



Master's Final Project 2007

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Executive Summary

Mission Statement

Roslin is an easy-to-use on-demand course management system for university instructors and students. It is designed to provide a more intuitive and enjoyable user experience than competing solutions.

A course management system (CMS) is a software application that is designed to help instructors facilitate and manage their courses. A CMS typically provides a set of tools such as a grade book, calendar, discussion forum, document storage and email. Although this is a mature market with many established products such as Blackboard, Moodle and Sakai, our team believed that there was still a significant opportunity for improvement. Preliminary interviews with instructors, students and teaching assistants corroborated this notion. We documented negative feedback specifically in the areas of user interface design and usability and unnecessarily complex features sets.

The objective for our project, known as Roslin, was to develop a simple, on-demand CMS for instructors and students at the university level. Unlike the existing products on the market that boast a wide array of features, Roslin focused on a small set of carefully selected core components. Reducing the number of features also enabled us to concentrate on providing a consistently positive user experience. We felt that a clean user interface with modern interaction patterns would help differentiate us from the dated look and feel of our competitors. We also made an effort to include fun and engaging features in order to encourage users to frequently visit and use Roslin.

Another objective of our project was to make the application open so that the data users entered could be repurposed in ways that we would not necessarily be able anticipate. This was accomplished by including RSS feeds and iCalendar export functions a part of the system design.

We selected Ruby on Rails, an agile web development framework, to implement the Roslin project. We chose Ruby on Rails over traditional web development languages such as PHP and JSP because we wanted an environment where we could quickly begin development without spending a significant amount of time on configurations. An important advantage of Ruby on Rails is the abstraction of the Model-View-Controller framework which allows code development and user interface design to run in parallel. In addition, database modeling was made extremely easy with Ruby on Rail's migration and fixture features. Overall, Ruby on Rails enabled us to have rapid development cycles and gave us the flexibility to adapt to emerging user needs.

Background

The Roslin Team

Gary Yao

Gary was particularly interested in the field of project management. The Roslin project presented a perfect opportunity for him to gain some hands-on experience with managing a complex project. Gary also contributed as an assistant code developer and worked on minor portions of the implementation.

Ivan Tam

Ivan dreamt up what would later become the Roslin project in the Spring of 2006, while employed as a Graduate Student Instructor. Roslin was his first project using Ruby on Rails. Ivan contributed mainly as a code developer.

Brad Herman

Brad's primary roles on the Roslin team were in user needs assessment, dynamic interface implementation, and architecting for the remixability of data in the system. His primary academic interests center around information architecture and market opportunity for innovative information technologies. The Roslin project proved a great opportunity to express those interests in a supportive team environment while building a valuable, usable information product.

Katrina Lindholm

Katrina joined the Roslin team because she was interested in developing a functional application rather than simply designing a prototype. Designing a new CMS application seemed like an intriguing problem given the usability problems plaguing existing applications. Her contributions to the project included user needs assessment, user interface design and user interface development.

Project Objectives

Our primary objective was to design and develop a simple CMS for instructors and students. We hoped to differentiate ourselves from existing CMS products by providing the most valuable set of features in a modern and welcoming user interface. In addition, we believed that a hosted, on-demand approach would make Roslin an appealing alternative for instructors not currently satisfied with their university-sponsored system.

We spent several weeks defining the goals of the project and deciding on the features that we wanted to include. At first, we considered everything from elementary schools to universities, eventually converging on the university level because of our familiarity with the market and access to potential users. Once we made this decision, we created an initial set of features through a series of team brainstorming sessions. We each spoke about the features that we envisioned Roslin to have and then categorized them as "must haves," "nice to have" and "out of scope."

Figure 1: Feature Brainstorm



Preliminary Feature List (January 2007)

Must-Haves

- syllabus
- grade book
- assignment and materials distribution/collection
- easy setup process
- user-friendly interface and interactions
- fun and engaging features
 - o greetings
 - o progress bar
 - o "new" indicator for new content
- class wide broadcast
- dashboard
- extensibility
- term transition (archiving and duplication)

Nice to Have

- easy to install
- communication tools (e.g. blog, chat)
- ability to parse existing syllabus
- iCal export
- themes / customizations

Out of Scope

- social networking
- learning modules
- distance learning capabilities
- wiki

As the project progressed, we continued to adapt the scope based on the feedback we received from users during interviews and usability testing. However, our overarching goals remained relatively constant:

- User-friendly
- Fun and engaging
- Fast and easy to setup
- Small and simple feature set
- Hosted/on-demand
- Open

Target Market

Although we believe that Roslin would be a valuable tool for all instructors, our user needs assessment and usability testing process made it clear that certain characteristics would make some instructors more likely to embrace our technology.

An ideal candidate for Roslin...

- Believes that providing course material online is valuable to students
- Encourages the use of discussion boards outside of class
- Wants to foster a sense of community in the classroom
- Actively uses the internet for tasks such as email and reading the news
- Is familiar with blogs and wikis
- Prefers simplicity over number of features

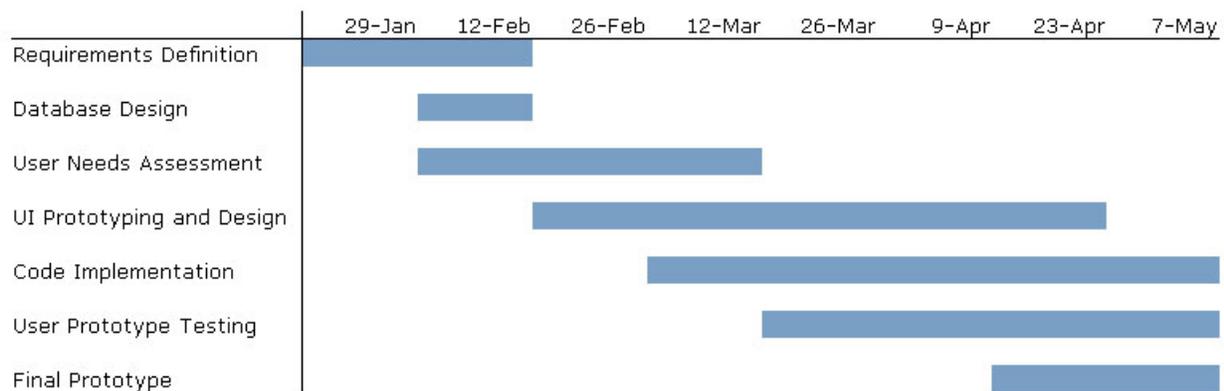
Project Timeline

We originally planned to run the project with an agile programming approach. We thought that an agile methodology would nicely complement the Ruby on Rails framework. With this in mind, we took all of the required tasks and prioritized them using a feature scoring matrix (see Appendix C). We then divided the features into individual "stories" which would be developed over a week-long iteration. The goal was to iterate through the stories, in order of priority, until the entire application was finished (see Appendix D).

Unfortunately, we began encountering issues once we started implementing the stories. We realized that there were many co-dependencies among the features which were making it difficult to implement them in the agreed-upon order. In hindsight, we believe that this was likely a result of our inexperience with determining how to split features into appropriate story-size pieces.

In order to stay on schedule, we switched to an ad-hoc priority list-based system. Once or twice a week, during a team meeting, we would assign tasks to individuals and give a deadline. At the next meeting, we would all report back on our progress and determine the next list of tasks. This arrangement was much more effective for our team and we were able to make steady progress on the development of Roslin.

Figure 2: Roslin Development Timeline



User Needs Assessment

Process

Soon after our team was established around the idea of a new course management system, we delved into the process of user needs assessment. To begin, we conducted six informal interviews with faculty and students on campus. Our objective was to learn the following information:

- What CMS has the participant used?
- What were the advantages and disadvantages of these systems?
- What are important and frequent tasks relating to a course?
- What features would an ideal course management system offer?

See Appendix A for actual interview questions and transcripts.

Instructor and Teaching Assistant Interview Results

Many of our participants had experience using other systems such as Blackboard and bSpace. In addition, each of the instructors we interviewed maintained a course website of some type, either through a CMS, a homemade website or a third-party tool such as Blogger or Twiki.

Although we only interviewed three instructors and one teaching assistant, we did find some common themes. First, all four of our participants brought up instructor-to-class and student-to-student communication during their interview. They all demonstrated a strong desire to foster discussion among students outside of the classroom. However, in many cases, the existing set of tools did not satisfy this desire. For example, one professor said that it was difficult to encourage students to communicate using bSpace's discussion board because students spent very little time on the site. The teaching assistant we spoke with said that because the discussion board was several clicks from the main page, students never bothered to read others' comments. Instructors also discussed the need to successfully communicate important announcements to students.

Another topic that emerged was grading. Although most of the professors were open to the idea of exposing grades to students, most relied on Excel for storing and calculating grades and seemed to be very content with their current processes. We also surmised that the size of the class, the subject material and the instructor grading style can be factors in the value of an online grade book. For example, in paper intensive classes, it is easier to review the paper by hand, scribble notes in the borders and then return it to the student in person. Also, in smaller, more interactive classes, instructors like to include class participation as a grade, which can be difficult to quantify in a formal manner.

Posting materials to a course website also came up as a need. Participants mentioned lecture slides, electronic readings, links, syllabus information, practice exams and assignments as documents that they provide on their current site.

Finally, one participant was enthusiastic about being able to view photographs of students. The professor thought that it would make learning the names of students much easier.

Student Interview Results

The three students that we interviewed all spoke about the importance of being able to quickly and efficiently discover what is due and when. This was also reported to be one of the most frequent tasks that they performed on current CMS applications. Furthermore, one participant talked about the need to know when something significant has changed such as a due date.

When asked about communication among students, there did not seem to be much enthusiasm around existing discussion board features. Two of the participants noted that they were motivated to post something when they had a question with their homework or a project or if they had missed class and needed to get information from another student. One participant mentioned that this was particularly true in computer science classes where other students became an extremely valuable resource for answering questions.

One participant said they she would find it valuable to be able to see who else was in the class and learn a little bit about them. For example, she might want to know about their interests or their background.

Discussion

The results of our initial interview process helped us to adapt our preliminary list of features into something that we felt would be of more value to potential users. The entire group met and voted on each feature, resulting in a prioritized list that we could then split into iteration phases for development (see below). One significant change that we made based on our interviews was to move the grade book feature from our "must-have" list down to a much lower priority.

Prioritized Feature List (February 2007)

Phase 1 Features

1. Start new class
2. Sign up for account
 - a. Enter basic information
 - b. Upload a syllabus file
3. Communicate to the whole class
4. Enter and edit a syllabus

- a. Viewing layout
- b. Add/edit topic and course description
- c. Add/edit assignment
- d. Add/edit resource
- e. Delete assignment
- f. Delete resource

Phase 2 Features

- 5. Mini syllabus viewer
- 6. Calendar sidebar
- 7. Have a printable syllabus
- 8. Sign-up as a student
- 9. Add a student to the class
- 10. Enter/edit a syllabus
- 11. Start new class
 - a. Site completion monitor

Future Features (if time permits)

- 12. Tag/label resources in the resource pool
- 13. Enter/add students
- 14. Restart class from an old/existing class
- 15. Turn in an assignment
- 16. Realign syllabus dates
- 17. Associate resource with syllabus
- 18. View permissions
- 19. User permissions
- 20. Auto-parse existing syllabus
- 21. User profiles
- 22. See grade book statistics
- 23. See who's online
- 24. Announce syllabus change
- 25. Enter/view grade book
- 26. Review/give feedback on assignments
- 27. Export grades to different formats
- 28. Printer-friendly views for resources
- 29. Leave comments on resources
- 30. Change page style/theme
- 31. Communicate to one student
- 32. Hold virtual office hours
- 33. Share work with team members
- 34. Export syllabus to Word/PDF format

Personas & Scenarios

In accordance with the standard user-centered development process, we created a set of personas and scenarios that we could use to help guide our design and validate our work. Personas can be an extremely valuable tool for keeping on course during development. When new feature ideas are inevitably born during development, comparing them against the needs of a persona can validate or invalidate their value.

Bob



Bob is a long-time, tenured professor in the Psychology Department of UCLA. For the 2006-2007 academic year, Bob is teaching one large undergraduate class and one small special topics class for graduate students. He considers himself to be reasonably internet savvy but not particularly technical. He, like most people these days, is very comfortable using Google as a starting point for navigating the web. He especially enjoys using Google Scholar to find publications in his field. He also visits the New York Times website to read the latest news online.

For his undergraduate class, he asked his GSI Josh to create a basic website. The site is simple and to-the-point. Rather than convert everything over to HTML, Josh simply posted a link to a Word document containing the syllabus. He also posted links to each of the problem sets, which are in PDF format. Every week, Bob sends Josh his latest lecture in PowerPoint (full of animations because Bob loves Microsoft clip art!) and Josh posts it on the website.

Overall, Bob is very satisfied with the site and feels proud that even an old guy like himself has a website set up for his students. The only downside is that Bob has to email Josh every time he wants something changed on the site - even for something small like fixing a typo.

For his graduate-level class, Bob just emails new information out to the students. He will also print out paper copies of some readings and hand them out in class. There are only 15 students so it is not a huge burden. Plus, he doesn't have a GSI for this class, so there's no way that he could have a website.

Scenario 1

It's Tuesday and Bob is grading midterms. It's a slow process, but part of the job description. Tomorrow he is planning on lecturing about psychological disorders, which is always a favorite topic among students. As he's thinking about the upcoming lecture, he realizes that he forgot to update one of the slides in his PowerPoint presentation. He logs into Roslin, a course site system that he began using this semester, and navigates to tomorrow's date. He deletes the existing set of slides and uploads the new version. All set. Now, back to grading.



Josephine (Primary Persona)

Josephine is a 34-year-old associate professor at Cal Poly Pomona who teaches Industrial Engineering. She's also involved in an interdisciplinary program between the Engineering department, the Business school and the Computer Science department.

When she's not daydreaming about scuba diving in Australia, Josephine can often be found on her MacBook. She spends many hours each day checking her Gmail account, chatting with friends and

coworkers, writing blog posts for her personal blog and adding relevant feeds to her feed reader. She's not a developer by any means but she is comfortable enough with HTML and CSS to have built her own basic website.

Josephine tends to teach small, upper-level classes. This semester she is only teaching a single class, with 18 graduate students. She really enjoys the sense of collaboration that emerges with a small set of intelligent, engaged students. In order to keep her classes fresh from year to year she maintains a relatively flexible schedule. The university requires that she provide a syllabus at the beginning of the semester so she will typically create a rough outline and then will proceed to adapt it along the way.

Because many of the readings she assigns are available online, she has been using a home-grown syllabus tool that is provided by the university to store links to readings as well as her slides and podcasts. It's not great but it's easier and less time-consuming than building a new site for each class she teaches. In addition, she created a blog for the class on WordPress and asks students to leave comments on interesting topics. She has tried various ways to encourage collaboration outside of the class but has been somewhat disappointed with the results. Her first attempt was with a wiki but students complained about the cumbersome wiki formatting. She's hoping she has more success with the blog. She doesn't want to have to resort to requiring students to leave comments but the idea has definitely crossed her mind.

Scenario 1

Josephine is thrilled with her new course site, which she created by using Roslin. She quickly started using the discussion feature, which allows her and her students to post interesting topics with one another. Yesterday she came across a fantastic article on the future of journalism and posted it to the discussion board. She's excited to see if anyone has responded with comments. She logs into Roslin and quickly sees that there are three new comments. She's pleased to see that one is from Megan, who is typically pretty shy and does not contribute much in class. The discussion feature has helped to bring her out of her shell a bit.



Ian

Ian is a 24 year old graduate student at UCSD studying journalism. Ian practically grew up on the internet and he's not entirely sure that he could survive without it at this point. From Google to Facebook to World of Warcraft, Ian uses the internet for school, socializing with friends and for entertainment. He even has a pretty popular video on YouTube right now.

Ian is a good student and even with the occasional case of procrastination, he tends to keep up on his studies. But one thing that frustrates Ian is the fact that he has to go to five different course websites in order to find readings, due dates and lecture slides. In nearly every other web application he uses, information is "pushed" to him automatically. For example, when he receives a Gmail email, a little balloon pops up on his desktop. When a new post is written on one of the feeds he subscribes to, he is notified automatically. So when Ian has to go to numerous websites to find stuff out, he becomes annoyed at the inefficiency of the process. Haven't his teachers ever heard of RSS?

Scenario 1

Ian feels like his academic life is in chaos right now. It's the end of the semester and he has a million things due. The silver lining is that three of his five courses use Roslin for their course sites and as a result he receives automatic updates for upcoming due dates. He never has to worry about missing a deadline.

Scenario 2

The first day of class is always a bit exciting. His graduate program is actually pretty large and so he'll often meet new people each semester. For the class that he has on Roslin this semester, he already logged to take a look at the student list. Most students have added photos and a short biography about themselves so he can quickly see if there are any new faces.

Comparative Analysis and Market Opportunity

Currently, there are a few CMS applications that dominate the market. Most of the instructors and students we interviewed had experience with at least one of these systems. The largest is the proprietary Blackboard Academic Suite, with over 2,225 customers and \$111 Million in revenue.¹ The smaller proprietary competitors are led by ANGEL Learning. While commercial systems have captured around 80% of the higher education market,² some noteworthy free and open source systems have made significant inroads. These include the Sakai project, led by a consortium of large universities, and Moodle, supported by a diverse community of users and developers.

The majority of these competitors share the same set of features. These include tools like discussion forums, wikis, chat rooms, a calendaring system, some capacity for group work, online test taking, and a grade book. See Appendix for a more complete feature list.

Technologically, all the primary competitors are web-based, requiring system software to be installed on a server with a database, but only requiring faculty and student users to have internet access and a web browser. The server requirements run the gamut from a simple desktop PC with Apache and MySQL for Moodle to an enterprise-level Java Tomcat server for Sakai.

¹ <http://www.antitrustlawblog.com/article-on-line-learning-market-may-be-monopolized.html> (retrieved April, 2007)

² <http://taste.merlot.org/lms.html> (retrieved April, 2007)

Figure 3: Blackboard Dashboard



Figure 4: bSpace (Sakai) Dashboard

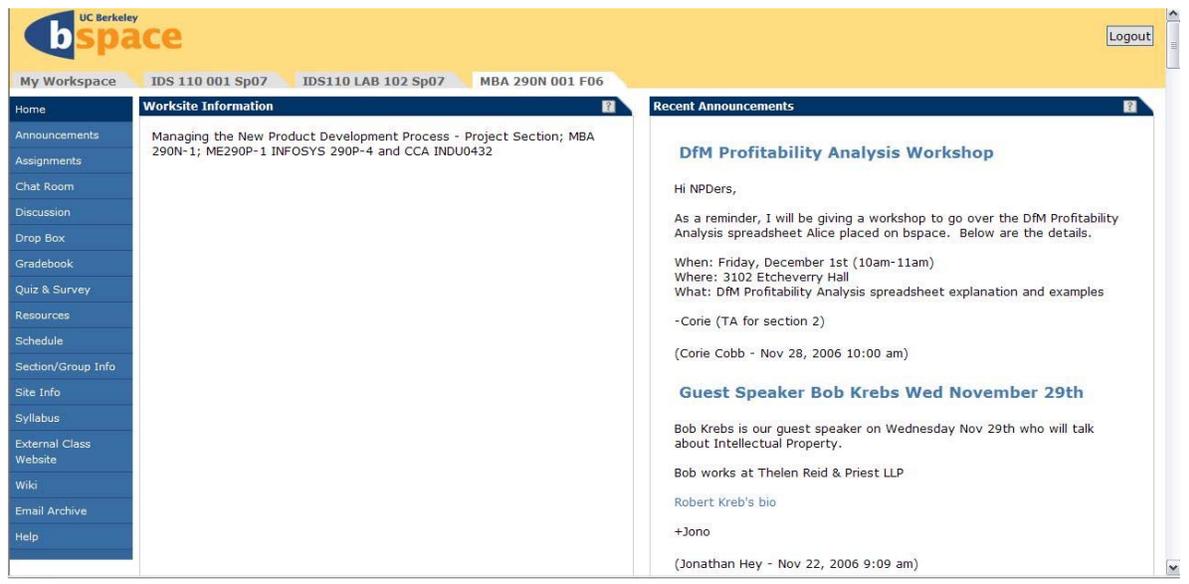
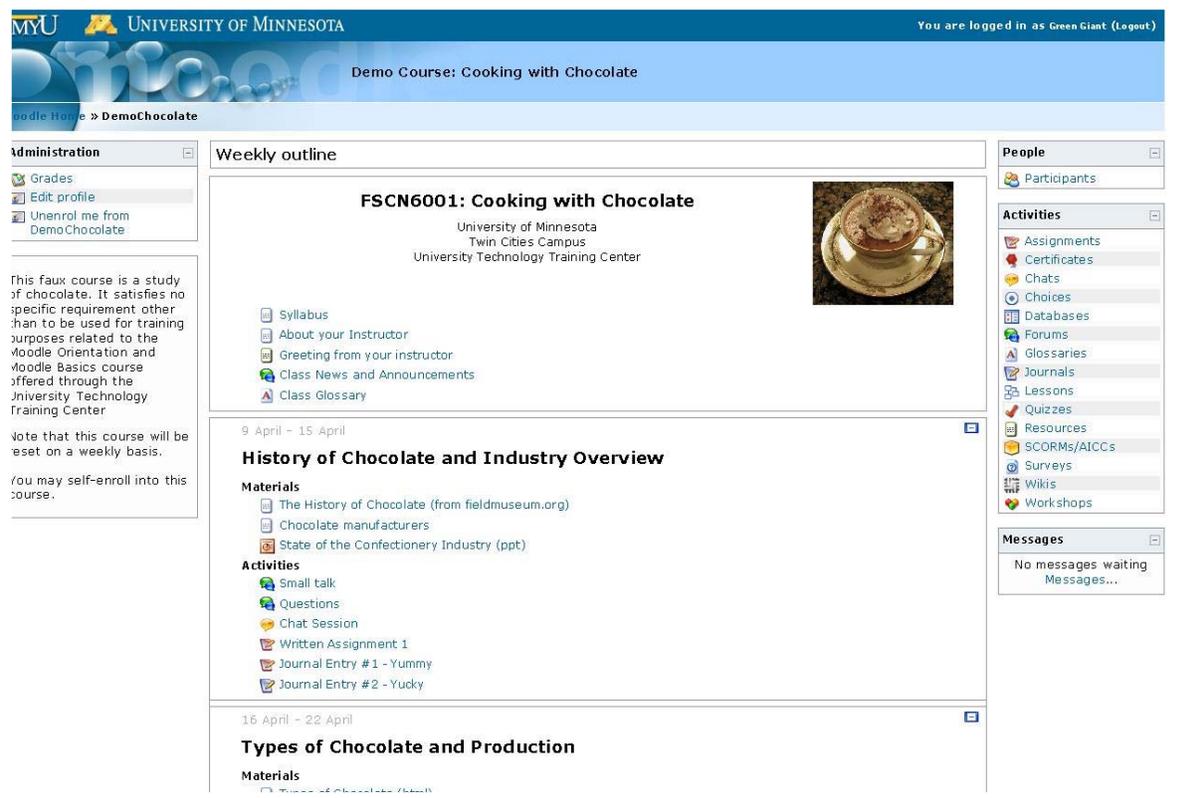


Figure 5: Moodle Dashboard



While each system makes an effort to be customizable, they all suffer from usability problems that limit their use by faculty and students. Interviews with users, a survey of the literature, and hands-on investigation revealed a number of themes. These systems do not provide the ease of use or transparency that users want.³ Many of the features go unused because they don't fit into the ways that real courses are structured. Instructors and students are put off by the "kitchen-sink" approach to functionality and visually unappealing interfaces that dominates the current offerings. Early adopters of educational technology are beginning to feel constrained by the silos of data encouraged by these systems and are looking towards the more open and interconnected model of "Web 2.0"⁴ for the future direction of CMS.

In addition to purpose-built CMS, instructors are finding ways to utilize other collaboration technologies in support of their classes. CMS providers are increasingly competing against blogging systems like Wordpress, wikis like JotSpot, content hosting like YouTube and Flickr, and even community annotation services like Del.icio.us.

The Roslin team had the opportunity to interview a UC Berkeley staff member responsible for managing the CMS for that university, Mara Hancock. In describing how Berkeley chose the Sakai system, she mentioned that the high cost of a commercial system compared with the flexibility of an open source one was an important consideration, but noted that calculating ROI

³ <http://www.educause.edu/ir/library/pdf/erm0643.pdf> (retrieved April, 2007)

⁴ <http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html> (retrieved April, 2007)

for non-profit educational institutions can be tricky. While the Berkeley team continues to improve the user experience of their custom Sakai installation, bSpace, Mara pointed out that faculty tend to learn to work with the system procedurally which makes it difficult to roll out iterations that change the interfaces as the system improves. User education - through training and raising awareness - is crucial to the success of bSpace. The Roslin team recognizes that user education will never cease to be important, but there seems to be a user need and market opportunity for more intuitive interfaces and better discoverability of features and content.

Administering a CMS system for an entire university is a difficult and costly endeavor. Certainly, much effort must be made to integrate the software with a school's existing registration and human-resources systems. Still, the costs of customizing interfaces and adding specific functionality are not insignificant. For many institutions, support costs may be greater than any licensing fees. Open source systems do not have much of an advantage in this area. In fact, an internal 2006 study by Idaho State University projected nearly identical labor and support costs for Moodle, Sakai, and the commercial WebCT system (now owned by Blackboard).⁵

This and other surveys show that there is a demonstrated market need for a higher education course management system that is both easy to use and easy to administer. Of the two, achieving good usability is the more important proposition given the centrality of teaching to a university's mission and the dissatisfaction with the status quo. Offering course management functions as a third-party hosted service could be a viable way to reduce administrative costs. The success of other mission-critical software-as-a-service offerings like Salesforce.com is encouraging. With faculty, students, and staff already used to interacting with their courses via the web and a potential market size in the hundreds of millions of dollars, there will be a lot of activity in this space soon.

Project Constraints

The Roslin project was constrained by a number of factors. These have had an effect on project's planning, development, and final prototype. Three factors worthy of discussion are the legal environment, the relationship to back-office enterprise systems, and the master's project context. While the latter is fairly straightforward and specific to Roslin, the first two factors present choices that any course management systems will face.

The most important legal consideration in higher educational technology is the Family Educational Rights and Privacy Act (FERPA). Since 1974, this law has limited the ways an educational institution can maintain and share student information. Generally, for this project, it means that most student information must be kept confidential and a student can opt out of having directory information shared (whether with classmates or with the public). The instructors interviewed by the Roslin team were aware of FERPA requirements and expected active compliance in any CMS they intended to use. This requirement led to the opt-in nature of Roslin's collection of student information and disconnecting personally identifiable information (like real names and email addresses) from almost all system interactions. Best practices suggest that privacy notices with opt-out instructions be accessible from pages that display student information. The system does, however, store sensitive student data and will need, when it is put into production, well documented protections for that data. This will likely mean a secure data center, controlled administrative access, and encrypted network connections to institutional information systems. Note that none of these security measures are included in

⁵ http://www.isu.edu/itrc/resources/LMS_Focus_Group_Report.pdf (retrieved April, 2007)

this prototype version of the system.

Connection to and integration with the back-office information systems of universities is an important constraint by itself. Education institutions are not exempt from the difficulties inherent in enterprise integration efforts. Experiences connecting student registration with financial systems, for example, is a big enough headache to scare some institutions away from trying to connect course management systems at all. Conflicting programming languages, proprietary data formats, and a lack of skilled programmers make integration a challenge at best. Roslin has responded to this constraint in two ways. First, the project team decided that, given the time and manpower limitations, integration was outside the scope of this project. But, since integration issues are likely to arise as soon as the system does get used, Roslin limits the data it requires to the bare minimum and takes advantage of open standards to store and share the data that it does keep. This makes it a little easier for an institution to choose Roslin for its CMS needs.

Finally, this paper recognizes that the Roslin project was conceived and executed as a Master's Final Project for a team of students at the UC Berkeley School of Information. This has limited the scope of the project as described above. The project team recognizes that more work is required in order for Roslin to be an effective competitor in the CMS market. Also, the Master's project context has limited much of the user research to the UC Berkeley campus. Still, the project team has made an effort to seek input across disciplines. We expect that the lessons learned at home are applicable across educational institutions, but there is an opportunity to validate our findings at other universities. Despite these constraints, we believe that the architecture and interface paradigms embodied in Roslin represent an improvement in the state of the art of course management software.

Product Development Process

Architecture and Programming Environment

The team selected the Ruby on Rails web application framework⁶ to develop Roslin. Ruby on Rails is an application framework based on the Ruby programming language geared towards rapid development of Model-View-Controller (MVC) web applications. This separation of concerns between the underlying data model, the program logic, and presentation of data not only simplifies and modularizes the code, but also allowed team members to work in parallel on different parts of the project. Work on the user interface on the view layer, for example, was done in parallel along with the development of the data model and controller code. Later changes to the user interface required minimal changes to the application logic and underlying data models.

Ruby on Rails features a simple object-relational database abstraction layer which greatly simplified the development process. Named ActiveRecord, this abstraction layer allows data models to be defined in terms of objects and enclosed attributes. The SQL statements required to create tables in the database are automatically generated by ActiveRecord and can be easily configured to run a variety of database management systems, including MySQL, PostgreSQL, and SQLite. Once instantiated, records are retrieved and returned as objects that can be manipulated in the application logic. These objects can easily be persisted back into the DBMS

⁶ See <http://rubyonrails.org/> for more about Ruby on Rails

with simple method calls. The SQL statements required for querying the DBMS and saving objects are also automatically generated by ActiveRecord.

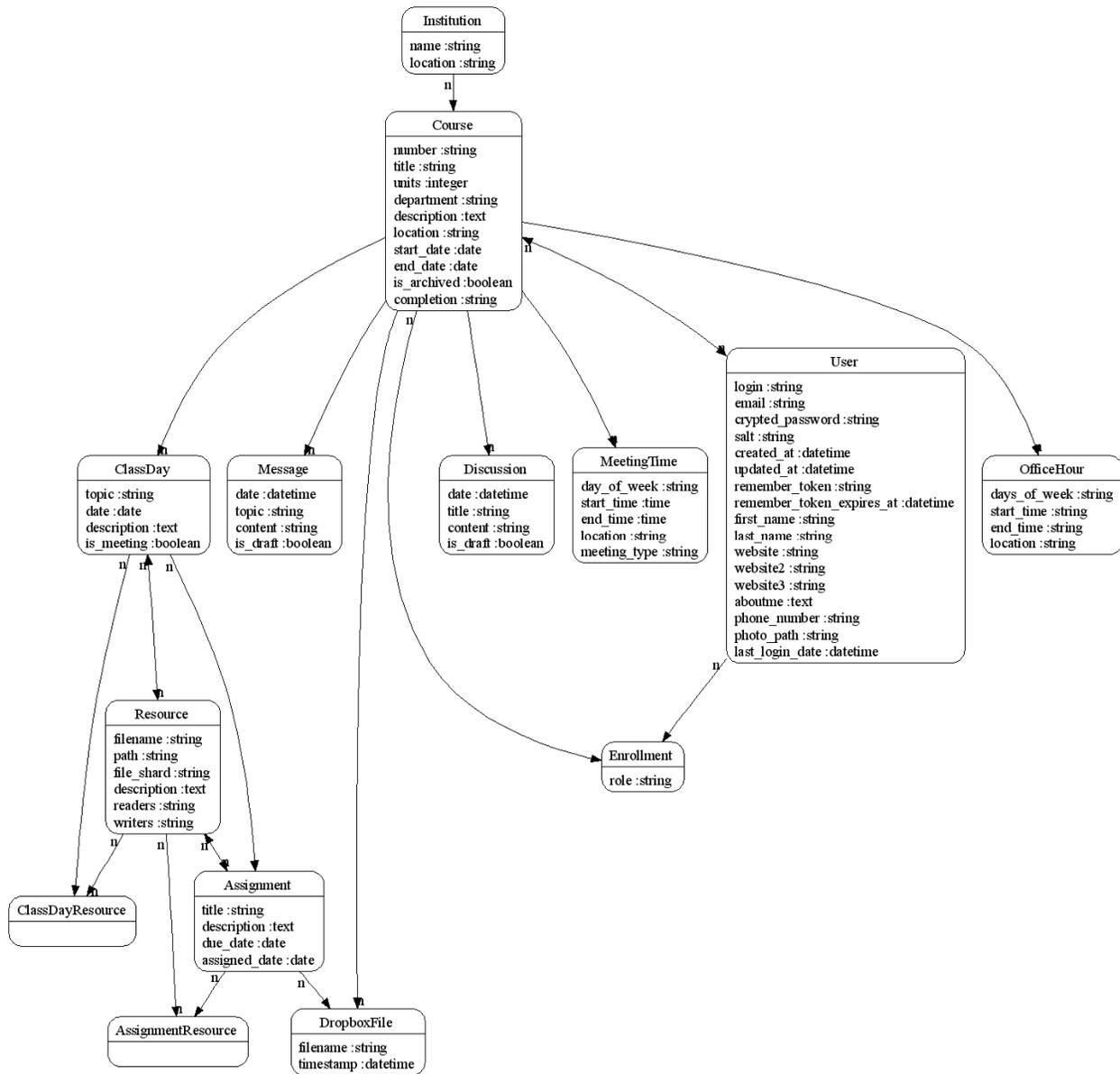
The view layer of Ruby on Rails utilizes Ruby code embedded in HTML to generate browser-based interfaces. Objects retrieved from the data model or generated from the application logic are passed on to the view layer where they are rendered into HTML. A library of helper functions provided by Ruby on Rails allows rapid development of the interface by generating large and complex HTML fragments with just a few lines of embedded Ruby code. The Ruby on Rails view layer is accompanied by the well-supported Script.aculo.us and Prototype JavaScript libraries. Coupled with embedded Ruby, these two JavaScript libraries can be used to create complex and rich dynamic interfaces in the browser.

The application logic is programmed in the Ruby language itself, aided by a large library of convenience methods geared towards the development of web applications. Following the spirit of the Perl programming language, the Ruby language is also well-suited for string manipulation, which makes it ideal for web-application development. The Ruby language itself is a dynamically-typed scripting language, interpreted at run-time. This feature allowed the team to rapidly test changes in the code with a simple page-reload at the browser without an intermediate compile phase.

Development was done mainly on the Windows XP platform. The Ruby on Rails and MySQL environments were provided by a freely-available software package called InstantRails. InstantRails allowed the team to quickly and easily set up a working Ruby on Rails development server with the MySQL DBMS. The team used the RadRails integrated-development environment to write the Ruby code and HTML/CSS used in Roslin. RadRails also featured integrated access to version-control software, which helped ensure that all team members were working with up-to-date versions of the application code.

Database Design

Figure 6: Roslin Model Diagram



As can be seen in the above figure, the Course table formed the primary hub of our database model. The many-to-many relationship between Course and User allowed a user to be an instructor at multiple institutions and enabled a particular course to have multiple instructors. In fact, users can be both instructors and students.

Early on we encountered a problem with enforcing foreign key constraints with Ruby on Rails' database layer abstraction. We were unable to have the tables cascade upon deleting a parent row. To work around this issue, we manually enforced with the foreign key constraints with SQL drops. However, this approach might compromise the data integrity with concurrent access from multiple connections.

Future improvement involves the optimization of some data types. For example, the role format in the Enrollment table should be converted from a string to an integer type to conserve space. It might be insignificant if the number of roles remain relatively small. However, if we choose to allow the client to define personalized roles, it could potentially increase the size and impact the overall performance of the database.

User Interface Design & Usability Testing

Much of the motivation for creating Roslin came from the fact that most existing course management systems offer a less than optimal user experience. During our user needs assessment process, interviewees stated again and again that a major issue with systems like bSpace (Sakai) and Blackboard was usability. For example, many simple tasks required more than the expected number of clicks to complete. Interactions were said to be "clunky." Also, the visual design was reported to be "ugly" and "old" looking.

With this knowledge in hand, our goal was to create an extremely positive user experience by wrapping our system in a very light and simple interface. We hoped to incorporate many of the latest web interaction techniques in order to reduce the amount of work and cognitive strain placed on the user. To determine which design patterns we wished to follow, we spent some time examining popular websites such as those provided by Google, 37 Signals, WordPress, Blogger and Yahoo!.

Techniques we were particular interested in emulating included:

- inline form editing
- file uploading
- date and time entry and selection
- temporary instruction panels
- color highlighting effects to indicate a change in state
- button and link hierarchy
- rich-text editing

Figure 7: WordPress Image Upload Form

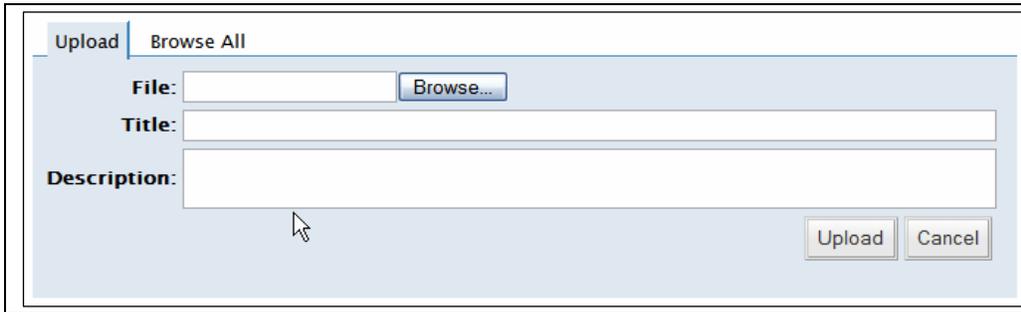


Figure 8: Google Calendar Inline Editing

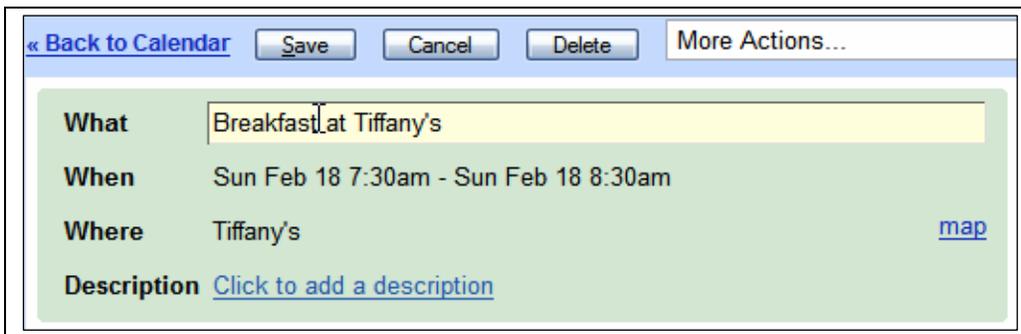
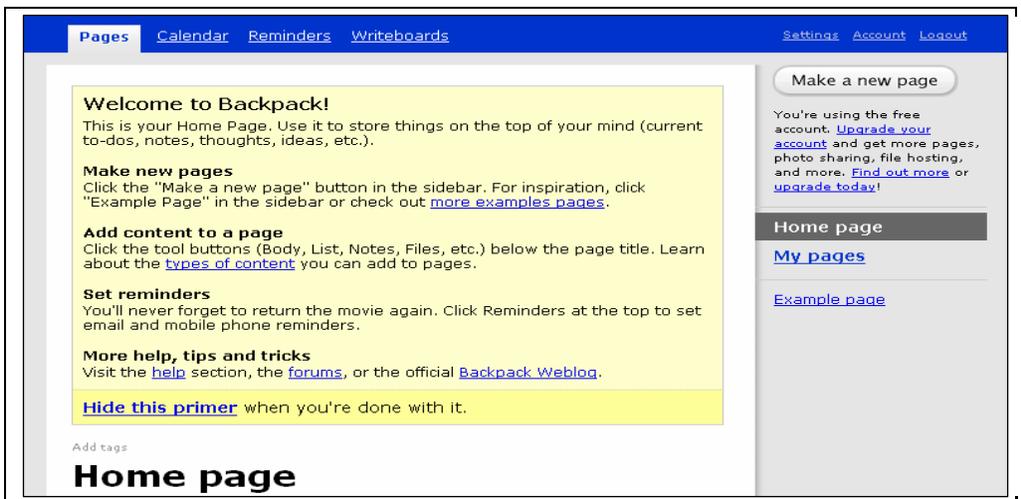


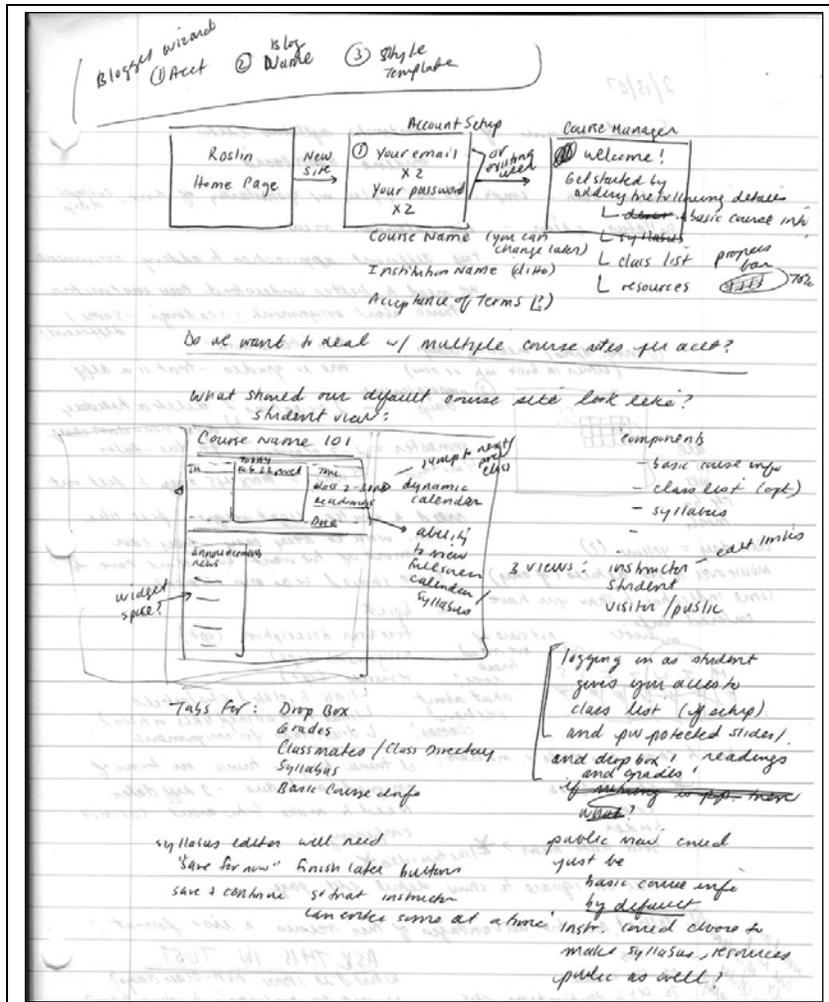
Figure 9: Backpack Introduction Panel



Armed with this research, along with the results of our user needs assessment process, we were able to begin sketching initial designs for the interface. Initial sketches were focused on the overarching architecture of the site with a special emphasis on navigation. Then, based on our

prioritized list of features, we began designing the sign up page, the syllabus feature and the basic information page.

Figure 10: Early Sketch of Roslin Dashboard



These designs were migrated from paper into Microsoft Visio so that they could be more easily shared with team members and could be changed with relative ease.

We quickly realized that it would be prudent to receive user validation before proceeding with development. Specifically, we wanted to ensure that our navigational organization would resonate with users and that our choice of features would satisfy instructors. As a result, we made arrangements with four professors and one student to evaluate our paper prototypes.

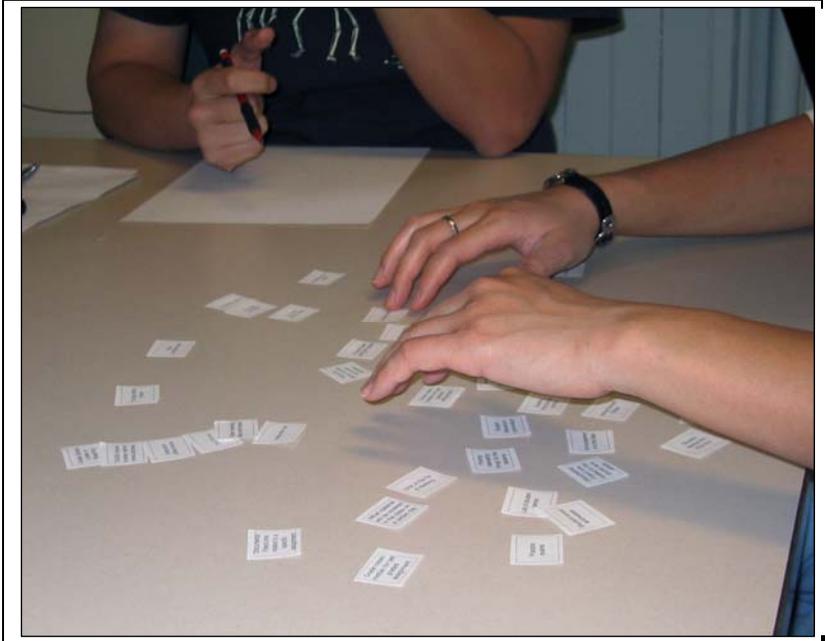
Card Sorting Activity

A key component of this round of testing was to perform a card sorting activity with two participants. We created a set of 45 cards on which was written a single course concept. Concepts included: student bios, practice exams, course description, assignments, grades,

readings and class meeting times. Participants were asked to arrange the cards in whatever groups felt most natural.

The results of the activity helped validate our navigational structure and also provided insight in to terminology. For example, we learned that the word "syllabus" actually means very different things to different people. In some cases, it was a schedule of readings and assignments as well as a grading breakdown. In another case it was a rough outline of course topics with no specific dates. This lack of a common definition would need to be accommodated by our interface.

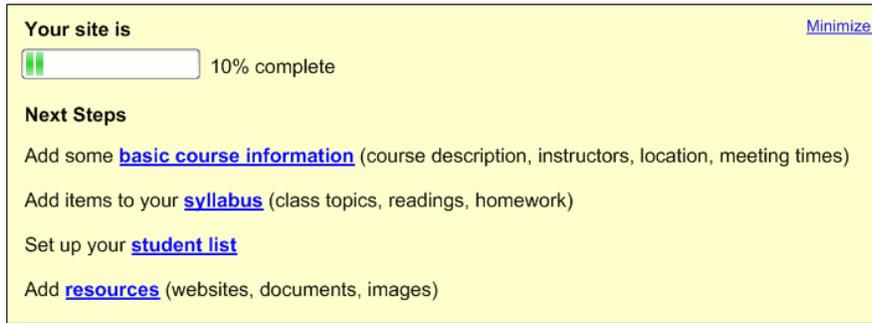
Figure 11: Card Sorting Activity



Paper Prototype Test

In addition to performing a card sorting activity, we asked our instructor participants to walk through a paper presentation of our interface. We began by displaying a sign up page which asked for information such as username, email, password and course name. The next page was the instructor dashboard. The dashboard contained a site completion monitor which indicated that only a small percentage of the site was complete. It then listed several typical "next steps" such as adding administrative information and creating a syllabus. Participants were encouraged to explore whichever path they would follow if they were actually creating a course site.

Figure 12: Site Completion Monitor



Your site is [Minimize](#)

10% complete

Next Steps

Add some [basic course information](#) (course description, instructors, location, meeting times)

Add items to your [syllabus](#) (class topics, readings, homework)

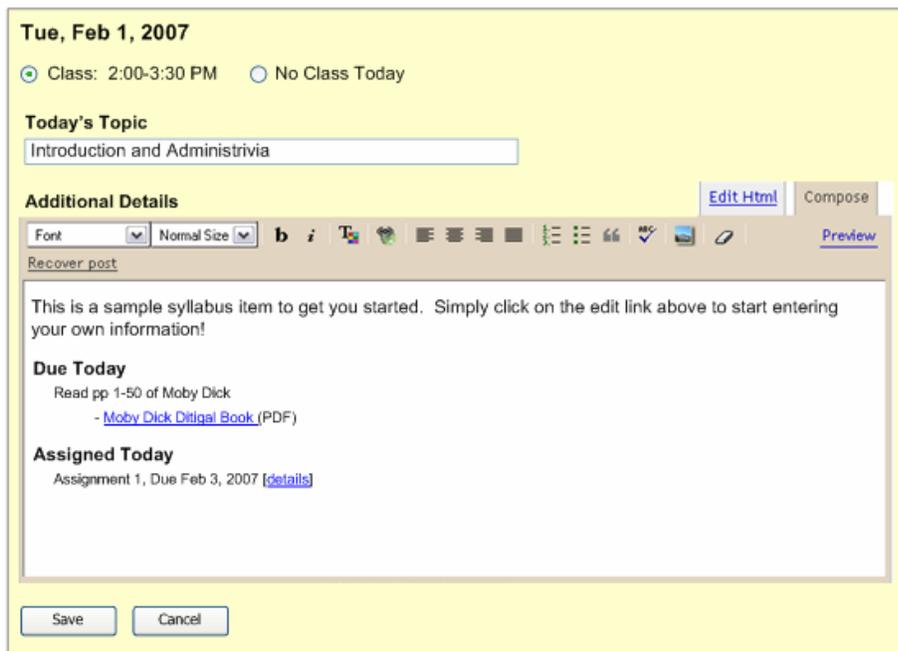
Set up your [student list](#)

Add [resources](#) (websites, documents, images)

We also asked participants to visit the Syllabus page where they could edit the contents of a day, adding a topic for the class, a description, assignments and resources such as lecture slides. We had three different variations of the page that we were hoping would receive feedback:

1. Single free-form text area
2. Structured fields, resources can be associated with the day
3. Structured fields, resources can be associated with the day as well as assignments

Figure 13: Syllabus with single free-form text area



Tue, Feb 1, 2007

Class: 2:00-3:30 PM No Class Today

Today's Topic

Additional Details [Edit Html](#) [Compose](#)

Font Normal Size **b** *i* [Preview](#)

[Recover post](#)

This is a sample syllabus item to get you started. Simply click on the edit link above to start entering your own information!

Due Today

Read pp 1-50 of Moby Dick
- [Moby Dick Digital Book](#) (PDF)

Assigned Today

Assignment 1, Due Feb 3, 2007 [\[details\]](#)

Figure 14: Syllabus with structured fields

The screenshot shows a web-based syllabus management interface. At the top, it displays the date "Tue, Feb 1, 2007" and two radio buttons: "Class: 2:00-3:30 PM" (selected) and "No Class Today". Below this is a "Today's Topic" section with a text input field containing "Introduction and Administrivia". The "Additional Details" section contains a text area with a placeholder message: "This is a sample syllabus item to get you started. Simply click on the edit link above to start entering your own information!". The "Resources" section has an "Add Resource" button and a table with three rows. Each row has a "Name" input field, a "File/URL" dropdown menu, and a "Browse..." button. The rows are: "Class 1 Slides" with "Class1slides.ppt", "Reflection Paper Tips" with "Reflectiontips.pdf", and "Moby Dick Digital Book" with "Mobydick.pdf". The "Assignments" section has an "Add Assignment" button and a table with two rows. Each row has a "Task" input field, an "Assigned" dropdown menu, a "Due" dropdown menu, and "More Details" and "Delete" links. The rows are: "Read pp 1-50 of Moby Dick" with "1/26/07" and "Today", and "Assignment 1" with "Today" and "2/8/07". At the bottom, there are "Save" and "Cancel" buttons.

Participants

Our first two test participants were instructors of Political Science and had been teaching for many years. They both provided students with course websites; one was developed and maintained by a GSI and the other was hosted on bSpace. In both cases, the instructors still provided schedule and assignment information through Word or PDF documents rather than in HTML.

Based on the results of our first two tests, we felt it was important to test an additional two instructors, within a different academic discipline, in order to understand which issues were global and which were issues specific to a particular instructor or discipline. Of our second two instructors, one instructor taught a course at the School of Information and the other taught two classes within the Interdisciplinary Studies program. These instructors also maintained websites; however, they were much more familiar with using newer web technologies such as blogs and wikis to supplement the course site. Lastly, these instructors both maintained flexible, adaptable schedules that often changed at a moment's notice.

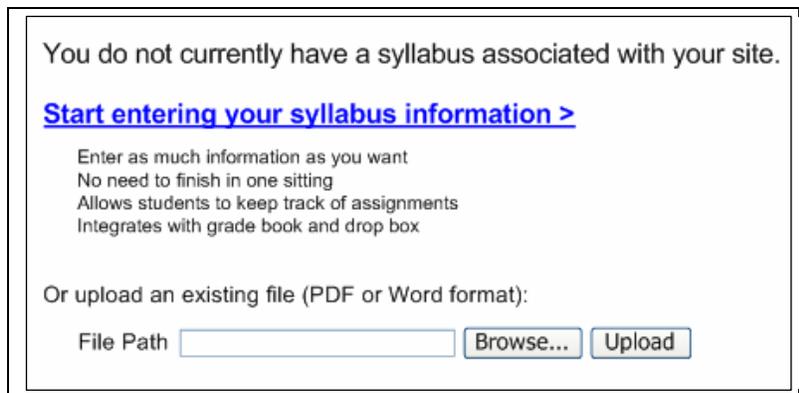
Lastly, we asked one School of Information student to give feedback on a portion of our prototype.

Results (Instructors 1 and 2)

In our paper prototype, we provided instructors with the option of either uploading an existing syllabus or using our syllabus tool to build a new online version of their syllabus. The feedback we received from the first two participants was unanimous - given this choice, there was little-to-no incentive to create a new syllabus. Rather, the participants stated that they would simply

upload their existing file. In addition, these participants had a different expectation of how our syllabus tool would function than it did in reality. In fact, once the participants were asked to build the syllabus rather than upload a file, they seemed to warm to the idea. By the end of the test, one participant said that he would actually find the tool quite valuable because he could now see how it could be used to supplement his current process. He could continue to use his standard syllabus (in Word document format) but could use the tool to post his lecture slides each week. Another participant thought that the ability to add assignments would be useful.

Figure 15: Upload an Existing Syllabus or Building a New Syllabus



You do not currently have a syllabus associated with your site.

[Start entering your syllabus information >](#)

- Enter as much information as you want
- No need to finish in one sitting
- Allows students to keep track of assignments
- Integrates with grade book and drop box

Or upload an existing file (PDF or Word format):

File Path

Another finding was that our participants were not very keen on the idea of entering data manually. These participants were accustomed to bSpace which automatically populates fields such as meeting dates and times, course name, description and student names and emails through its direct integration with the campus database. Manually entering this data felt redundant and inefficient.

Another outcome of test was that we learned that different instructors have different methods of preparing for a class. One of the instructors tended to re-use the previous year's schedule and simply change the dates to fit the new semester. The other instructor also had a schedule from a previous year but did not assign dates upfront. Instead, he would adapt the schedule on the fly, adding an extra week here and there based on the wants and needs of the class.

Intermediate Changes to the Interface

After our initial test, we felt that it was important to address some of the issues we discovered before proceeding with the next two tests.

It was clear from the first two participants that there was indeed value in our syllabus tool but that the vocabulary was misleading. As a result, we began to consider alternate terminology such as "lecture planner," "class plans," "today in class", "schedule" or "calendar." For our second set of tests, we changed "Syllabus" to "Lecture Planner."

We also added a link in our Lecture Planner that would rearrange the lecture plans to different dates. We felt that this would be an important feature for instructors who shift their schedule around during the semester.

Results (Instructors 2 and 3)

Our second set of tests felt much more successful. Participants were able to navigate through the interface with ease.

The term "Lecture Planner" did not seem to cause any misunderstanding at all, which made us believe that we had selected a more appropriate term for the tool.

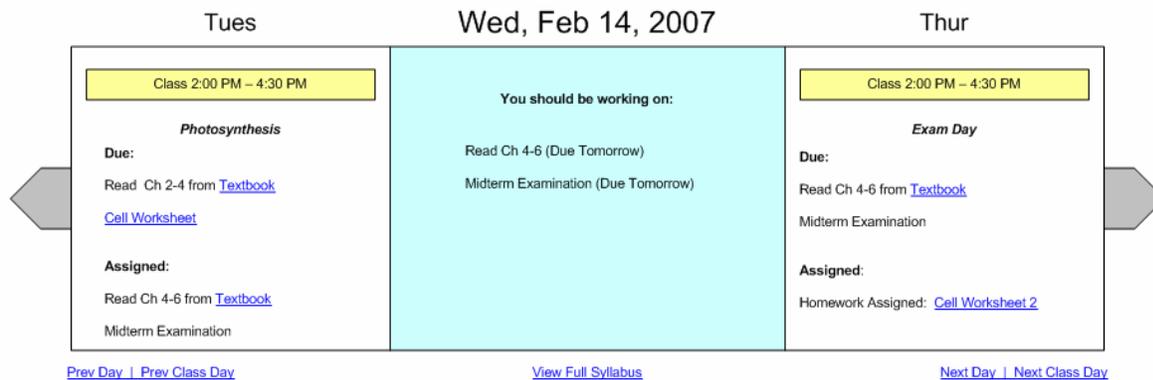
These participants, like the first two, expected that fields like course name, number, institution, description and meeting dates would be pre-populated through an integration with the university system.

They also referenced the Family Educational Rights and Privacy Act (FERPA) when discussing features such as the grade book and student roster. By using a campus-approved system, these concerns were alleviated; however, with a third-party system like Roslin, participants questioned whether they might be in violation. For example, one participant believed that the student roster had to be kept private and should not be visible to non-registered students. The concerns relating to grading were particularly high, even when participants were told that grades would only be revealed on a student-by-student basis.

Results (Student)

Our single student participant reviewed the "Mini Syllabus Viewer" component of the student dashboard. The goal of this component was to summarize the details of the Lecture Planner for yesterday, today and the next day. Students could use this to see what was due in the near future.

Figure 16: Mini Syllabus Viewer for Students



The participant liked the idea of the viewer, but felt that the time frame of three days was too constricted. Instead, she said that she would like to see the whole week and also deliverable due dates that were further than one week away but still relatively soon.

Discussion of Results

Once all four tests had been completed, we felt that we had a much better grasp on how Roslin could and would be used by potential users. Some of the feedback we received was easy to integrate into the next version of the user interface. For example, the vocabulary change from

"Syllabus" to "Lecture Planner" was a simple change with a significant impact. Expanding the "Mini Syllabus Viewer" to a week was also not difficult.

The feedback regarding pre-populated data was a bit more difficult to remedy. We did not want to make an assumption that integration would exist so instead we decided to make the data entry process as painless as possible for instructors. For example, we identified the student roster, particularly for large enrollments, to be one of the most critical bottlenecks in data entry. We decided to add an invitation feature which would send an email to students and invite them to sign up for an account and enter their profile information. We felt that this tool could save a significant amount of time for instructors and would also ensure that they would have the most up-to-date information on their students.

The feedback we received about FERPA as well as the fact that our participants all used Excel for their grades, helped validate our decision to forgo the development of a grade book tool.

As a result of these paper prototyping sessions, we decided to revisit our Josephine persona. We modified Josephine's characteristics to closely match those of our second pair of instructors and then proceeded to designate her as our primary persona. We felt that it was this type of professor that would most benefit from Roslin and who would most likely embrace the technology.

Conversion to Code

During the months of March and April, the Visio mockups were solidified and were slowly converted into HTML and Ruby. At this point, the user interface design process shifted substantially. Gaps in the mockups became apparent as we began stitching together the application and design solutions had to be created on-the-fly. In addition, as is natural in most software development processes, changes to the interface were made on an as-needed basis. For example, the Basic Information section shifted from a single page to an interconnecting set of four pages (What, When & Where, Instructors and Students) and then finally down to two pages (Basics and Instructors). This shift occurred after we were able to interact with interface online and found potential usability issues that were not obvious to us in a static paper mockup.

Interactive Prototype Test

In April, after much of the interface had been coded, we decided to conduct two interactive usability tests with the same two professors that participated in our paper prototyping session. We developed a set of six tasks (see Appendix A for task details) that would require the participant to touch on virtually every aspect of our application. In brief, the tasks were:

1. Sign up for an account
2. Enter basic information (dates/times, description)
3. Add lecture slides (in PowerPoint format) to a day in the Lecture Planner
4. Add an assignment to a day in the Lecture Planner
5. Add a discussion post to the discussion board
6. Review the dashboard

Figure 17: Interactive Usability Test



Results

The participants were able to sign up for a new course with ease. The first participant, after reaching the dashboard, spent some time pondering the purpose of the site completion progress bar. He wanted to know what constituted completeness. This participant also noted that his email address was being shown in the header rather than his username. He wondered whether he would be able to change this email address in the future if, for example, he switched jobs.

When asked to enter meeting times, there was no hesitation by either participant in finding the appropriate place to add the information. The participants did make note again, as they did in the paper prototyping session, that they wish this information would be pre-populated from the university's registrar for them.

On the third task, adding a resource, navigation was also not an issue. The participants followed the expected steps for adding a resource. However, one participant noted that he would not want to fill out a file name and description field and hoped that these were not required. In fact, the file name was required.

The task of adding an assignment was also completed as expected. We asked the participants about the terminology of "Student Task" and they felt that it was the correct term to use. "Student Assignments", another term we were considering, would have felt too restrictive and would not have been able to include other common tasks such as exams and readings.

The discussion board task was also straightforward. One participant wondered whether the conversation would be threaded or flat. He said that he preferred a flat structure because it was easier to read.

The review of the dashboard was extremely positive by both participants. One noticed the RSS

feeds and commented that they were "very cool." He also really liked the concept of the course countdown meter (not to be confused with the site completion progress bar) which showed how many calendar days remained in the semester. However, he did recommend that it change to class session days rather than to calendar days as this would be a more salient unit of measurement.

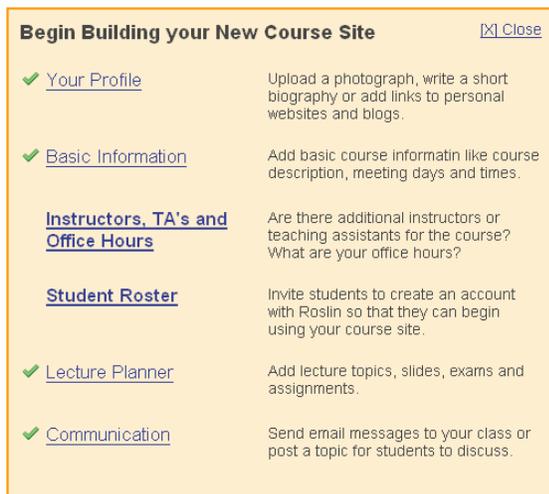
Figure 18: Roslin Course Countdown Meter



Discussion

We were all quite pleased with the results of our interactive test. We did not encounter any major usability issues. Of the smaller issues that were encountered, many were simply consequences of an unfinished interface. However, there were some that warranted change. For example, the negative reaction to the site completion monitor motivated us to replace the feature with a simple checklist of "next steps" that the user could follow or ignore, if desired.

Figure 19: Roslin Introductory Checklist



Another change that we made was to make the date fields read-only, thus forcing users to use the calendar date-picker tool. We found in the usability test that one participant entered the date in format that was not in compliance with our database. Although this is not an ideal usability solution (the ideal solution would be to accept any reasonable date string and convert it to fit the database requirements), we felt that it would at least prevent errors from being returned.

Figure 20: Fixed Start and End Dates with Date Picker



In response to a participant's comment regarding required fields in the file upload dialog box, we decided to remove the description field altogether and to make the file name field optional.

We also changed the email address to the username in the header so as to make clear that the username was fixed but the email address could be changed.

Interface Constraints

In many software development processes, the user interface often suffers as a consequence of time and resource constraints. With Roslin, this was also true to an extent.

Many of the "Web 2.0" techniques that were enthusiastic about implementing early on had to be left out due to time constraints. For example, we would have liked to be able to accept any date or time format and gracefully parse it but instead we were forced to make users comply with a calendar date picker widget.

We were also hoping to use color fading as a method for indicating changes in state. For example, when a resource is deleted, have it glow red and then slowly fade away. However, again due to time constraints, we were not able to implement this feature.

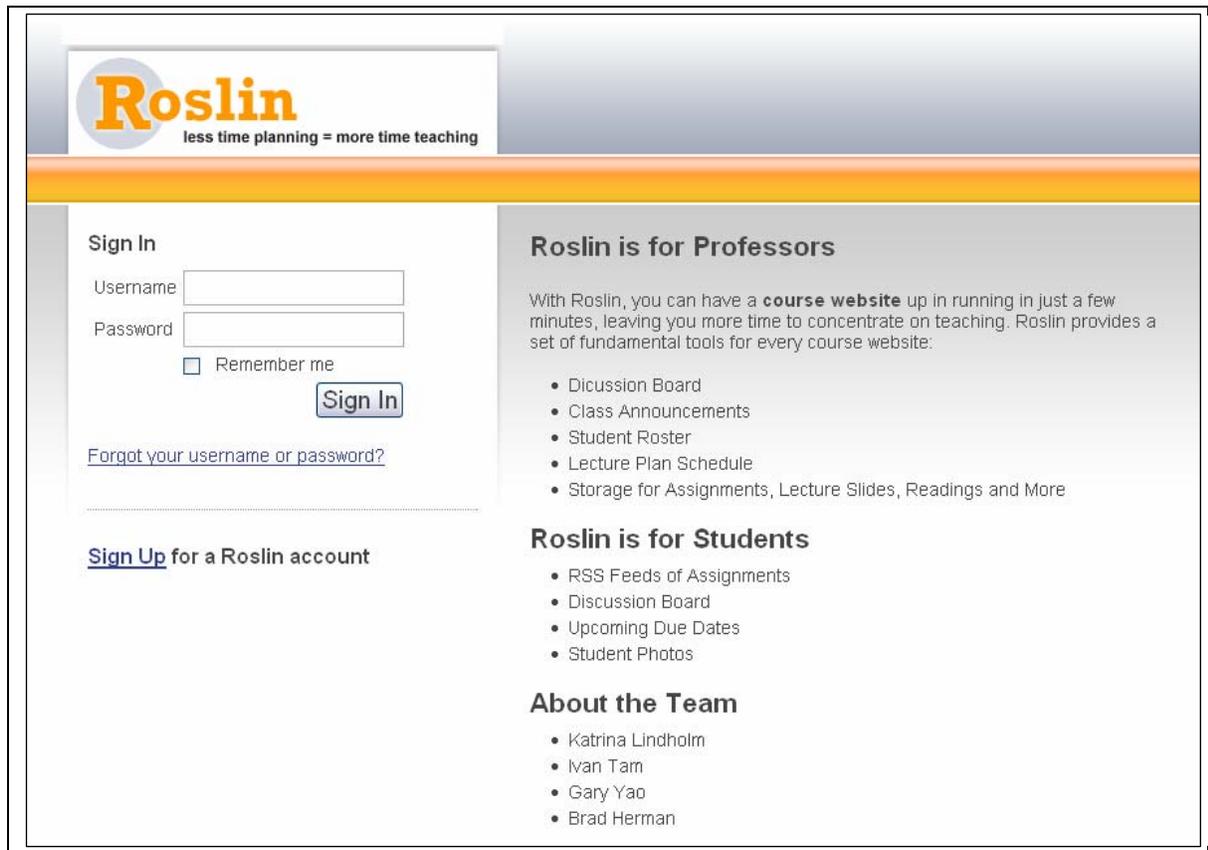
Final Prototype

The final prototype took what the team learned from usability testing and added a bit of polish. When a user arrives at the Roslin home page, they can either sign up for a new account or login to an existing account. As part of the sign up process, users are prompted to include the name of the course they want to host.

The process is a bit different for students. Students will receive an invitation email from their instructors with a special link. Following this link will lead them to either login (if they already have an account) or create a new account and enter a code included in that email. In this way, all users are connected to at least one class in the system.

In the screenshot of the Roslin homepage below, the use of white space and strong color give a modern and attractive look.

Figure 21: Roslin Home Page



Once logged in, users can interact with any of the classes in which they are enrolled. We believe that the majority of interaction will take place on the dashboard, which is the heart of Roslin's interface. Not only does it hold at-a-glance information about upcoming and recent activity in the class, but it provides quick links to all of the functions that a user will need to access.

Figure 22: Roslin Instructor Dashboard (First Time)

The screenshot displays the Roslin Instructor Dashboard for a demonstration course. At the top left, there is a logo with a large orange 'R' and the text 'administrative site' and 'Demonstration Course'. To the right, there are links for 'Demo', 'Profile', 'Log Out', and 'View Course Site'. Below the header is a navigation bar with tabs for 'Dashboard', 'Basics', 'Students', 'Lecture Planner', and 'Communication'. The main content area is titled 'Word, Bob' and features a large orange-bordered panel titled 'Begin Building your New Course Site' with a 'Close' button. This panel contains several sections: 'Your Profile' (upload photo/bio), 'Basic Information' (add course description), 'Instructors, TA's and Office Hours' (add additional staff), 'Student Roster' (invite students), 'Lecture Planner' (add topics/slides/exams), and 'Communication' (send messages). To the right of this panel is a 'My Courses (1)' box listing 'Demonstration Course (Instructor)' with a 'Create a New Course' link. The footer contains the copyright notice: 'Copyright © 2007 Roslin. All rights reserved.'

Figure 23: Roslin Instructor Dashboard (Once Information Is Entered)

The dashboard is titled "administrative site" and "Demonstration Course". It includes navigation tabs for "Dashboard", "Basics", "Students", "Lecture Planner", and "Communication". A user greeting "Hi, Bob" is displayed. The main content area is divided into several sections:

- Begin Building your New Course Site** (with a "Close" link):
 - Your Profile**: Upload a photograph, write a short biography or add links to personal websites and blogs.
 - Basic Information** (checked): Add basic course information like course description, meeting days and times.
 - Instructors, TA's and Office Hours** (checked): Are there additional instructors or teaching assistants for the course? What are your office hours?
 - Student Roster**: Invite students to create an account with Roslin so that they can begin using your course site.
 - Lecture Planner** (checked): Add lecture topics, slides, exams and assignments.
 - Communication** (checked): Send email messages to your class or post a topic for students to discuss.
- Course Countdown**: Shows a progress bar and indicates that 4% of the course remains and 5 of 112 days are left.
- Recent Discussions** (with a "New Post" link):
 - Thoughts on Roslin**: Wed, May 02, 2007 08:59 AM. By Bob Demo. Content: "I'm curious to know how you feel about Roslin as a course site?"
- My Courses (1)**:
 - Demonstration Course (Instructor)**
 - [Create a New Course](#)
- Week at a Glance** (with "Previous Week" and "Next Week" links):
 - Mon, Apr 30 (Edit)
 - Tue, May 01 (Edit)
 - ★ Wed, May 02 **Student Presentations** (Edit)
 - Description**: Expect to give a 10 minute presentation about your final project. You will be given 5 minutes for Q&A.
 - Associated Resources**
 - Student Tasks**: You currently do not have any tasks associated with this day. Student tasks include things like readings, assignments and exams.
 - Thu, May 03 (Edit)
 - Fri, May 04 (Edit)
 - [Export to iCal](#)
- Upcoming Due Dates** (with a "New Post" icon):
 - Nothing is due within the next 14 days.

There are a number of aspects of the dashboard worth exploring. First, user identity confirmation, a profile link and a "log out" link are in a common location in the upper-right of

the page. The tabs along the top provide access to different sections of the application and are likely to be a familiar form of navigation to most users.

There is an orange section in the top-left corner of the dashboard which lists the first few steps an instructor should take to build his or her course site. This introduction section was designed to guide first-time users through the process of building their course website, a feature which is lacking in competing CMS applications. Our usability testing confirmed that this section successfully grabs the attention of the user and helps them to use the system effectively. Both participants responded very positively to this feature and relied on it for navigation throughout the duration of the test.

Though not shown, each of the pages that the introduction section links to collects relevant information needed to complete the course website. As an instructor completes each of those steps, a checkbox will appear next to the link in the dashboard. Once they have gone through each step, the introduction section will become hidden. The links are still available, however through the tabbed navigation and other sections of the dashboard.

Next, the dashboard offers easily digestible information about the progress and activity of the course. The "Week at a Glance" section on the lower left shows instructors and students the lecture schedule, topics, and assignments for the current calendar week. Instructors enter this information and upload any day-specific resources like slide decks or handouts in the "Lecture Planner" page. In the prototype, this section uses AJAX-style interaction patterns to show or hide days in response to the user's mouse-clicks (shown days are highlighted in blue while the orange highlight indicates which day the mouse is on).

Just below the "Week at a Glance" section, the dashboard lists any assignments that are coming due in the next two weeks along with links to the descriptions. Usability testing indicated that each of these features and their interaction patterns made sense to users and seemed valuable.

Informational sections continue on the right side of the dashboard. A countdown meter indicates visually and numerically how much of the class has passed and how much remains. This feature generated a very positive response in our tests and is something we think will encourage users to repeatedly visit and use the system. Below that, instructors and students can quickly skim the most recent comments that have been posted to the discussion board. A last section on the dashboard, below the countdown meter, shows which other Roslin class websites (if any) that user is enrolled in and gives an easy way to switch to those courses or to create a new course.

Finally, instructors and students can use the dashboard to export Roslin course website data to external programs. The course schedule information, including class topics and assignments can be sent to a personal calendar program like Microsoft Outlook, Apple iCal, or Google Calendar using the iCalendar standard file format. There is a simple link for this at the bottom of the "Week at a Glance" section. Also, users can subscribe to two different streams of information via the popular internet syndication standard, RSS. Indicated by the standard orange square icons, assignment due dates and discussion posts can be read off site in any RSS reader. The freedom these data export tools provide is hard to find in other course management systems and elicited a positive response in our usability testing.

Roslin also includes pages to enter specific information about the course and participate in the collaborative features. For instructors, these include ways to add a co-instructor or TA, invite students to the course website, plan lectures, upload materials, send messages to students, or

create discussion topics. Students have a more limited, read-only view of the same information, with the exception of the discussion board located under the Communication tab.

Figure 24: Roslin Basics Page

administrative site
Demonstration Course
 Demo [Profile](#) | [Log Out](#)
[View Course Site](#)

Dashboard **Basics** Students Lecture Planner Communication

Basic Course Information [Instructors](#)

What are the basic details about this course?

Course Name *

 e.g. Introduction to Biology

Start and End Dates
 Mon, Jan 15, 2007 to Mon, May 07, 2007

Institution Name

 e.g. University of California, Berkeley

Course Number

 e.g. INFOSYS 290

Course Description

Figure 25: Roslin Lecture Planner

administrative site
Demonstration Course
 Demo [Profile](#) | [Log Out](#)
[View Course Site](#)

Dashboard Basics Students **Lecture Planner** Communication

Lecture Plans [Resources](#) [Assignments](#)

January, 2007
 Sun Mon Tue Wed Thu Fri Sat
 1 2 3 4 5 6
 7 8 9 10 11 12 13
 14 15 16 17 18 19 20
 21 22 23 24 25 26 27
 28 29 30 31

February, 2007
 Sun Mon Tue Wed Thu Fri Sat
 1 2 3
 4 5 6 7 8 9 10
 11 12 13 14 15 16 17
 18 19 20 21 22 23 24
 25 26 27 28

March, 2007
 Sun Mon Tue Wed Thu Fri Sat
 1 2 3
 4 5 6 7 8 9 10
 11 12 13 14 15 16 17
 18 19 20 21 22 23 24
 25 26 27 28 29 30 31

Class Plans [Go to Today's Week](#)

Date	Topic	
Mon, Apr 30		Edit
Tue, May 01		Edit
★ Wed, May 02	<i>Student Presentations</i>	Edit
Description Expect to give a 10 minute presentation about your final project. You will be given 5 minutes for Q&A.		
Associated Resources		
Student Tasks You currently do not have any tasks associated with this day. Student tasks include things like readings, assignments and exams.		
Thu, May 03		Edit
Fri, May 04		Edit

[< Previous Week](#) | **Today's Week** | [Next Week >](#)

Figure 26: Roslin Discussion Board

administrative site
Demonstration Course

Demo [Profile](#) | [Log Out](#)
[View Course Site](#)

Dashboard Basics Students Lecture Planner **Communication**

[Recent Activity](#) [Messages](#) **Discussion**

Class Discussion

[New Post](#)

Date	Title	Status	# Comments	Author
Wed, May 02, 2007 09:46 PM	Ideas for Next Class	Published	0	Bob Demo
Wed, May 02, 2007 08:59 AM	Thoughts on Roslin	Published	1	Bob Demo

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Flow Diagrams

Figure 27: Instructor's Flow through Roslin

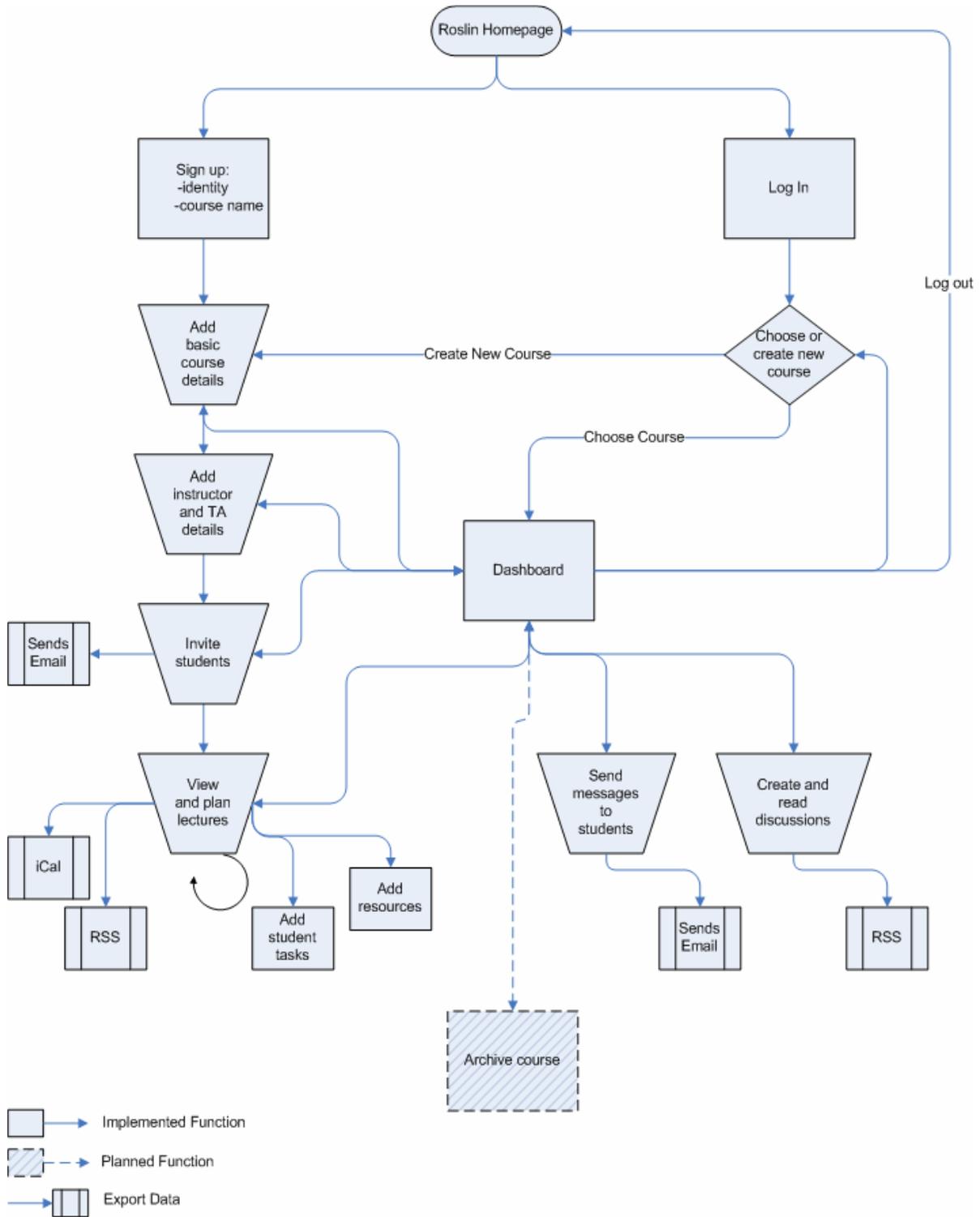
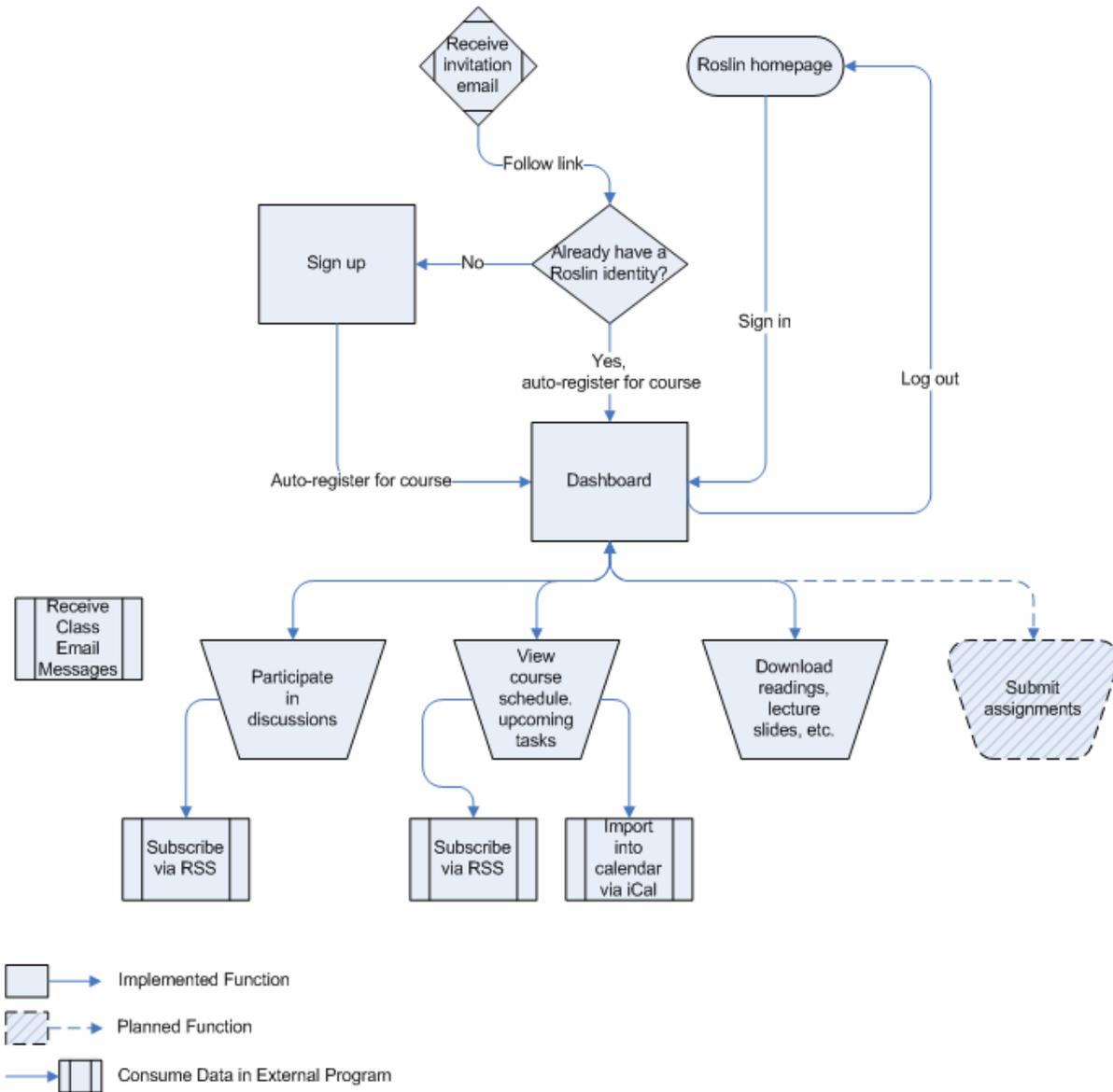


Figure 28: Student's Flow through Roslin



Future Development

Some of the initial scope remains undeveloped in the current implementation of Roslin. Of the data importing and exporting goals, only the RSS and iCal formats were implemented. There is a large opportunity here to leverage existing course information formats (e.g. SyLVIA) to either import or export course plans or for Roslin to develop a format that captures all information pertinent to a course (enrollments, resources, etc.) in addition to the syllabus. Roslin could also be fitted with a REST API so that other applications or environments can easily exchange data. This would be most valuable in university deployments of Roslin, where student enrollment information can be exchanged with the registrar.

Further development might utilize the Roslin code base to build a hosted-service for individual instructors, college or university departments or small schools. For a small fee, a company would host an instance of Roslin for students and instructors to use. For some use cases, this solution might prove more economical than a campus-wide enterprise deployment of a larger course management system. Under such a model, the Roslin product might also be extended for use in K-12 environments where larger course management deployments may not be cost-effective. Extensions for the K-12 environment would make Roslin not only a tool for teacher-student communication, but also a tool for teacher-parent communication.

Conclusion

We feel that the Roslin project drew inspiration from all the different areas of concentration in the School of Information. The database design process applied disciplines from the Information Design and Architecture area. The user interface design and implementation drew heavily from the Human-Computer Interaction studies. Finally, the usability needs assessment benefited from the Social Studies of Information area.

From a market perspective, we strongly believe that Roslin can be an innovative niche product with further development. Unfortunately, we do not have any current plans to pursue future development. In an effort to ensure Roslin's development will not be in vain, we are looking at the possibility of releasing the source code under an open-source license.

Overall, this has been a rewarding experience for all of the team members. We would like to thank the faculty and staff of the School of Information for giving us this opportunity.

Who is "Roslin?"

Roslin was named after a fictional character from the 2003 "re-imagining" of the sci-fi series "Battlestar Galactica." As the Secretary of Education of the Twelve Colonies of Kobol, Laura Roslin sat on the cabinet of President Adar. She was succeeded to President when all other higher-ranking government officials were killed in the Cylon attack on the Twelve Colonies. After escaping the initial attack, which nearly wiped out the human race, President Roslin gathered the survivors in the retreat that would later lead the search for a new home planet.

Appendices

Appendix A: Interview Transcripts & Usability Test Notes

Interview Guide

Interview Goals

- To determine the most valuable features or tasks of course management systems (for each category of user)
- To determine what course-related tasks users perform most frequently and least frequently
- To understand how users want to and expect to perform tasks
- To understand popular and successful communication patterns for courses
- To discover points of pain with current CMS
- To discover design/interaction patterns or elements that users find fun and engaging
- To identify valuable external (non CMS) services related to courseware that users might want to connect with (i.e. turnitin.com)
- To understand how multiple instructors want to interact in a CMS

Questions for TA/GSI/Instructors

- What/how do you communicate course information to your students?
- What portion of your communication with students is one-on-one? one-to-all?
- If you are currently using a course system, which one are you using?
- Who chose to deploy this system? Who maintains it?
- What do you like/dislike about it?
- What features do you use most/least frequently?
- What features are the most valuable/important to you as an instructor?
- What off-campus websites do you often use in conjunction with running your course?
- Grading
 - How often do students have questions about their grades or progress in the course?
 - Would you feel comfortable with students having access to their grades in the grade book?
 - How do you turn in grades to the central university grading system?
 - How do you currently maintain and keep track of student grades?
 - How hard was it to learn and use?
- What websites do you use that you consider "fun" and why?
- What would you like to see in your ideal course management system?

Questions for Students

- What materials and/or communication do you receive from your instructors relating to a particular course? How do you receive them (e.g. paper, email, website, CMS)? Could you rank how important each of these materials are to you?

OR

- Course Brainstorm: 1) Ask the student what comes to mind when they think of a course (e.g. syllabus, room, etc.). 2) Have them describe how they receive these materials/information. 3) Ask them to rank them in terms of importance.
- Have you had course information distributed by paper? By website? If so, please explain.
- Have you ever used CMS systems like BSpace, Catalyst, Sakai, Blackboard?
 - What features did you use most frequently? Least frequently?
 - What features did you find to be most valuable/important and why?
 - How did you learn to use the system? Was it easy?
- What did you like/dislike about these different approaches to distributing information (CMS v. Website v. Paper)?
- What off-campus websites do you often use to help you in your courses?
- What websites do you use that you consider "fun" and why?
- What would you like to see in your ideal course management system?

Interview Transcripts

S1 - K, 22, 1st Year English Graduate Student

Interviewed by Gary Yao, January 2007

Q: What comes to mind when they think of a course (e.g. syllabus, room, etc.)? How would you rank these in terms of importance?

- What's on the syllabus? (1)
- What are the books? (4)
- When are things due? (2)
- Get contact information from somebody in case of missing class. (3)
- How agonizing the course itself is going to be? (5)
- Should I take my laptop so I can surf the Internet or leave it behind so I can pay attention. (6)

Q: Have you ever used CMS systems like BSpace, Catalyst, Sakai, Blackboard?

- Yes, Blackboard.

Q: What features did you use most frequently? Least frequently?

- Most frequently: look at syllabus, look at the due dates and see if any has changed.
- Least frequently: the feature that tracks your grades because grades are never in there.

Q: What features did you find to be most valuable/important and why?

- Discussion board is extremely valuable in case you miss a course and need to ask the class a question.

Q: How did you learn to use the system? Was it easy?

- It was confusing since there was no live training. There was a tutorial but it was not in depth. I learned by exploring. I picked it up fairly quick. Not many features. What is confusing is when you use a discussion board, I'm not sure how to post a thread vs. replying to a thread. It is not easy to navigate through the thread when you are trying to read it.

Q: What did you like/dislike about these different approaches to distributing information (CMS v. Website v. Paper)?

- Blackboard is more flexible and communicating with you on the current information. I don't have to worry about losing the paper with blackboard system. I like paper because it is more comfortable to read when you have it in your paper. I suppose you can print whatever that is on blackboard.

Q: What off-campus websites do you often use to help you in your courses?

- Google and J-stor.

Q: What websites do you use that you consider "fun" and why?

- ABC videos for free, MSN Games and YouTube.

Q: What would you like to see in your ideal course management system?

- I want an email every time when something significant changes. I want to be able to set preferences, stuff like when a professor changes the syllabus or if there is new content or materials.

Q: Final thoughts?

- Blackboard is ugly. Make yours sexy.

S2 - R, 24, 2nd Year School of Information Graduate Student

Interviewed by Katrina Lindholm, January 30, 2007

Q: What comes to mind when they think of a course (e.g. syllabus, room, etc.)?

- Syllabus
- What to read
- Assignments
- When stuff is due
- What books to get
- When the class is
- Links to articles to read
- Office hours

Doesn't see the point of Blackboard forums. Some mailing lists are useful. Some sort of communication method. Not necessarily with prof but with other people in the class. Sharing things that are related to the class w/ other students. CS Newsgroups – I'm having trouble logging in – I don't understand – sometimes asking the TA but mostly asking if anyone else had the same issue and knows what do to. Interpreting assignments. Mostly for CS classes. Doesn't remember forums for other classes. Other classes it's more sharing resources and looking engaged rather than getting a specific question/problem answered. TA/Instructor also got these newsgroup postings.

Q: What questions would you specifically ask an instructor/TA?

- Stupid questions – am I doing this totally wrong. Or stuff you don't want other people to know – what is the grading scheme going to be for this? I'm sick, I need an extension, etc.

- Q: How have instructors distributed information to you?
- Undergrad – either made websites or used Blackboard. Always had an online option – at minimum emailed out a PDF with syllabus.
 - Graduate – Sylvia, websites.
- Q: Have you had any classes on BSpace?
- No.
- Q: What features did you use the most on Blackboard?
- What room is the class in? What is the reading for Thursday? Need to be able to check the readings and assignments on a daily basis.
- Q: What features did you use the least on Blackboard?
- Community stuff – maybe used it on one class because they required it. Forum sort of thing. Really bad forum software.
 - Remembers seeing grades online – not sure what that was through – Blackboard or home-grown CS site.
 - Blackboard in general was very awkward. Badly designed. You'd want to get the reading and you'd have to click on 5 things to get to the download. Really horribly and badly designed. Everything took too many clicks and very awkward and bad.
- Q: Why do you think instructors used it then?
- I think it's the easiest way – they're not comfortable posting PDF's of readings on the open web. Security reasons. It was bad because you can't see the syllabus unless you're in the class. For some teachers that may be important – they don't want people to steal their syllabus. Also, for anyone who doesn't know how to make a website it would be easier. If you don't know how to write HTML you can just fill out these forms...
- Q: How did you learn how to use Blackboard?
- Self-taught.
 - There would always be students who couldn't figure out how to join class. Always a source of trouble for people – associating themselves with the class. Didn't always work very well.
- Q: What off-campus websites do you use to help with courses?
- Library I guess.
 - Programming examples.
 - Ratemyprofessors.com once in while.
- Q: What sites do you consider to be fun?
- bloglines (it works, does what it does very well)
 - gmail
 - google calendar
- Q: Describe your ideal course website.
- Really really trivially easy for me to see the damn syllabus.
 - When is the class? Where is it? What is the reading for tomorrow, when is the assignment due?
 - Don't want to have to login every time. Want to see immediately – “Thursday” – okay...

Q: What are the nice-to-have features?

- Readings integrated in some way. Instead of having a citation – have a direct link to the file.
- Identify other people in the class but I think that's illegal.
- May be able to have students fill out their own profile – otherwise it defaults to being hidden.
- Some way to communicate with other people in the class but in a mailing-list way. I like mailing lists better than forums. I'm not going to check a forum each day but I check my email.

Q: What about seeing your grades?

- Um. It's nice to be able to see what you're getting. It's nice especially if you're submitting things online anyway – it's not like they're going to print out a copy and give it back to you.
- Nice to have TA's write notes on the assignment.
- But an essay – I'd rather have you give it back with red writing on it.
- But if they have the grades stored as well then that's useful.

Q: Is it interesting to see what the mean/average was for grades?

- Yes, I do think that would be useful – to see mean and stuff.

Q: What is the most important feature to you?

- View the syllabus – what do I have to do at this given moment Then have other stuff that I can do and go from there.

Sylvia – if you could have a page that would say...for your next day you need to do the following and your next assignment due is this and it's due... Should still be able to see the whole thing but highlight what I need to do for tomorrow.

Q: Speaking of Sylvia, what are your likes and dislikes?

- None of my classes right now use it.
- I didn't quite ever use any of the features that made it anything more than a list. Used them once and never used them again.
- I don't think about all my classes at once – I usually have one class in mind so it doesn't really make sense to aggregate.
- Making it RSS is kind of weird. If something changes I want the professor to email me about it. Automatically generated email makes sense, not RSS. But worried that it would be unnecessary notifications – meaningless (changed spelling). Don't need to know that. Like the idea that the prof needs to think about it and if you get an email then you know it's worth being notified about.

Q: What do you like about Sylvia?

- Like the concept that you can go to one site that has all my syllabuses. But I tend to bookmark them each individually.
- Standardized location – standard URL so you could always find a site by editing the URL.
- I think the syllabus model is fine. Like assignment assigned date and due date.
- Course description is not essential to have at the top.
- Does well at providing information.
- I'd like to know all of the things that I'm supposed to be working on right now – even overlapping assignments and readings.

P1 - S, Instructor at Haas Business School

Interviewed by Katrina Lindholm, January 31, 2007

- I like bSpace better than catalyst because I can structure information in different ways. Catalyst is totally date-driven so I can't just put up lists of interesting links and articles. Can't structure material in any way other than date.
- Being able to structure information like you did in wiki is important.
- I feel like I'm limited by the tools and how they work now.
- I try to do grading with these pieces of software. Yet I can't find a site where I can annotate a student's document. BSpace allows you to write a comment in a little box but it doesn't allow you to enter a grade until you go to a grading spreadsheet. End up printing out class spreadsheet, write them and then enter them all at once. Sometimes it makes sense to do them all at once but it seems really silly to me.
- If I want to be able to open a document in BSpace I have to save it to my desktop. Ideally I would like to be able to open them in the application and write on them without saving them all to my desktop.
- Columbia students use Bold. It's a completely different system. But they have collaborative file systems. More like bSpace in structure, not date-driven. They have facebook in there for the students which is cool. Really nice to have a facebook to see photo and background on them. Never been good at learning student names but once I've met them it's easy for me to put the name with the face. The Bold system actually lets you do flash cards to help you learn student names. I've never used it, doesn't work for me.
- It still feels like none of these sites support a conversation of any sort. All the questions still come by email. Among the project teams – hints for other teams. No one goes to office hours any more. Maybe it's instant messaging. No active engagement in these sites. And there's no way for student's to post interesting links without emailing professor. Class time is limited so nice to have conversations out of class.

Q: How is course material delivered?

- Traditional textbooks will become obsolete. How do I deliver the course material in a more multimedia fashion? Have a reading, a video. Not much support for faculty to be able to do that.
- I can upload a bunch of links/articles but I have no idea how that gets used if it gets used at all or how to structure. Need to get the right feedback – students didn't like a reading because it wasn't well written or because the content was poor? What did they get out of them?

Q: Do you post your lecture slides?

- Always put lecture slides up on bSpace. People wanted them on catalyst also. Pain to do both systems. But MBA students get readers paid for and you can only get them on catalyst. Can't get CCA students on catalyst. Catalyst does not have facilities for doing group projects. Blackboard did have it but people didn't like it. Had to click down a lot of levels to get to the groups. And the group space weren't as well-featured. Could only upload documents. Equivalent of drop box, no other capabilities. None of the groups on bSpace used anything other than wiki, email threads and drop box. But email threads were weird because sent to whole group plus faculty/TA. But this is stuff they know about and can change.
- Photo sharing and video sharing would be nice. Wasn't obvious how to do this. Lots of

links (video link) but not integrated. Ideally you would put it on the same site and not have to jump around to different sites.

- We had 17 projects and we wanted to go in and see quickly what's going. Following 12 links to do that takes more time. Quick picture – there's lots of action, etc.
- Most of my classes don't have teams.
- It's nice if I don't have all these different spaces for all my work. BSpace serves class and work. Catalyst is worthless to me. In BSpace I have my own tab (Sara's Stuff) and upload stuff – answers to problem sets and I can access them later – password. Doesn't have grade book or student name. Project tab. Bold allows me to create a project. Store files. Course files and non-course files. Email, individual and group from website.
- Security/permissions are important. Nice to be able to control all that. I like to be able to post slides that have answers in them and not have students see them until after the class. Hide them until after class. No way on catalyst or bSpace to do that unless I put them in my own folder.

Q: Have you ever created your own course site?

- Never created own course website. Reason is there are issues with copyrights. I know other people have done that. If I post an article that is copyright protected then I am liable. Don't care about sharing my syllabus (public) but can't share copyright works. But password protection would be sufficient. The easier to use the better.
- BSpace is pretty flexible. Some stuff not obvious but pretty easy to use. Bold and Catalyst pre-structure syllabus so you have to put assignments in the assignments section, office hours in office hours section and it's a lot of cutting and pasting.
- BSpace doesn't have syllabus writer. Wouldn't want to create it in bSpace – I'm afraid it will crash and lose work. Don't trust the systems. I'd rather upload it in Word. Having to fill out a form would be too tedious. Unless it filled out the calendar. That's the worst part. When you get one date wrong it's a pain because then the students get confused and start emailing.
- Jono did a fair amount of work on administrating bSpace. You should talk to him.

Q: Do you have to use bSpace or catalyst?

- We aren't required to use anything (e.g. bSpace) – some faculty use nothing at all.

Q: How do student names get into the system?

- Student names are not manually entered – they come in over from the university.

Q: What features do you use most/least frequently?

- Depends on class. In Bold, I upload files and lecture notes and grades. BSpace most time was spent looking at the project work.

Q: What features are the most valuable/important to you as an instructor?

- Most useful is the groups being able to load their work in one place so all three faculty have the same view. We used to have people turn it in hardcopy and we would have to make extra copies or pass it around among the faculty/TA's. Archive is huge.

Q: What off-campus websites do you often use in conjunction with running your course?

- I haven't. Google – look for examples, imagery, etc.

Q: How do you turn in grades to the central university grading system?

- No, the only benefit is that the student's can see their grades and make sure they are all there. Other benefit is if GSI is doing grading they are all integrated onto one sheet. It's a

spreadsheet – you export Excel, fill it out and upload it OR input directly in form fields. Two places that you enter a grade – once at the assignment level and once in the grade book. Doesn't really make sense.

- Bearfacts – go there and enter them one at a time. It's not a smart system at all. You can export the data but can't import it. Wait, you can upload it to e-grades. (Not obvious)

Q: What would you like to see in your ideal course management system in order of priority?

1. Group stuff (although I realize it's not a common need)
2. All course materials, slides – don't have to print copies and hand them out (save trees)
3. Online grade book – helpful to make grades visible to everyone involved
4. I would like the conversation thing we talked about
5. I like that there's a class email alias, I wish it were easier to pick and choose – in blackboard could separate engineering from mba, etc.

S3 - T, 2nd Year School of Information Graduate Student

Interviewed by Gary Yao, January 2007

Q: What comes to mind when they think of a course (e.g. syllabus, room, etc.)? How would you rank these in terms of importance?

- Networking, meeting people (2)
- Resources and experience, knowing about Jstore etc (3)
- Content of the course (1)
- Textbook before the exam
- Problem sets
- Discussions and seminars
- Reading groups and coffee house

Q: Have you ever used CMS systems like BSpace, Catalyst, Sakai, Blackboard?

- Used BSpace before.

Q: What features did you use most frequently?

- File upload and common space.

Q: Least frequently?

- Chat room, discussion, schedule and resources. Because of lack of information and redundant features.

Q: What features did you find to be most valuable/important and why?

- Common shared space, keeps things ordered by time and eliminate the need to flood the email space. We didn't like the interface though.

Q: How did you learn to use the system? Was it easy?

- Basically playing around with it for a couple nights. I remember we had to train each other on the system.
- Easy is relative, harder than gmail but manageable.

Q: What did you like/dislike about these different approaches to distributing information (CMS v. Website v. Paper)?

- CMS might be overkill. Unless the CMS is really integrated into the workflow, then people will probably not use it. It has to provide value.

Q: What off-campus websites do you often use to help you in your courses?

- Gmail and Google. Don't really use anything else.

Q: What websites do you use that you consider "fun" and why?

- Blogs, I like hearing people stories and random stuff. Little mannerisms, etc. Catch up on email.

Q: What would you like to see in your ideal course management system?

- I think it would be cool if there is an awareness of a classroom atmosphere. Might be good to have a discussion forum within the class that people used. If there is a buddy system for discussion, it might motivate people to post.
- Maybe a back channel built into the system.
- More random feedback on the people in the class. Might be nice to know where other people are coming from. Like what their interests are. As long as people are using the system, give people reasons to show up and they'll entertain each other.

P2 - U, Professor of Political Science, UC Berkeley

Interviewed by Brad Herman, February 2, 2007

Q: What course sites or CMS software do you currently use?

- Homemade website (created by department staff), bSpace

Q: What are you teaching?

- 2 undergrad courses (50, 75, or 100 students)
- 2 grad courses (handful of students)

Q: What are the most salient features of a course website?

- (threaded) discussion board
- announcements
- electronic readings
- reading questions
- syllabus
- useful links

Q: What are your thoughts on bSpace?

- Discussions in bSpace are difficult to manipulate
- bSpace treats the syllabus as a "resource," same as a reading, but it should be different
- Uses bSpace announcements posting for grad course, email list for undergrad announcements (via courseweb)
- Grad students post their own presentations, like the "categories" and "subcategories" tree for the "resources" section
- Likes to see "whole discussion at once" through names and titles on threaded discussion
 - but hard to print in a useful way
- Assignments all submitted hard copy - would be printed out to grade, anyway

Q: What is your grading process?

- GSIs keep track of undergrad grades, paper or simple Excel
- For Grad students, there are few enough people and assignments to do by hand - less about grades
- Students get assignments back, don't bug him for grades
- Be OK to give students insight into their "participation" grade, but don't want to make more work for GSIs

Q: How did you learn how to use bSpace?

- One of his grad students taught him to use bSpace, department staff set up homegrown
- Permissions on bSpace were a little confusing, not always sure whether they were set right - maybe have a "what does it look like to the students" button
- Took about 1/2 hour to set up the course in bSpace and 1 hour to upload all materials (readings, etc)

Q: What other websites do you use?

- Eres for electronic resources (next year will be in bSpace)

Q: Please describe your ideal CMS system.

- Include attachments directly into announcements (like "oh, read this document for tomorrow ")
- Archiving: want to keep readings (uploaded docs), links, not discussions
- Easy to read (no mousing or scrolling) discussions, better printing

P3 - B, Professor of Political Science, UC Berkeley

Interviewed by Brad Herman, February 2, 2007

Q: What course sites or CMS software do you currently use?

- homemade website (set up by a GSI, but he edits it in Dreamweaver)

Q: What are you teaching?

- undergraduate class with 150 students

Q: What are the most salient features of a course website?

- Posts PowerPoint slides (usually delayed a week to encourage class attendance)
- Posts texts of readings (court decisions -> public domain)
- Google search integration
- Online office hours (chat room) - has 3 students a week in office, 17 in chat room

Comments:

- He's quite technology savvy and eager to incorporate technology into his courses
- Communicates to students mostly through email
- Difficult to refresh each semester
- Wants better email list access
- Likes having text search (of docs)
- Slide posting is valuable, should be drag & drop easy

Q: What is your grading process?

- Students don't often ask about grades, get assignments back (only 4 a class)

- Uses a simple Excel sheet with weightings and calculation
- GSIs do most grading
- Wants to discourage worrying about grades

Q: What is the ease of setup? Is there a learning curve?

- Had a skilled assistant do the hard work
- Time consuming, difficult to change

Q: What other websites do you use?

- Lexis-Nexis
- Other university law schools
- FindLaw (all are currently links)

Q: Please describe your ideal CMS system.

- Drag & Drop easy
- Concerned about the world finding his slides (i.e. on Google) because they are not complete treatments of the material
- Should be visually appealing & engaging (bSpace isn't)
- Nice to have an "urgent announcements" that scrolls across the page
- Live syllabus (linked to readings, easy to adjust on the fly)
- Wants joint annotation of uploaded documents (his are mostly plain text)
- So students can share notes on a reading
- and GSIs can grade papers, share comments
- Statistics on who's using online office hours, what are the most popular parts of the site

T1 - J, GSI for Political Science, UC Berkeley

Interviewed by Brad Herman, February 9, 2007

Q: What course sites or CMS software do you currently use?

- Blackboard, now bSpace

Q: What are you teaching?

- Sections of about 25 undergraduate students.

Q: How do you interact with students?

- Wants to encourage student discussion
- Professor posts syllabus, reading materials, study guides, and slides
- GSI sometimes emails supplemental readings.
- Receives email papers & assignments - comments inline and returns via email.
- Holds office hours and virtual (AIM) office hours

Q: What are your thoughts on the CMS systems you have used?

- Manual enrollment of students in course was a problem with Blackboard (low usage), solved with auto-add to bSpace (?).
- Likes CalNet? authentication with bSpace.
- Difficult to use discussion board or blog in bSpace: students didn't read each other's posts, infiltrated by outsiders (blogger blog), hard (too many clicks) to find from main bSpace landing page. Also was a lot of work for GSI
- Uses as a centralized document repository

- Uses email for announcements because students unlikely to check bSpace regularly
- Doesn't use the schedule (calendar view)
- Has links to external sites and imports outside RSS feeds (like NYTimes)
- "I haven't found it to be indispensable" - most features can be accomplished via email
- Adds materials to the main course space (setup by prof.) rather than set up his own
- Doesn't interact with other GSIs on bSpace

Q: What is your current grading process?

- Uses Excel sheet with columns and weighting + auto calculation
- It's some work at the beginning, but easy to maintain
- Grade transparency would be valuable, but instructors can play around with class participation if a student is on the cusp

Q: How easy was it to setup? Is there a learning curve?

- He's technical, but thinks it is not user friendly or particularly easy
- Found undocumented features (like import of RSS feed) by trial and error
- Likes the "duplicate" function for archiving and restarting a class
- Saves resources, not announcements, wants to save links
- Everything goes to "draft mode" first so he can approve
- Likes the tab interface

Q: Please describe your ideal CMS system.

- Has a dynamic roster (auto import from registrar)
- Central repository for docs with larger file limit (current is 50mb) to hold podcasts, audio, video
- Blog functionality (esp. a team blog) that is faster and more scaled down than Blogger
- Searchable text
- Point is to "facilitate communication"
- Would like to see a "virtual classroom" with voice chat, screen duplication, whiteboard functionality, etc...

Card Sorting and Paper Prototype Usability Testing Notes

P3 - B, Political Science Professor, UC Berkeley

**Card Sort & Paper Prototyping Session, February 22, 2007
Conducted by Katrina Lindholm, Notes by Brad Herman**

Card Sort

- Unclear on "site preferences"
- Concerned about flexibility of schedule (i.e. syllabus)
- Unclear on "assignment description" - whether it's a paper or problem set or something else
- Concerned about privacy of student grades
- Does "assignments" mean the particular assignment or "the general description of what types of assignments will be coming?"
- Had 8 categories at the end
- Assignments category: "what students would need to access to do the assignments," and "where they would go to find details on turning it in"

- Grades category: stuff for students to see grades - differentiate between grading policy and individual grades
- "materials about what happened in a class"
- General Course category: Just wanted to know what the course is about - overview, link to GSI contact info: it doesn't all need to be there on the home page, also details can be a link away
- Syllabus category: "could imagine a syllabus with links to daily assignments," "I'd want something separate for 'assignments'"
- His syllabus is a thin description not the day-to-day, shows topics but doesn't publish a daily outline
- Most assignments have a specific due date, but it's flexible
- Critical groups: assignments, reading links
- Nice-to-have: web access to broadcast announcements to students (or a subset of students), chat-room for discussions
- Non-critical: preferences, grades, student bios

Paper Prototype Test

Signing Up

- confused about password restrictions (security)
- his "course name" would be "Game Theory..."

Dashboard

- would first click "basic info" because that's the first on the list
- expects that's the information typically on the syllabus (and therefore redundant)
- could be helpful to see an example of what's possible
- doesn't know what "manage student" link is about

Basic Info

- expects "course name" to be pre-filled
- would have to double check the course location
- school name would be "L&S" or "engineering"
- would cut and paste from his syllabus - would be helpful if a lot of this could be pulled from the syllabus
- Not thrilled about entering start/end dates, but would do it
- Wonders "what about section info?"
- might want GSIs to enter their own info. This page or the next could prompt for GSI info
- drop down for "role" didn't register, never occurred to him to click it
- suggests one line for instructor & another for GSI/assistant
- expects "save" to prompt for more info, he would prefer it say "done"
- he'd be upset to leave the page and lose info dislikes the cancel button
- he thinks he might come back to put in office hours

Dashboard

- now he'd click on syllabus because its the next one on the list

Syllabus

- first thought is he'd upload his word doc syllabus
- didn't see the "entering info" link
- when prompted, he expect the "enter info" link to take a lot of typing
- having active links might be his incentive to do it

- he can't imagine someone with a written syllabus entering it again - maybe if they'd seen an example
- confused about the sample data: why is it there? what does it mean?
- need more than just a blank entry box, suggests "for example" next to the box
- "class1slides is informative" but "moby dick book" is confusing
- confused about entering his own data
- tries to click on the links themselves, expecting them to be editable, misses the "edit" link
- doesn't know what "edit" means, suggests it say "click here to enter info"

Syllabus - Free-form Edit

- confused about the sample text
- mildly confused because nothing is due on the first day of class
- not sure he'd break from the format of the sample; he'd prefer a blank box
- expects "due today" and "assigned today" to be its own box, he wouldn't delete those headers
- he doesn't understand that he's meant to edit the whole day box in the rich text editor
- he prefers an "edit" link that makes just that content editable
- feels like he has to fill it out all at once
- "2% of people are anal in any dimension - those are the only ones that will fill this out"

Syllabus - Structured Edit B

- unsure about the "additional details" phrase
- knows that "resources" would have slides
- didn't see "add assignment" button
- when pointed out, he likes it, though
- Might like to upload a pdf syllabus and also add slides/readings to a particular day
- would call that "today in class" or "structure today's class"

Syllabus - Structured Edit A1

- likes "topic" and "blurb", doesn't like "additional details"
- likes "add resources", suggests putting a hint: "e.g. slides"
- add assignment seems clear
- has no idea what "more details" would be
- when its explained, he thinks it's nice, would want to assign links to readings
- doesn't really have a preference about in-line v pop ups
- it's not necessary to connect a resource to an assignment, but it could be valuable - no harm, anyway

Dashboard

- things to see regularly: grades for small classes, manage "today in class," easy access to the calendar day view to add slides, disseminate assignments, edit slides online, make changes

Final Remarks

- "I think of a syllabus as an outline of a plan"
- "This is a way to communicate day-to-day the stuff that happens that day" - referring to the "today's class" planner
- Would be valuable to save it at the end of the year

S3 – T, 2nd Year School of Information Graduate Student

Card Sort & Paper Prototyping Session, February 22, 2007
Conducted by Katrina Lindholm, Notes by Gary Yao

Card Sort

- I feel like there are so many of them that they are not equal in granularity.
- Separated into groups (by features' similarities) as well as clusters (social, non-social).
- Clusters identified: course, exam, syllabus, stats, social (authoritative) and social (peers), assignments.

Q: Were there ones that were hard to group?

- Administrative (should be in multiple groups).
- Links could be part of the course general as well as exams.
- Assignment and exams could be grouped together. I feel like it should be set before the course begins. I feel that the social stuff is more dynamic.

Q: How would rank the groups in terms of importance?

- It would be based on the needs of the students. If you are here to network, you might be more interested in the social stuff.

Q: Do you think exams and practice exams would be helpful to be on the website?

- Yeah, definitely. For engineering students, it's very helpful since that's all they care about.

Q: Would you say in an non-engineering student course, is it going to be the same?

- I think discussions would be more important.

Q: What are the top two priorities out of all the cards?

- Syllabus and student names. Want to know student names so I can contact them if I miss a class.

Q: Would you consider a required reading an assignment?

- No, I associate assignments with a deliverable.
- One another point I'll make: I think there is also the danger of having too many discussions. People just want to go to one place to see the discussion.

Q: If you were to create tabs to organize this, would the names on your post-it the names for the tabs?

- I would call it discussion (containing social networking stuff) and syllabus (assignments, syllabus and administrative stuff).

Q: What would you like to see when you log in as a student?

- New postings, what I have to work on.

Paper Prototype Test

Horizontal Mini Syllabus Viewer

Q: What do you think?

- I like how you can look at today when you login. Maybe if you can determine how far you are along with the course. If you are done with something, just knock it off.

Q: What do you think about the previous day, would that be useful at all?

- No, I don't think it is. The only time that it'd be useful is if there is a midterm coming up. I feel like the past is history.

Vertical Mini Syllabus Viewer

Q: What do you think of this?

- Just show the next few item due, it doesn't matter how far away it is, don't track it based on date.
- It'd be also nice if you can get an email saying you want a notification about an assignment due two days in advance.
- I think it should be color coded. Maybe collapse empty days (a la Gmail). Resources make it seem secondary. Assignments should be outlined clearly.

Q: Is it useful to have a resource associated with an assignment or does it not matter?

- I feel like the slides are mandatory and should not be labeled "resources."
- I feel that resources are secondary and slides are mandatory / required.

P2 - U, Professor of Political Science, UC Berkeley

Paper Prototyping Session, March, 2007

Conducted by Katrina Lindholm, Notes by Gary Yao and Brad Herman

Sign Up

- For name: would put "Varieties of Capitalism," not a number

Manager

- "Congratulations" is good
- a little confusion on the progress meter - he's hesitant to do all 100% of the things
- Doesn't think he'd fill out name and administrative info; it's duplicated and the syllabus isn't even all that important
 - he wants "post syllabus" and "discussion board" in a course website
- Student lists: thinks that professors are too lazy to add their own students; bSpace populates the list for you (including the adds and drops)
 - it would have to be super easy
 - doesn't think students would do it either
 - dangerous, because you'd need 100% compliance (not valuable if you can send messages to only 50% of the class - or even 90%)
- student readings is good
- feels pretty flexible, though, since you don't have to fill it all out

Lecture Plans

- Wants to invest the time up front, rather than ongoing
- He already has the plans on a word doc (calls 'em "outlines")
- familiarity is important
- the weekly (calendar) view is valuable for viewing and writing memos (his discussion

boards)

- Like the fact that he can go in and change
- Editing: probably wouldn't use lecture tasks and resources, student tasks would be on the syllabus already
- Student tasks: I think they would be assignments
- Readings: considered as an assignment
- Printing all the syllabus in advance, students definitely want to know due dates in advance

Administrative

- Not sure why we need a school name
- Class time might be put at the top because that's what they want to know
- Select college as the first thing
- Cutting and pasting in bSpace is really weird (formatting)
- Photo would be left out blank (for professor)
- Website: link to personal website

Comments

- Something that can be flexible, adjust to people's quirks and preferences
- Can be complex or easy

Q: Would you ever find a use for this?

- Integration is a big plus, if students information are all there
- Course web used for course management but not syllabus

P4 - V, Professor at the School of Information, UC Berkeley

Interview and Paper Prototyping Session, March, 2007 Conducted by Katrina Lindholm, Notes by Gary Yao

Q: What is your experience with wikis and blogs?

- writing course materials at the last minute
- think of days in class numbers
- ideally a structure with table of content sync with course outline

Q: When do you typically start planning for a course? What do you provide for students?

- course outline
- before a semester starts, what we will be doing in those 29 days
- faces time and pressure with
- exposed to the students and ideally up to date

Q: What's the value of having course information online?

- value for students and instructors
- subject matter, since the course is about the web, naturally to use something web related to match the course materials
- something to communicate to the students
- especially when the department doesn't have much budget for photocopying

Q: How do you communicate with the whole class?

- oral communication in class

- or by blogs
- by habit, used email on an individual basis
- got email address by asking students to email me

Syllabus

- course materials, reading, assignments, and all that artifacts
- records of what the students have accomplished (final projects, etc)
- anything would be associated with a book but not part of a syllabus? records of what happened, like podcasting would be part of the course or online notes or something the students did

Q: What are some of the must haves with courseware?

- used something like bSpace if it were easier use, (subjective) initial impression: constant javascript reloading was found annoying, felt heavy, didn't feel open.
- role based authentication, sessions opened to the public
- good enough individual tools such wikis etc.
- having stuff set up for me, like a blog or wiki.
- integration with on campus, know who's in my class
- mailing list, threaded discussion and certain type of interaction
- tools for assignment submission, might be helpful if there are a lot of students
- multimedia and podcasting automation

Q: How do you maintain grades?

- used spreadsheet for grades
- any value to have grades on an application if there is no integration?
- FERPA issue

Q: Would it be useful to have a list of students?

- keep notes on students, would be helpful to have a list
- track how people are doing, using something like Ecco Pro
- names from copy and paste from bearfacts

Q: What are the pain points of your current process?

- uploading materials to the ischool directory, keeping track of directories
- wiki didn't have a way to download all the materials, having a way to archive the materials
- cloning the course for a new semester

Q: Do you think you are the type of person who would want to do all the work up front or work on the fly?

- I would definitely be the latter or a combination
- I would like to tweak things as the course moves along

Course Basics

- wouldn't expect to enter UC Berkeley in the context for school name, or prefilled
- syllabus: maybe an URL
- course description, formatted text?

Meeting Days and Times

- expected to be filled, if I had to fill it out this might work
- need to consider odd ball cases

- Instructor Information
- specify phone number type
- might not do photo

Lecture Planner

- Having the date is really helpful but I think in terms of numbers like number of classes
- Like the sub-heading
- wondered if the structure might work against me, might want to turn it off or have it not shown if I don't enter anything

Resources

- Global resources, library of resources or some easy way to pull up and insert a resource

Q: Please describe your ideal CMS system.

- People would have their own web presence
- Some way to fold in their online identity
- Want system to encourage teacher and students interaction
- First thing want to see: what's happening right before me, tell me what needs to happen right now, are there any critical issues? Sometimes keeping track of deadline is useful.
- What do you see as a common activity? early stages: materials development (assignment, etc.) Once materials are mature, focus on students engagement.

P5 - A, Professor, UC Berkeley

Interview, March, 2007

Conducted by Katrina Lindholm and Brad Herman, Notes by Gary Yao

Q: What types of CMS systems have you used?

- used blackboard, bSpace, blogs, wikis, etc.
- encouraged students to comment by sending specific topic on bSpace, put pre-recorded mp3 on the blog
- used online to get students talking and discussing in course
- might not work with a larger class, students might not participate unless it is a requirement
 - use participation points to encourage students to talk
 - lottery system, give 5 points to people who first reply
- been teaching at college level since 1972

Q: How do you typically prepare for class?

- adapt to course schedule to what's going on, esp. in the small classes
- likes to be creative and change the schedule for every year
- preserve books and fragments of the exams from year to year
- syllabus: used as a roadmap, but with warning for change

Q: How do you communicate changes to students?

- used the web, announcements

Q: How do you define a syllabus?

- a description of the field, if the syllabus is about calculus, map out what calculus is about
- readings are included in syllabus, used online text, webpages, audio, videos, etc.

Q: Why do you use blogs?

- they are flexible, bSpace doesn't feel friendly in designing the environment
- blogs don't give the right privacy, it is not FERPA compliant
- FERPA requirement: people outside of class cannot go into the class and see students' names and SIDs
- blogs doesn't give control to what should happen during a day, gets around it by changing dates, categories are limited
- blog posts are made in order of the discussion
- students don't comment unless there's an incentive (for large class)

Q: What are your likes and dislikes for bSpace?

- announcements are really useful, everybody checks email or facebook
- resources: video, audio, powerpoint presentations
 - lectures, articles, news
- categorization is superior in blogger since it uses tags whereas bSpace uses Window system's folders
- uses announcements for upcoming due dates
- discussion board
 - not happy with bSpace's discussion board
 - likes Red Crossing: discussions have topics and topics have posts, basically more control on how the posts are displayed
 - prefers having comments and replies more apparent for a smaller class, likes socratic dialogue
 - aesthetics is important, more important than people realize, students have strong aesthetics about the design, if it looks like something like it's from ten years ago, people will have prejudice
 - layout of the components: can change the default so easily, it was hard not to
 - frustrated that cannot change the structure of the page
- can code HTML but doesn't do it because he's comfortable with the tools, tired of coding, just want to get the message out
- on bSpace: don't use the grade report tool, laziness
- haven't used the wiki on bSpace
- used chat before but haven't been that useful
- top three pain points:
 - cannot embed pictures
 - used to a little more reliability
- taxing and slow to learn but not hard to learn
- Name: Cal Matrix or something that students would relate to
- First login page: wants to see blogs, you-tubeish recording pages

Q: Would it be valuable to see photographs of students?

- Yes, would be nice to see pictures of each student, it helps a lot and gives a lot of personality

Q: Would it be useful to preserve old posts?

- Likes to preserve the old blogs, use the old blog topics but not the comments

Q: Do you think you would use drop box functionality?

- Currently allowing students to upload files like resources
- Drop box feature is not used

Interactive Usability Test Tasks

Background

It's August 2007 and you're about ready to begin a new semester teaching at Berkeley. You usually set up and maintain your own course website for students, but this year you're considering using a tool called Roslin because a colleague of yours recommended it.

Task 1

Starting at the Roslin home page, **sign up for a new account** and create your first course website for the course **Mixing and Remixing Information**.

1. What was your impression of the sign up process?

Task 2

You've successfully created a new course site but you know that there is plenty of data that you need to add in order to make a useful website for your students.

2. What data would you want to add at this point in order to make the site useful to students?
3. Let's say that you want to add a list of students to your site. What tab would you click on?
4. Let's say that you have a teaching assistant for your class and you want to include his contact information on the site. What tab would you click on?
5. Let's say that you want to include information on where the class meets (the room and building) and the days and times that it meets. What tab would you click on?

Taking the last question a bit further, go ahead and add the location of the class as well as the days and times that it meets. For the purpose of this test, let's say that the class meets in **110 South Hall on Mondays and Wednesdays from 12:30 PM to 2:00 PM**. You also want to indicate when the class starts and ends. Let's say that it starts on **Monday, August 27** and ends on **Wednesday, December 5th**.

6. What was your impression of this process?

Task 3

You want to give students an idea of what you will be talking about on your first class, **Monday, August 27** class. The topic of the class is **Basic Flickr Concepts**. You've created a set of slides that you will use for the lecture. The file, located on your desktop, is called **FirstClassSlides.ppt**.

7. Where in the interface would you go to add this information?

Go ahead and add the information mentioned above.

8. What was your impression of this process?
9. What other items would you want to associate with a given day?

Task 4

The beginning of the semester is fast approaching and it's important that you get the first day's reading on your course site so that students can be prepared before the first class. You want your students to read **pages 1-10 of the textbook** this for the **Monday, August 27** class.

Please add this information.

10. What was your impression of this process?
11. Let's say that you wanted to let students know about a quiz that will take place on September 12. How would you do so?
12. Let's say that you had to miss a class because of illness and you need to move your plans for a class into the future by one week. How do you think you would do this?

Task 5

Fostering a sense of community in the class is important to you. One of the reasons you were attracted to Roslin was because they allow students and instructors to communicate through a discussion board. Let's say that you wanted to start off the semester with a discussion topic to get people thinking about the class material. The topic you've chosen is **What makes Flickr so Addictive?**

1. Where in the interface would you go to post this topic?

Go ahead and add the post.

2. What was your impression of this process?
3. Is it important to you to know when a student posts a reply to the topic? If so, how would you like to find out?
4. Do you think it would be valuable to have students post their own topics?

Task 6

You are currently at the Dashboard page of your new course website. Take a look at the page. <SHOW PRINT OUT>

13. What is your impression of the Dashboard?
14. Is there any information that you would want to see on this page that you do not currently see? Why?
15. Is there any information that is currently on the page that you would not find useful?
16. Please rank the importance of the different sections of the page.
17. Looking at the tabs at the top of the page, please tell me what information you would expect to find after you click on the tab.
18. What would be your next step from this page? Why?

Interactive Usability Test Notes

P4 – V, Professor at the School of Information, UC Berkeley

Interactive Usability Test, April 20, 2007

Conducted by Katrina Lindholm

Notes by Ivan Tam

General Issues

- make more use of flash fields
- should we make email the username?
- emails might change more often than identity.
- make it possibility to change email address.
- Re-factor to remove all :id's from the URLs; use session information instead.
- more engaging background?
- floating help?
- implement flash stacker helper
- do the mailing, how does the subscribe functionality work?
- RSS for communications?
- "Student of the Day", is this some kind of accolade?

Task: Starting a new Course Website

- red asterisk clues mandatory field
- email address: does it matter? what is it for? institutional or personal email?
- Had to scroll down a bit to see what was on the form.
- need to remove redbox login (confusing debug)
- should add some hint boxes next to the fields.

Task: Dashboard

- how is this progress measured? is it reliable?
- is it supposed to be moving right now?
- progress bar doesn't tell me really how much work is involved.
- hard to gauge what else is involved, but it is eye catching.
- does it mean we have a certain percentage of the course has passed?
- a how many days left meter would be more helpful.
- The "R" prefix is cryptic.
- two-weeks before class. what do you need to do next?
- need to advertise the course. title, description. "Enter Basic information" is indicated.
- clicking on the link to find out what is in there is more helpful than reading the hint.
- Quick links seem random, doesn't tell user what they do or which ones might be used more often.

Task: Adding Basic Info

- No one expects to embed a video into the course description.
- 'Exit' link might need a confirmation. maybe auto-saving forms?
- why give an e.g. unless you expect a type-in response.
- meeting location: is it an address or a campus building?
- expecting smartness in date format (e.g. 2007-09-05 is same as 2007-9-5)
- time picker, expected a clock thing. aligning PM/AM issues. should we assume times are the same on each day and attempt to auto-complete for users?
- does 'previous' link save this work? the 'Next' button seems more reassuring. feels like there is an action behind it.

- flash messages can be easily ignored. Should have a bigger RED warning.
- wondered if he could change his email in the instructor page.
- does the website URL need the http prefix?
- little iffy about the phone number. might only apply to the regular profs. might be more compelled to add it if he had an office phone.
- maybe photo: would rather provide a URL for a photo (admits edge-caseness)
- expects the same type of time picker as the class day setup.
- almost overlooked the teaching assistant section. might need it to pop out more. the instructor fields were more boxed up. TA section feels like a footnote.
- Social-network feeling with the 'invite students' link. what does it mean to invite? do they get added? or are they just looking? had to read the blurb to understand what was going on.
- focused on 'to save time' in the blurb. but what does it mean to add students myself?
- two-doors, doesn't know what is behind each one.
- what are the limits for the invite functionality?
- expected at the end that dashboard should reflect more of the work we have done. still what have we completed at the end of basics?
- if applied to a virtual course the rooms, location, etc. will be extraneous info.
- institution dropdown: make it auto-complete. but must be careful with how the list is exposed
- many schools go by many names as well. (e.g. Cal vs. UC Berkeley vs. University of California, Berkeley)

Task: Lecture Planner

- found the lecture planner in the bottom part, not in tab.
- Help is not obvious in the quick links.
- why did it decide to highlight a certain day?
- shouldn't highlight unless I highlight it. the highlight also connotes in-line editing.
- insisting on a filename would be annoying.
- might need to display today's date on the planner view.
- filename needs to be asterisked.
- puzzled by 'add assignment', will it take me to a form? why is it next to a box, do i have to do something with the box?
- 'suggested' assignments. others are deliverables.
- wants actual date, not a plain "today" label.
- might also want a due time.
- wouldn't use the resource, but can see value
- URL's can be resource as well. will it point also to a resources section?
- highlighting calendar, helps me know i can click on the day.
- will it show all my courses? will this interface allow that?
- thought 'save' was tied to assignment.
- might want to flash after saving a class day info

Task: Add Discussion

- flash notices from lecture planner leak into other pages. (e.g. adding plan then to communication will show the "plan added" message on the communication page.)
- are the discussion threaded? will experiment with threaded versus just response.

Notes by Katrina Lindholm

Task: Starting a new Course Website

- Hits sign up button. Looks at red asterisk, tells me that those things are mandatory. Used to minimum characters. Tabs to each field. Types in first/last/email. One question: on email address, does it really matter? Which email – institutional or personal? Put it institutional address (@berkeley.edu).
- Overall impression: straightforward. Did have to scroll down a bit to see how long it was. Wasn't much longer than screen so that was helpful to know that there wasn't a lot. Was form too long? Not sure what else I'll be asked, is it graduate intake of information. Not obvious what else I'll have to enter. Wonder's whether I can put punctuation in password?
- Email address or user name? Used to both cases, have standard user name. If it's email, it always brings up the problem of how long will have this email address? If you leave a job and email no longer works, what do you do? Now uses gmail more because it will be more persistent.
- Why did you fill out optional fields? I have commitment to process, didn't ask too much stuff, so didn't mind filling. Reasonable to ask name/email. Didn't ask personal information like income, so it was okay.
- On DB, puzzled by "R:". Takes a second to think about it – is it a logo. Eye was drawn first to the "R:". Sees that I'm logged in. Notices that email address is being used in header => SWITCH TO USER NAME.
- Drawn to orange box. First thought, is what does 10% mean? How are you calculating that? Is that reliable? I still have a lot of stuff to fill out. What if we told you how much each task would give you percentage-wise? Unless it was a clear measure, doesn't know what that means – how many pages of information. The bar had more impact than the number to the right. Did you feel motivated or discouraged? Still don't have a sense of what needs to happen. Not surprised, but not sure it really tells me anything I didn't know.
- Not really noticing boxes to the right. Knows he should concentrate on orange box.
- What would you do next? Pretty contextual. Depends on how much time I have until the start of class.
- Say you had 2 weeks before class, what would you do next. Course description, title, office hours, that type of standard stuff.
- Where would you click to start entering this information? I would click on "Enter Basic Information" – I would click before reading text to the right. Reading is more work than c clicking and seeing.
- Where would you add students? Wouldn't think Basic – whole different category. But see that it is on Basic (after reading text to right). Students feels like a different category – other stuff is my control, students are students control.

Task 2: Basics

- Goes into basic information (from DB). I want to scroll because I can see that goes beyond. Wants to see how long it is. Fills in course number. Always has a hard time remembering number. I would copy and paste course description from a Word document. Is there formatting? It does have bullets. How you format it depends on context. Some systems might expect plain text. I like to put bullets. I don't think people tend to put hyperlinks into description. No one expects to be able to embed a video in the course description.
- Clicks next step. I would wonder what would happen if I clicked exit. Would it save my

state? Would you want it to save or discard it? I see forms that prompt you – you're leaving this page, do you want to save it? I like that. Seen others that autosave. Some sense of persisting the work.

What And Where

- What's your reaction to the dropdown? I like it when I start typing in and it has autocomplete. If it's not on there you can enter something else. Used to long drop down of options but I understand it, not very elegant. Odd to have example under dropdown (this is a known issue).
- Different places name their rooms differently. Example is telling me that I would prefer it in this format. (maybe we should give 2 examples?) Would prefer to write 110 South Hall. Doesn't know if example is helpful or prescriptive. If you put two examples, it tells me that you don't really care.
- Interesting that the second box was changing too. (This is a known bug, should only update after the calendar box is closed on the first. Manually enters second date (types 2007-12-5. Wonders if it will accept it?)
- Meeting times. Wondering if there would be a clock to match calendar. Clicks on days first, Mon, Wed then fills out times. Mentions that he's seen others automatically update the second time based on the first. (This is a known feature that we want to add). Copies and pastes times from one day to the next.
- Wonders if I hit previous will it save it or discard my information? Reluctant to click on this. With next step I have a greater expectation that it will be saved.

Instructors Page

- Tends to ignore the confirmation messages. I don't really see them. The fact that I got here I make the assumption that everything went okay. Doesn't get in my way though.
- I would wonder whether I can change my email? Looking now, do you think you could? Yeah. Refers to the email in the header – feels like it can't be changed because of this. (Known issue -> change header to username or first name/last name).
- Enters website. Http:// - doesn't know if he needs to enter this (we should add this to the left of the field for them).
- What phone number should I put. Do you put a phone number on course syllabus? No, I don't. If I had an office phone number I would put it in. I'm going to leave it blank. Photo? Maybe. I'd rather be able to put a URL for a photo (because he's a flickr user).
- Office hours. Again, on the format because of example. (Times don't auto-fill with example like on addWhatAndWhen – will need to add this once we get the bugs worked out)
- About to hit next step and think Oh, there's an option for Ta's. It's interesting that I'm ready to move on but there's this other thing. Seems appended on here. Don't give much thought to it. (We may need to rethink the location of the TA's – seems to get hidden at the bottom of the page). Box around instructor, TA feels like footnote.

Students Page

- OK, this is going to be a big contrast to systems that are integrated with university system. The fact that I can invite students implies that it's more like a social network. Reading the instructions here was helpful. Focused on "to save time" phrase (maybe we should make this bold to really emphasize).
- Inviting students means that I need to have their email addresses. I could copy and paste their emails there. (We may need to bring the option to have students email an

- address). What do you think you would add if you clicked on “add student” - Name and email address. I would click invite students to save time. Clicks it. Reads instructions. I was picturing word doc with a long list of emails separated by newline. (We should give them options for any reasonable format). Size of box implies what you do. Don't know of any lists delimited by semicolons. Don't know if there are limits to the number of emails? What about 500 students. What about preventing spamming.
- Sees message about not having email addresses. Brings up question about what will student see when they email this address?

Overall Impressions of Basics

- Good so far. Was expecting more sense of what I just filled out (on DB). Maybe there's a preview or distillation of what I filled out. Expects DB to change to reflect the work I just did. What does it mean complete? There are lots of parts that I didn't fill out.
- Extra or not enough fields in the process? No. Except that there's no tight integration with university. If I'm a freelancer, I can use this, I'm not tied to Berkeley, then it's a virtual course in which case physical information doesn't make sense. Maybe that's a different market and not what this is intended for.
- Don't have enough of a sense of what I'll be doing later. Quick links at first glance seem kind of random. Figure over time I will figure these out through use. Can't look at this quickly and figure this out.

Task 3: Add Lecture Slides to Day

- I think I would look here and click on Lecture Planner. Confirmed by description the right. I would not that the help link under Quick Link – not the most obvious place to put a help link (known issue – move to header).
- Clicks on Lecture planner (from DB). See that the first row (Mon Aug 27) is highlighted. Why is it highlighted? (I agree, I think we need to rethink this). I would not expect any highlighting initially. I would wonder if I can change the focus. I thought I could click anywhere in the space to edit it (This is good to know, we are planning on implementing this). It's a little confusing.
-
- Clicks edit on first day (Aug 27). So starts entering topic name (right away, no hesitation). Often just trying to get materials up in time. I would jump past the Description. Clicks attach resource (no hesitation). See big browse button. Finds file on desktop. I just want to upload with nothing else there. I would be annoyed if it was required to fill it out. (REMOVE DESCRIPTION from FORM). Clicks upload (Currently not implemented). It would be better if there was a red asterisk on the File upload field and not on the other fields. (Need to remove Roslin header/footer as well.)

Task 4: Add Reading Assignment to Day

- (Should have removed quick add box from UI for this test) Not sure what he will have to do at this point. Sees box. I would click the link. (This is not implemented, show him the mockup instead)
- Problem could be the taxonomy of assignments. What kind of assignments are there – “suggested” assignments, others have specific deliverable handed back to me. That's the background question that I have. Title is useful, assigned, due. Assumed that assigned would turn into today's date. Attached to the date I'm coming from. Actually attached specific times to the date (like beginning of the day / before class, etc.)
- I don't think I'd use the resources but I could see where it would be helpful. I think

- resources could also be a URL (planned feature). Would I have a library of assets?
- Wonders about highlights on calendar (bug). He thinks it would be helpful to show days that the class meets. I think in terms of days (29 days in the course).
- (Need to add option to not have class on a specific day)
- Brad asks him to go to a day in the next month. He's not sure if he can click on the calendar. He tries it, and says that the behavior is as expected. What if I run several courses? (We may need to have course picker in the header so that they can switch between multiple calendars.)
- Adds topics. Doesn't know where to click. Sees save button but he's unsure if it's for the assignments only or not. (This could be a spacing issue – form is rather cluttered right now).

Task 5: Add a Discussion Post

- Sees tab communication. It's kind of interesting. I would click on that even though that word is puzzling. I could see it being descriptive of many things but it's not quite the word that I'm expecting. What word would you use? Collaboration tools? I don't know. I didn't stop me from clicking on it.
- Sees discussion. Well I'm not sure, but let's try it. Clicks on New Post. Wonder do you have threads or is it a flat list of posts? Brad: What would you expect? I'm expecting threading. Fills out form. Clicks submit.
- I would wonder how people would respond to this?

Task 6: Dashboard

- Looks at printout of dashboard. Wonders again about highlight. Explain that it would be today. Makes sense. Upcoming due dates is helpful. The discussion – wondering about threading. Explain the blog post/comment style we were planning on. Okay, that would work. Do I have to adjust my collaboration strategy for this? He would think about it.
- Student of the day – that's fun. Do I pick the student? (Rename it to “random” student of the day). But he thinks that might be demeaning. Maybe “get to know a student”.
- Progress bar – 50% finished – still not sure what the means. (I think that maybe a checklist might make more sense).
- I would want to know how much of the course is left (the number of class days left).

P5 - A, Professor, UC Berkeley

**Interactive Usability Test, April 27, 2007
Conducted by Katrina Lindholm**

Notes by Katrina Lindholm

Task 1: Sign Up

- Clicks right on sign up. Likes the way it blinds down. Slick. Likes that he didn't have to go to a new page.
- One standard user name everywhere.
- Sees tab to move between fields.
- Has to scroll down. (NOTE: Try to make sign up shorter so there is no scrolling)
- "If it was installed on campus, I wouldn't have to enter all of this, right?" Enters in all fields.

- Clicks sign up. Shows him course picker screen (NOTE: Should skip this and go directly to dashboard)
- Clicks on profile link immediately. (Coming soon...)
- "Feels like I'm on Blogger."
- Clicks on Basics. Clicks on Students. Clicks on Invite Students.
- Types in first names, not email addresses. (NOTE: Is it not obvious to enter email addresses?)
- He says: It's a small class so first names would be fine.
- Students used to being anonymous. Might be better to have pseudonyms. Can be a discussion killer. They don't want peers to see what they say so they won't post at all. (NOTE: Should we consider adding a pseudonym feature? This might fit well into the student profile page)

Task 2 - Enter Basic Info

- Clicks on Basic Info on DB right away.
- Immediately starts entering date. Types in full date (Aug 15, 2007) rather than using calendar tool. (NOTE: We may need to change date fields to Read-only - force users to use calendar widget. Not ideal but at least will prevent database errors until we can come up with another solution)
- Types in additional info like course number. Physics 24.
- Says "the description should be in the course catalog." Doesn't like that he has to re-enter information that the university already has.
- 41 Evens for course location. No hesitation.
- Meeting days/times - wants integration with university again.
- Instead of pressing Save button clicks on Basic Course Information link again. (NOTE: How can we make the save button more obvious, perhaps put another one at the top of the page?)

Task 3 - Add Resource to Lecture Planner

- Says he would click on Edit (mini syllabus viewer).
- Then clicked Lecture Planner in intro section of dashboard.
- Goes right to resources. No hesitation. Types "Myths about Physics."
- Likes how it works. "Simple." Enters topic title.
- Tangent - "how would it look to students?" Q: What would you call this link?
- "View Public Course Site" or "View your course site." I guess that's it. It's pretty generic.
- Spellchecking would be nice. Like Google. Biggest complaint with bSpace. Embarrassing for students to see misspellings! (NOTE: This could be a very valuable feature)
- Clicks Save button. After save (NOTE: The blinder should stay open after Save with RO text)
- Q: Besides PPT slides, what else would you add?
 - Starting using own blog. Better than PPT slide. Make your own pseudo slide system. Support links and putting in images. Build a page around a lecture.

Task 4 - Add Assignment

- (RO view) sees student tasks. "No brainer. The less thinking the better."
- Asks about assigned/due date (NOTE: Should assigned date should default to today? Or due today?).
- Puts website into description field. Expects the day he clicked on to be the automatic assigned date rather than the due date.
- Q: Do you care about having a time on the due date?

- I don't usually care but some instructors would.
- May want a date when you can see the assignment. Sometimes you don't want students to get ahead. Hide it until you expose it.
- Likes term lecture planner. Planner is good.
- Wants another area like Assets. For yourself. Private area where you put stuff. Maybe another set for all lectures. (NOTE: Interesting idea, we thought about it briefly before. Provide a private area for files/notes, etc. and they can move some items over to lectures when they are finished/finalized)

Task 5 - Discussion Post

- Thinks students. No. Dashboard. No, can't find it. Clicks on Communication. See's intro area. Assume messages are sent out to everyone. Like an announcement. Used to term "announcement" so is biased towards that term. (NOTE: Should we change messages to announcements? Maybe?)
- Clicks on discussion post from intro section. Worried about spelling again.
- Q: How do you feel about the RTF text area?
 - "Yes, it's so standard now. You almost expect to see an arrangement like."
- Pretty easy. How are the responses managed per topic? Can you control whether the responses are going to be back to my comment or are they to each other? What would you prefer? Want it to be flat, all on one post. Works well for small groups (up to 20). Doesn't work well past 20.
- Q: Would you want students to be able to write their own posts?
 - Yes. Give them the ability to be much more creative.
- Another feature - an ability to create a folder for certain categories of posts. As the class unfolds, lots of posts, need organization of different categories. Different folders. Move posts from one folder to another. Posts should be able to live in more than folder. Hypothetical folder name: Physics on Mysticism. Mystics on Physicism.
- Q: How would you add exam/test to a certain day?
 - Would add under student tasks. Having a whole category for quizzes is too much. (NOTE: Validation on terminology: call it tasks rather than assignments).
- Maybe not just students but faculty tasks as well.

Task 6: Dashboard

- "I like the dashboard" (emphasized).
- Feeling for how much work you've been doing (clock of how much time I've been working).
- Like the course countdown. Maybe change it into a pie chart...that's a really good feature.
- Maybe have landmarks - midterm, final, etc.
- Q: Is the unit of measurement meaningful to you (calendar days)?
 - The number of sessions is a better way to think about it. (NOTE: Change measure to session days)
- Mini planner - You might want draft mode for class days. May have a current version and a draft version. Might reduce some of the trauma.
- "RSS feeds, that's cool. That's really cool."

Q: Student Roster - how do you feel about invitations taking the burden off of entering all student names manually?

- "Yes, it's familiar. I've done this with other systems."

FERPA. Default should be all course content is open to public but names of students (roster & discussion) have to be hidden. Could assign pseudonym. Even among students (not public, only registered students) still want pseudonyms.

Q: What about student roster (not on discussions)?

- He's concerned that even registered students could fish names out for malicious reasons.
- Should have the option to do both. Visible names or not?

Final Impressions

- "I think it's beautifully simple. It has all that I need."

Q: Is there anything that you do not need?

- You haven't been doing it long enough to add too many features.

Notes by Ivan Tam

Task 1

- liked the blind down
- wants the campus installed system to not require course creation
- was curious about profile
- felt at home with Dashboard, like blogger.

Task 2

- started typing in the date, did not use the picker
- if connected to the registrar, calendar/field should default to the academic calendar.
- description should be ported in from the catalog.
- why should I bother with checking listing
- did not click on save and didn't realize that it didn't save.
- we need a 'changes made, save?' dialog.
- profile is something that the instructor wants full control over.
- saved his office/hours profile however.

Task 3

- went to quick links for the lecture planner
- spell checking on fields. (firefox2 actually implements this)
- bSpace preview modes. editing vs. preview change perception of spell/grammar checking.
- need URL resources.

Task 4

- make assignment assigned date default to today.
- for the date picker make a set of quick dates for due
- one week, two weeks, three weeks, one month, etc.
- progressively reveal tasks and resources as the days come along, instead of all at once.
- "assets": notes on each lecture, private note area. course day notes and course notes.

Task 5

- class discussion environment: blog comment style is better for discussions, forces all to read the main comment; threaded only scales up to 20.

- many mindlessly expect threaded.
- maybe expose all the comments in an indented view?
- students should be able to create their own posts and folders for their posts.
- sometimes a post will live in multiple folders

General

- started adding names to invite students.
- first names might be useful in small classes
- younger students want to remain anonymous amongst their peers
- slides in XHTML, for presentations in roslin.
- have instructors and students create, comment, and annotate on the site itself
- picked up blogger habit of retreating to the dashboard.
- tasks will hold the exam/quiz information
- draft mode for planned days.
- course countdown
- pie chart
- want number of sessions is a better metric
- maybe markers for important dates,
- need anonymous mode in discussions, also make anonymous all students from each other.
- list of the most active discussions

Appendix B: CMS Competitor Feature Comparison

Blackboard, Moodle, and Sakai data taken from 2006 EduTools reviews by David Rosenbaum, Frank Fucile, and Vivie Sinou

Available at <http://www.edutools.info/compare.jsp?pj=4&i=552,554,557> (retrieved April, 2007)

	Blackboard Learning System (v 6.1)	Moodle (v 1.6.1)	Sakai (v 2.3)	Roslin (v 0.1)
Discussion Forum	X	X	X	X
Discussion Management	X	X	X	X
File Distribution	X	X	X	X
Internal Email	X		X	
Online Notetaking	X		X	
Chat Room	X	X	X	
Whiteboard	X		X	
Bookmarks	X		X	
Calendar	X	X	X	X
Search within Course	X	X (only discussions)	X	
Help	X	X	X	
Groupwork	X	X	X	
Student Interest Groups			X	
Personal Portfolios	X		X	X
Authentication	X	X	X	
Access Control	X	X	X	X
Registration	X (enterprise integration)	X (manual)	X (manual)	X (manual)
Online Tests	X	X	X	
Gradebook	X	X	X	
Customizable	X	X	X	X
Open Source		X	X	X

Appendix C: Feature Ranking Matrix

(P) = Instructors (S) = Students

Features	Brad	Ivan	Katrina	Gary	TOTAL
SYLLABUS					
upload an existing syllabus as a file (P)	5	3	5	5	18
upload an existing syllabus and auto-parse into form (P)	3	2	4	5	14
manually enter (copy/paste) syllabus items into form (P)	4	5	5	4	18
edit syllabus (P)	3	5	5	5	18
export syllabus in a popular format (PDF/Word) (P)	1	1	1	2	5
realign syllabus dates (P)	3	3	5	4	15
associate a file/link with a syllabus item (P)	3	3	5	4	15
announce changes to syllabus (P)	2	4	2	4	12
print out the syllabus (S)	5	4	5	5	19
see what I need to work on (S)	4	5	5	5	19
RESOURCES					
add link to resource "bucket" (P)	5	5	5	5	20
leave a comment on a resource (P)	2	2	2	2	8
categorize/tag resources (P)	4	4	5	4	17
print out a resource (S)	3	2	2	3	10
GRADING					
turn in an assignment (S)	4	4	5	5	18
review assignment (S)	1	3	4	3	11
give feedback on an assignment (P)	1	3	4	3	11
enter grades (P)	3	3	4	2	12
see my grades (S)	2	3	4	3	12
see grade statistics (P) (S)	2	3	4	4	13
export grades to another format (P)	1	3	3	4	11
COMMUNICATION					
communicate to one person (S) (P)	1	1	2	2	6
communicate to whole class (P) (S)	5	5	5	5	20
share work with my teammates (S)	2	2	2	2	8
see who else is online (P) (S)	3	4	3	3	13
CLASS MANAGEMENT					
enter student names (P)	4	5	5	3	17
sign up for my class (S)	5	5	5	5	20
add information to my profile (S)	2	2	5	4	13
viewing the directory (P) (S)					
create a persistent user account (S)	4	2	5	3	14
SECURITY					
determine who sees what (P) (S)	3	4	5	3	15
determine who can do what (P)	5	3	3	4	15
OTHER					
start a new class website (P)	5	5	5	5	20
start a class website based on an old/existing class website (P)	4	3	5	5	17
hold my office hours (P)	1	1	2	2	6
change the style of the page (P)	3	1	2	1	7

Appendix D: Project Timeline with Iterations

This was the initial timeline for Roslin project. It was soon abandoned in favor of a more ad-hoc and priority list based system.

ID	Task Name	Duration	Start Date	Finish Date
1	Roslin Project	68 days	Fri 2/23/07	Wed 5/9/07
2	First Story	10 days	Fri 2/23/07	Sun 3/4/07
3	Start new class	5 days	Fri 2/23/07	Tue 2/27/07
4	Initial sign up	5 days	Fri 2/23/07	Tue 2/27/07
5	Basic info	5 days	Fri 2/23/07	Tue 2/27/07
6	Communicate to the whole class. From the Instructor POV. Load dummy variables	5 days	Fri 2/23/07	Tue 2/27/07
7	Upload a syllabus file	5 days	Fri 2/23/07	Tue 2/27/07
8	Enter / edit syllabus	5 days	Wed 2/28/07	Sun 3/4/07
9	Viewing layout	5 days	Wed 2/28/07	Sun 3/4/07
10	Add/edit topic and course description	5 days	Wed 2/28/07	Sun 3/4/07
11	Add/edit assignment	5 days	Wed 2/28/07	Sun 3/4/07
12	Add/edit resources	5 days	Wed 2/28/07	Sun 3/4/07
13	Delete assignment / resources	5 days	Wed 2/28/07	Sun 3/4/07
14	Second Story	7 days	Mon 3/5/07	Sun 3/11/07
15	Mini syllabus viewer	7 days	Mon 3/5/07	Sun 3/11/07
16	Calendar sidebar	7 days	Mon 3/5/07	Sun 3/11/07
17	Have a printable syllabus	7 days	Mon 3/5/07	Sun 3/11/07
18	Sign-up as a Student/Add a Student to the Class	7 days	Mon 3/5/07	Sun 3/11/07
19	Enter/edit a syllabus	7 days	Mon 3/5/07	Sun 3/11/07
20	Start new class	7 days	Mon 3/5/07	Sun 3/11/07
21	Starting site completion monitor	7 days	Mon 3/5/07	Sun 3/11/07
22	Mid-project approval form due	0 days	Fri 3/16/07	Fri 3/16/07
23	Third Story	10 days	Mon 3/12/07	Wed 3/21/07
24	Tag/Label Resources	10 days	Mon 3/12/07	Wed 3/21/07
25	Enter/Add Students	10 days	Mon 3/12/07	Wed 3/21/07
26	Restart Class from old class	10 days	Mon 3/12/07	Wed 3/21/07
27	Turn in an assignment	10 days	Mon 3/12/07	Wed 3/21/07
28	Fourth Story	10 days	Thu 3/22/07	Sun 4/8/07
29	Realign Syllabus	10 days	Thu 3/22/07	Sun 4/8/07
30	Associate Resource with syllabus	10 days	Thu 3/22/07	Sun 4/8/07
31	User profiles	10 days	Thu 3/22/07	Sun 4/8/07
32	See grade book statistics	10 days	Thu 3/22/07	Sun 4/8/07
33	See who's online	10 days	Thu 3/22/07	Sun 4/8/07
34	Fifth Story	10 days	Mon 4/9/07	Wed 4/18/07
35	Announce syllabus change	10 days	Mon 4/9/07	Wed 4/18/07
36	Enter/see grade book	10 days	Mon 4/9/07	Wed 4/18/07
37	Review/give feedback on assignment	10 days	Mon 4/9/07	Wed 4/18/07
38	Export grades to different format	10 days	Mon 4/9/07	Wed 4/18/07
39	Print Resources	10 days	Mon 4/9/07	Wed 4/18/07
40	Final project paper	14 days	Thu 4/19/07	Thu 5/3/07
41	First draft	5 days	Thu 4/19/07	Mon 4/23/07
42	Review and revision	2 days	Tue 4/24/07	Wed 4/25/07

43	Final draft	2 days	Thu 4/26/07	Fri 4/27/07
44	Final project paper submission	0 days	Thu 5/3/07	Thu 5/3/07
45	Final presentation preparation	7 days	Thu 5/3/07	Wed 5/9/07
46	Slides and hand out materials	7 days	Thu 5/3/07	Wed 5/9/07
47	Live demo set up	7 days	Thu 5/3/07	Wed 5/9/07
48	Final project showcase	0 days	Wed 5/9/07	Wed 5/9/07