted specific areas of knowledge found in the iSmack.org site from various posted articles. The logic was to sample the students on their knowledge in these areas before they began participating and later, towards the end of the course, in order to measure how effective the site was in delivering the information. As predicted, a comparison of pre and post data revealed that participation in iSmack.org raised their awareness and general knowledge in these areas. Further, students who participated were also asked to provide feedback on their experience and perception of the site. These yielded various favorable responses from participants; the site as a whole was well received and seen as a valuable addition to their curriculum.

2.2.4 The Topics: The topics we chose were not meant to cover all the information students need to know about living in a digital world but to provide them with a reasonable amount of information for a two to six week learning period. Because we divided the topics into six broad categories, we could structure a course to either focus on all topics in a two-week period or focus on one topic per week for a total of six

weeks. The faculty teaching the class could choose how to structure the lessons.

The topics evolved through brainstorming sessions with our team of students, technical staff, and faculty. Through discussions, we identified broad areas that we believed affected students the most at the time of our initial development. We felt strongly that the first topic, "Molding a New Culture," would provide students with a sense that they could affect change in and outside the college because they could read real examples of ordinary people creating cultural change. We believed that if they could sense their potential power of influence that they may feel more inclined to *iSmack@TCNJ*.

Figure 2 lists the topics used for this study. We tried to create content that progressed in a logical order but we often found that many discussions overlapped in some area.

In the "Molding a New Culture" articles, we painted a picture of our current culture, the technological tools students are apt to use, and students' preferences with these tools. For instance, students prefer IM to Email but they still prefer to spend time with each other in physical space rather than virtual space (Lenhart, Madden, & Hitlin, 2005). Students learn that in the past, we could maintain about 150 stable relationships (Robin Dunbar, 2008). But, with the Internet we can substantially increase this number.

Figure 2: Topics for Living in a Digital World

In "Living in a Digital Community," we introduced students into some of the negative aspects of our emerging culture such as Digital Vigilantes and Trolls. Students learn about trolling packs and their attacks on people who attract their attention and some of the advice trolls and social scientist provide on dealing with them (Schwartz, 2008). They also learn about some of the negative effects technology has on the environment and on the poor. This topic ties in our discussion about our "Digital Footprints." In these articles, we discuss the amount of data being stored on each one of us through our click stream exhaust and our passive digital footprints. We encourage students to try to actively shape their footprint depending on the type of career they wish to pursue.

"Digital Ownership" is a sensitive subject with students. Because of this, we try to explain copyright laws by using simple facts and cartoons for support. We then attempt to get the student to view copyright infringement not from the point of them taking others' work but by others' taking their work. We show them a newscast depicting a young woman who posted her picture to Flickr. This picture was then used to advance a major advertising campaign for an airline without her consent or knowledge. By approaching copyright from this angle, student comments demonstrated an opinion differing from previous discussions regarding illegally downloading music and videos.

With the last two topics, we teach students methods to protect their computer resources from attacks and keeping their personal information secure. We found from the comments left on iSmack that they are not nearly as protected as they should be or that we believe them to be. Many of them who left comments did not know many of the simple techniques that should be used to protect their computers and their data from outsiders.

2.2.5 The Blogging Format: We considered a number of different delivery options when deciding on how to best implement the iSmack community site. Our main criterion in selecting a framework was to have the ability to easily manage content and solicit feedback from students. We initially considered using a wiki as a potential solution but we realized that, while incredibly useful for more open-ended projects, a wiki did not impose the level of structure that we needed for this project. We then thought about building a traditional Website using an off-the-shelf development tool such as DreamWeaver and possibly implementing the interactive elements using custom-written PHP scripts. Unfortunately, we did not have the resources necessary to devote to the development of a site from scratch, so we began to research open-source alternatives.

The blogging format ultimately provided us with the best mix of these features, giving us a framework that was rapidly updatable, had integrated commenting capabilities and robust support for multiple authors. In addition, we had the ability to extend the base functionality of the blogging engine that we ultimately chose (Wordpress) through the use of community-authored software, or plugins, that work with Wordpress (WordPress, n.d.). In Section 4, we will provide the reader with a discussion of the technology we used to create this site and the reasoning behind some of our decisions. Hopefully, this discussion will provide you with enough information to move into a Web 2.0 environment to satisfy your teaching needs. In Section 3, we will discuss some of the lessons we learned along the way and the advice we gleaned from this project.

3. DEVELOPMENT AND ADMINISTRATIVE ADVICE

3.1 Administrative Advice

We believe that collaboration between technical staff, faculty members, and students greatly enhanced this project. Each group brought a unique perspective to our conversations and we were able to analyze our decisions from these perspectives. Participants also brought back feedback from discussions we had with our peers; this feedback provided us with a wealth of information and a level of excitement that we wouldn't have had if working alone. Even though each member of our team often strayed out of his or her main area of responsibility, it was important to assign each team member one area to oversee (e.g., content, design, management). By doing so, we decreased the amount of individual work we had and the potential for error. It also ensured that the Website was regularly monitored and that students knew that someone was reading and reacting to their comments.

We discovered that students from our Interactive Multimedia (IMM) program had a decent knowledge of Web applications and strong writing skills since many of them have plans to pursue digital journalism. We suggest that, if faculty members plan to go this route, they identify similar programs at their schools in search of student assistance. The students will need coaching with new technology and need to be guided on the style of writing required from the project. We also found that, even though students were paid for their work and their work could be completed at home, we needed to create a structured environment for them that required them to come to an office during scheduled hours. We found that weekly meetings kept them on task and aligned them with our vision. Even when motivated, students were not mature enough to work solely in virtual space; they needed structure and continual guidance. We did discover, however, that these students brought energy to the project that full-time staff could not. In addition, the student contributors were essential in providing us with an understanding of our student population.

3.2 Technical Advice

Faculty members who wish to replicate our model can do so fairly easily using a few open-source tools and low-cost services. Depending on the IT infrastructure on your campus, we recommend that you obtain a Web-hosting plan from an off-campus commercial hosting company. These plans are generally inexpensive (less than $20 a month) and allow you to "brand" your project with your own unique URL versus having your site be a subset of your college or university. We also found that it was easier to control and shape our site using off campus resources since there are generally fewer administrative restrictions placed upon users.

Most commercial hosting companies also offer free installation of open source tools, such as Wordpress (2009). Our hosting company, for example, offers a "one-click" installation of Wordpress via their Web interface. Once you have a site, it is recommended that you get familiar with the Wordpress framework and explore the expansive Wordpress community for ideas and inspiration on how to best organize your site. We relied heavily on the use of 3rd party "plugins" to enhance and extend the base functionality of the Wordpress environment. A complete listing of these tools can be found in Appendix A.

4. A TECHNICAL DISCUSSION OF THE SITE AND THE WEB 2.0 RESOURCES USED

4.1 A Brief History of the Project

The first version of iSmack was implemented during the Spring of 2008 using the publicly accessible blog management system, Blogger (Google, 2009), which allows anyone with a valid Google identity the ability to quickly create a free blog. Blogger met our initial needs by providing us with an infrastructure within which we could rapidly deploy dynamic content, support multiple authors and foster communication between contributors and students using a built-in commenting framework. The only required component that was missing from the Blogger environment was a user-driven content rating system but, at the time, we were confident that we could implement this functionality using third party software, or plugins, which provided Blogger with additional functionality.

Unfortunately, as we began to develop our Blogger site we found that utilizing third party plug-ins was more difficult than we had originally anticipated. We ran into numerous integration issues that prevented us from fully implementing these third party systems, and it looked as though this limitation would hinder our attempts to grow iSmack into a more engaging system. Given these limitations, we began to explore more robust blogging frameworks. Wordpress (2009), with its large community base and expansive feature set, quickly stood out as a better fit for the type of collaborative community that we were trying to create with iSmack. We proceeded by leasing the "ismack.org" domain name and purchased a hosting plan through an off-campus hosting provider. Within about a week, we were able to get the core components of the site up and running.

Wordpress (2009) provides its software for free for those who are able to install and manage the software on a Web server. For those who can't, you can also setup a free site (WordPress, 2009a). Hosting a site via wordpress.com limits your access to many system features, however, and plugins cannot be installed.

4.2 Working with Wordpress

Wordpress is a generic Web development framework that is based upon a small set of extensible content units that can be organized and rearranged to address a particular development need. This allows a site developer the ability to construct very different types of Web applications using the same code base; this built-in flexibility is ultimately the reason we decided to use Wordpress in implementing the iSmack site. A list and brief description of the major base units of Wordpress can be found in Table 1.

It is worthwhile to note that all of these base units are highly customizable. For example, privacy options can be applied to content units, allowing the site administrator to designate individual posts or pages as being publicly visible or protected by a password.

Another major advantage to using Wordpress is its ability to handle multiple users. Setting up identities for authors with their own roles and privileges in the system was easy to implement.

Wordpress supports a robust engine that allows a site developer to integrate external HTML/CSS templates in the form of packaged "themes." These themes provide a visual "makeover" to the Wordpress content, and there exists a large, active, user community that is continually developing a wide range of themes that can easily be downloaded and incorporated into a site.

Commenting functionality is tightly integrated throughout Wordpress, and almost any asset within the system can be set up to contain its own asynchronous discussion that can be controlled on a page-by-page basis. This feature was of particular importance to us as we wanted to obtain feedback from students on a wide variety of topics that we would be presenting, yet we didn't want them to have to return to a centralized discussion tool in order to do so. Giving them the ability to respond "on impulse" while being actively engaged in the content was our goal, and the Wordpress system of decentralized commenting allowed us to do just that.

Base Unit	Functionality
Page	Static content akin to a traditional Web page
Post	Date-based entry akin to a traditional blog posting
Category	System-wide classification system that provides a standard means for content organization
Tag	Per-item classification system that supports a more "folksonomic" (e.g., social tagging) organizational system
Widgets	Dynamic or semi-dynamic tools that can be placed into the sidebars of a site
Plugin	A 3rd party package that can extend the base functionality of a Wordpress installation

Table 1: Wordpress Framework

While Wordpress does many things "out of the box" it can't handle every possible implementation idea thought of by a developer. Thankfully, the designers of the system implemented a robust "plugin" system that allows 3rd party developers the ability to "hook" into the inner workings of Wordpress and build more or less seamless additions to the original code base. Knowing that the framework that we were standardizing on was extensible was a particularly important feature for our team, as we did not know at the outset what kinds of functionality we would later like to build into the system. Having the freedom to easily extend the framework to incorporate new types of functionality allowed us to focus more on content and less on technical implementation issues.

4.3 Site Organization
iSmack is accessible at http://ismack.org. Upon visiting the site, a user would see a page much like the one depicted in Figure 3 without, of course, the numbers. These will be used to discuss the structure of the Website and the design considerations that went into the implementation of that particular feature.

Figure 3: iSmack.org

Section 1 provides a welcome message to the students when first visiting the iSmack site. It contains a brief mission statement, basic directions on how to use the site along with contact information for the contributors. We implemented this static "splash" page in hopes of providing a common jumping-off point for our students using a "page" construct. We opted to turn off commenting functionality on this page as we felt that there was little value in asking students to register feedback on what is, in essence, a page filled with instructions on how to use the site.

Along either side of the welcome message, we organized a series of widgets (chunks of reusable code) that provide some additional functionality for our students. These widgets are a persistent feature of the site, and serve to frame the active content window no matter where a student is in our site navigation.

The widget in section 2 provides links to the six topical modules that we aim to cover with iSmack. We utilized the "Categories" feature of Wordpress to set up a standard organization system for our content, and articles that are tagged appropriately by our authors automatically show up under the corresponding topical link in this widget.

The polling widget (section 3) appears on the right side of the screen and presents a random poll question to visitors. The poll allows students to compare their technology habits with their peers. By choosing a response and clicking the 'Vote' button, the student will see the current polling results collected by the site. The polling widget detects users-based IP addresses and will only allow one vote per IP address per question. The act of voting is handled via an Asynchronous Javascript call (AJAX) and, as such, will not impact the rest of the site (i.e. voting will not 'refresh' the page and cause the visitor to lose his or her place in the article that they are currently reading).

Questions for the polling module are designed and entered into the system by users who have "author" level access (or higher) to the site. The polling module that we use also allows polls to be embedded within specific articles, allowing students to register feedback while reading an article.

The Smackdown! Widget (section 4) on the left side of the screen allows students to participate in an ongoing conversation that is focused on annoying or inappropriate uses of technology in social situations. Students can cycle through recent comments left by other visitors as well as post their own comments to the shared discussion space. If a student does post a comment and then receives feedback from a peer, an email alerting them of this event is automatically sent to them. This feature was added to the site after we spoke with students about their initial reactions to it. They told us that they wanted to know what others thought of their statements but didn't want to return to them to check for responses. This application was not initially available to us but was implemented using a third party plugin.

The recent comments panel (section 5) searches through all of the articles in the system and aggregates new comments that have been posted by visitors. Clicking on a comment will transport the visitor directly to the full text of the comment, along with any other comments that exist within the same context.

The "Highest Rated Article" widget (section 6) displays the top 10 ranked articles and their ratings (from 0 to 5 stars). Clicking on an article will take you directly to the posting

along with any comments that have been left by other students. Students can also find additional information about the articles and the topics by clicking on a link in section 7. These links will take interested readers who wish to learn more about related topics to external Web sources. Users who have author-level access to the site maintain these links.

When a visitor selects an article or category via any of the widgets on the main page they are redirected to a new page. Note that the sidebars of the site, including all widgets and plugins, remain visible providing a consistent experience for the student. Figure 4 depicts what is displayed when accessing an article.

Figure 4: iSmack Articles

The center portion of the screen (section 1) updates itself to display the article title, author, published date as well as a hyperlink that directs the visitor to the commenting system. iSmack utilizes a pagination plugin (section 2) which allows an author the ability to break a posting into multiple pages thus enhancing the user interface and allowing students to quickly return to a desired place.

In section 3, students can rate articles with a 5-star rating system. Students simply mouse over the stars and click on the number of stars that they feel is appropriate for the article in question. The rating system is designed to limit ratings based on IP address, so that a student is prevented from rating an article multiple times. Students can also leave comments about an article; see section 4. The shaded box below an article displays all comments left by students in reverse chronological order. Students can choose to reply to a specific comment by using the 'Reply' hyperlink, which creates a threaded discussion within the main comment thread. The plugin we used to implement this functionality is configured to support three levels of nested comments. We also added a widget that allows a commenter to receive an email if someone responds to their comments. The "thumbs up" and "thumbs down" icons shown in section 4 allow students to rate the relevancy of any comment in the system. Comments that receive significant negative ratings are eventually "faded" out of the system and no longer appear as part of the comment thread. This provides students with the

ability to exert a bit of control over the information left on the site, thereby, giving them the ability to influence the future views of their community.

4.4 User Management
One of the first challenges we faced when working with Wordpress was setting up the system to handle multiple authors. The Wordpress framework provides a five-tiered user management system that allows a system administrator to assign varying levels of responsibility to individuals. As a group, we discussed how much responsibility we wanted to assign to student contributors. We decided that they should be given full access to the content production and revision aspects of the site yet very little control over the design and architecture. Wordpress provides this ability through the "Contributor" functionality. The faculty and technical staff had full administrative control over the site. Visitors were allowed to view and rate articles, post and rate comments, contribute through the "Smack Down" or "Smack Up", and post to the contribution page. This allowed the students to participate in the site in an anonymous manner. It also allowed outsiders to do the same. During the next phase of this project, we will assign all students a unique username and password. This will allow us to "turn off" the public commenting feature on the site. This has two advantages. First, we will be able to better track student participation since student-authored comments will be tied to a unique identity. Second, we will be able to prevent visitors from outside the class, be they well-intentioned Web-surfers or automated SPAM robots, from contributing to the discussions that are taking place. We can quickly create these accounts through enrollment information stored in TCNJ's course management system.

4.5 Usage Statistics
A major part of assessing the effectiveness of iSmack hinges on gathering usage statistics from the Website. In addition to the exhaustive server logs that track every transaction made by the system, we have also installed the freely accessible "Google Analytics" tracking system (2009a) into the iSmack site. This system is integrated into iSmack through invisible HTML tags that are embedded into the sidebar of every page of iSmack. These tags communicate statistics to our Google account, which can then be easily analyzed using Google Analytic's online management tool. Google Analytics can provide us with a wealth of information about our visitors, including their browser, geographic location, average length of time spent on the site as well as the ability to view a page "overlay" to visually see the browsing patterns of our visitors. We will use these server logs and statistics from Google Analytics in the future to help us better understand the effects this type of environment has on learning.

4.6 Plugins
We chose Wordpress over other blogging tools because the core functionality of the system can be extended through the use of third party plugins. Wordpress has attracted a thriving community of plugin authors and, at the time of this writing, there are almost 4,000 freely accessible plugins available (Wordpress Plugin Directory). iSmack uses a fair number of these plugins to enhance the viewing experience of our

visitors. Direct links to the source code for modules that we use are provided in Appendix A. Table 2 outlines the specific plugins that are utilized in iSmack and their application.

Installation of a plugin is handled by the system administrator and requires that the plugin code be uploaded to the server and placed in a special "plugins" folder. Once there, the administrator visits the Web management interface for the system to activate the plugin.

We have found that using plugins is an effective way of implementing new features into the system without having to spend significant amounts of time writing new features or hiring a student worker to develop them. In addition, the Wordpress community provides great resources for debugging and troubleshooting troublesome plugins.

Plugin	Functionality
WP-Post Ratings	5-star rating system for articles
Comment Karma	Thumbs up / down rating system for comments
Wordpress Thread Comment	Threaded discussion support for comments
WP-Polls	Visitor polling system
Multi-page toolkit	Article pagination support
WP Wall	Smackup! / Smackdown! comment "Walls"

Table 2: iSmack Plugins

5. CONCLUSIONS

Based on our experience, we believe that there is a need for research on how online learning environments that support student participation and collaboration affect student learning. While the question of how the students participating in iSmack.org plays a role in enhancing their understanding of the material seems promising, other questions still need to be explored. For instance, we were able to look at Post-Test and Pre-Test scores and found that learning did occur. But, research is needed to determine if this learning was directly correlated to their participation in the site as compared to a traditional learning environment. Further, when evaluating the participants' feedback on the usage of the site, we found that the majority of the participants indicated that they were pleased with the content of the site and felt that the site contributed to their learning of the material. However, we don't know how participation affected learning. For instance, did students who commented on articles score higher on the exam? Does the level of participation affect one's understanding of the material? Finally, students had mixed feelings about whether they would recommend the site to others or continue using it. This leads us to question whether our students prefer a traditional learning environment to an online learning environment.

The commenting system did provide us with an understanding of students' opinions, perceptions, and experiences that we could not have obtained in a traditional learning environment. In the classroom, students are unwilling to be so open about their feelings and experiences. But, when sitting in their homes and reading the iSmack articles, many did just that. And, we discovered quite a bit about them. For one, students were very surprised about some of the negative behaviors, such as trolling and digital vigilantism, that occur frequently on the Web. In addition, many students were unaware of the amount of information that was collected and permanently stored on them and how little control they had over this information. But, they were hard on others about the public nature of the Web and the effects that this publicity may bring about. Students felt that if someone suffered because of a posting about them, then that was their problem; they should have known better. For instance, students had little tolerance when a peer posted a foolish picture on Facebook then, thinking better of it, removed the picture only to have it come back to haunt them. Finally, we learned that students are not as knowledgeable as they need to be with regards to computer security tools and behaviors; they are ill equipped to adequately protect themselves from Internet attacks.

As teachers, we were rewarded with immediate student feedback on our writing style and content. Student ratings allowed us to quickly learn about the quality of our work. Because of this, we were provided an opportunity to adjust the Website and its contents to better affect the learning process. An online learning environment such as iSmack.org can provide teachers with an opportunity to continuously improve and cultivate the learning environment. On the other hand, we still know very little about online learning environments and how and when they should be used.

In the future, we will move to Phase 2 of this project by exploring how participation affects knowledge in an online learning environment that incorporates interaction and collaboration. Another dimension of this second phase will also be to use a control group that does not participate in iSmack.org, but receives similar content through traditional methods such as assigned readings and lectures. This will allow us to further compare and contrast how the use of Web 2.0 technologies facilitates learning in the classroom. Hopefully, this research will bring us closer to understanding some of the opportunities Web 2.0 holds for education in the future.

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AUTHOR BIOGRAPHIES

Lynn M. Braender (Ph.D. Drexel University) is an Assistant Professor of Management Information Systems in the School of Business at The College of New Jersey. She's taught courses in Software Engineering, Web Development, MIT, and Database Management. Currently, she also acts as the Academic Computing Advisor to The College of New Jersey. Before joining The College of New Jersey, she worked for McGraw-Hill as a software editor and as a software consultant to businesses along the New Jersey shores.

Craig Kapp (M.S. The College of New Jersey) is an Adjunct Professor in the Schools of Business and Education at The College of New Jersey and has most recently served as the Assistant Director for Instructional Technology at TCNJ. He has taught a wide variety of courses, such as Authoring and Multimedia Development, Introduction to Interactive Computing and Educational Applications of Computing for School Administrators. Craig is currently a full time graduate student at the Interactive Telecommunications Program (ITP) at NYU.

Jeddel Yeras (M.S. University of Phoenix) is an Adjunct Professor of Management Information Systems in the School of Business at the College of New Jersey as well as a Network Administrator for over 10 years. He has taught Managing Information Technology (MIT) and has presented on various topics in Information Technology at professional conferences. In addition to his interests in research he is also a consultant in Information Technology.

APPENDIX: SITE RESOURCES

Blogger http://www.blogger.com/
Google Analytics http://www.google.com/analytics/
Wordpress Plugins Directory http://wordpress.org/extend/plugins/
Plugin: Multi-Page Toolkit http://www.tarkan.info/tag/multi-page
Plugin: Reverse-Order Comments http://www.zyblog.de/wordpress-plugins/reverse-order-comments/
Plugin: WP-Polls http://lesterchan.net/portfolio/programming/php/
Plugin: WP-Post Ratings http://lesterchan.net/portfolio/programming/php/
Plugin: WP Wall http://www.prelovac.com/vladimir/wordpress-plugins/wp-wall
Wordpress http://www.wordpress.org/
Wordpress Themes Directory http://wordpress.org/extend/themes/
Plugin: Comment Karma http://cyber-knowledge.net/blog/2006/10/15/wordpress-plugin-rate-your-comments-comment-karma/
Plugin: Recent Comments http://rmarsh.com/plugins/recent-comments/
Plugin: Wordpress Thread Comment http://blog.2i2j.com/plugins/wordpress-thread-comment
Plugin: WP-Polls Widget http://lesterchan.net/portfolio/programming/php/
Plugin: WP-Post Ratings Widget http://lesterchan.net/portfolio/programming/php/

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