Reflections on the implementation of a course website maintained by multiple faculty members: Analysis, Development, Sustainability, and Evaluation.

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Abstract

Sustainability is a major issue when creating websites that students use with courses. How will content change over time, how can faculty inexperienced with web development add to and maintain content? This paper presentation will examine an implemented sustainable website that can be managed by everyone associated with the course.

Introduction

Large course sections provide a variety of difficulties for the instruction faculty. Time with students, individualization of instruction, solving practice problems, and direct lines of communications are issues that all instructors have. These issues can all be exacerbated in large course sections. Large section courses with a lab can further complicate this situation. For example, SUNY Cortland offers Introductory Biology I and II for non-majors. Enrollments in the fall (BIO110) can reach upwards of 700 students divided into sections offered by three lecture professors and four or five lab instructors. Simple logistical issues can come into play: How can students gain access to lab materials when the labs are closed? How do students communicate certain problems? To whom do they report? How can personalized assessment be provided for students on a constant basis?

Technology provides remedy or redress for some of these issues. But how can technology most efficiently be utilized to mediate these problems? What types of remedies are students looking for? What are the best ways to integrate technology consistently across these large sections?

These questions were all at the forefront of a recent technology implementation provided by the Department of Biological Sciences for the almost 1200 students that enroll in Introductory Biology I and II annually at SUNY Cortland. Starting in Fall 2005, a comprehensive instructional development project was undertaken in order to produce a co-curricular website that supported the lab sections for the courses. No one instructional development model was selected. Instead, several different models were used to support the project development team (Diamond, 1998, Gagné, Briggs and Wagner, 1992, Lee and Owens, 2000, Morrison, Ross, and Kemp, 2001). The main project activities included a large and comprehensive front-end analysis in order to determine departmental goals and the instructional needs that the students had a large hand in identifying.

Description of the Project: Front-End Analysis

A comprehensive front-end analysis was deemed an important first step in the process. A temporary version of the website was already in place. The purpose of the analysis was to collect data in order to describe the goals for the website and discover what instructional gaps existed that a website could address. Several different types of data were collected in order to triangulate the best possible conclusions. Examples of the analyses conducted were: (a) goals assessment of instructors involved in the course, (b) learning style inventories, (c) available technology analysis, (d) situational analysis of when the students would be using the website and what they would be using it for, and (e) extant data analysis of previous quiz and exam scores and course evaluations.

Although time consuming, the front end analysis provided valuable insights into the future development of the lab website. First and foremost, the issues that came up most frequently fit into three main categories: content, design, and sustainability (see table 1). While many of these goals are straight foreword, the major concern for the development of the new website would be the issue of sustainability. The old system of web update focused on a single webmaster that acted as an hourglass filter between the instructors and the students. This limited the potential flexibility and potential of the full website. Additionally, problems would arise if one webmaster was not available in the future. It became apparent that the future feasibility of this web project would lay not only in the implementation of a good instructional website, but in the developing of a plan for the sustainability of the entire project past the people immediately interested in its implementation.

Lessons That We've Learned Part A: Front-End Analysis

The front-end analysis was a critical component of this project. The two main questions answered during the analysis were: 1.) How should we use the website and 2.) How can we sustain the project for the long term?

Responses to student surveys, usage of a previous form of the website, and learning style inventories provided valuable information about the content and potential student usage for the new website. In general, the main items that students indicated that they would use on a regular basis were items that helped the students review for the lab. More specifically, the students showed high interest in being able to get information from their own lab instructor on the website (survey data 72% of respondents requested instructor specific review). The only content that was ranked higher in interest was sample quizzes, 92% (for the complete listing of recommendations, see Table 1 below under the Content Standards).

-- Insert Table 1 Here --

The instructors involved with the course displayed interest in participating, but many were concerned with learning how to code web, post, and manage web content. Would it

be possible to implement this project without creating extensive training? Additionally, it became apparent that the overall success of this project hinged on the sustainability of this project beyond the initial implementation and evaluation.

Project Development & Implementation: A Possible Solution

Web space was acquired for the project from the institution and a common portal was created (http://web.cortland.edu/biolab). A design template was created that would serve for internal as well as institutional consistency. The website was updated based on student input to include: (a) labeled and unlabeled photos, (b) interactive quizzes were added, and (c) exam review was bolstered and individual instructor resources were added as an integrated portion of the website.

The largest hurdle to overcome was the problem of sustainability. How could the individual instructors become more involved with the maintenance and longevity of the project? Would it be possible to have the instructors maintain the website with as little assistance and training as possible? Initial solutions focused on the use of WYSIWYG (what you see is what you get) web editors (e.g. Macromedia Dreamweaver™, Microsoft FrontPage™). However, these editors often require some knowledge of HTML programming. New software, however, provided the best possible solution. Macromedia Contribute was selected for the test implementation. Contribute allows users to navigate to a webpage and, with permission, edit and repost content to the page.

For the initial project implementation, Contribute, as well as other web software were all deployed on a departmental workstation that was dedicated for use with the project. This workstation would serve as the websites editing hub so that all activity could be monitored over the course of the first semester of deployment. The website was deployed for use during the Spring Semester of 2006, during the first half of the spring course (BIO111, Principles of Biological Sciences II). The web usage was tracked over the course of five weeks (four weeks of content delivery and one exam week) so that student habits in reference to the website could be evaluated. Three (of four) instructors actively used the workstation in order to maintain the website and provide content for their students. Results of an initial evaluation are promising.

Lessons That We've Learned Part B: Initial Evaluation Results

The dust is settling from the first major implementation of the website; 472 students enrolled in the course during the Spring semester. The students and instructors involved in the course were quizzed about the usage and satisfaction with the website. This information is best summed up in several lessons that we learned.

1. ***If you build it, they will come.*** The usage of the website was tracked for the first six weeks of the lab. During that period of time the website received 23,500 hits (or just under 3000 hits for every page that was available to students). Many of the hits were early in the week (Sunday – Wednesday, labs run Monday – Thursday). There was also a large increase in web hits in the week before the

midterm exam (Figure 1). Three out of the four instructors involved with the course used the workstation to update the website on a regular basis (regular basis means weekly).

-- Insert Figure 1 Here --

2. ***You can teach old dogs new tricks.*** The workstation that allowed instructors to convert their content into PDF files and post content with Macromedia Contribute was a success. The training session at the beginning of the semester took 10 minutes and no one required additional training beyond the job aids that were stored at the workstation. Over the course of the entire semester there was only one technical problem that had to be reported and the problem was related to a campus network outage, not problems with the workstation. Additionally, lack of experience did not seem to slow down the usage of the server. When asked how much time routine maintenance of the website took for the instructors, all indicated that the only substantial extra time that went into posting content on the website was the time it took to physically travel to the website.

3. ***Students were satisfied with the product, especially if their instructor was more involved***. A stratified sample of the course population was sampled and surveyed about their satisfaction with the website. An equitable number of students were selected from the sections of the one instructor who did not post content on the website. Students were asked to rate their satisfaction with the website on a scale of 1-5 with one being the most satisfied and 5 being the least satisfied. Overall satisfaction with the product was apparent (Mean = 1.84, SD - 0.669, N = 125; several categories are displayed below in Tables 2 and 3). Students that scored between 31 and 45 (out of 50) were most satisfied with the website (Table 2). Table 4 demonstrates that although all groups of students were satisfied with the website, those on Instructor D's showed less average satisfaction. This effect was not statistically significant except for the difference between Instructor D and Instructor C. Instructor D was the instructor that was least involved with the website while Instructor C used the website most frequently.

   -- Insert Tables 2, 3, and 4 --

4. ***The long term sustainability will* STILL *require someone in charge of the website.*** While no problems were indicated during this first implementation, it is reasonable to expect problems will arise in the future. There will be a need for someone to be "in charge" of assistance with training, support, and most importantly, controlling the routine end of semester cleaning. This project also required working with Academic Computing in order to maintain the server space and disk quota.

Conclusion

This was a successful project. A majority of students were using the website (3000 hit is half of a semester) and their satisfaction was high. Plans are to bolster this current incarnation of the project. Much of the success of this project can be directly traced to the front-end analysis. The project team spent a year testing content and trying to understand exactly how the students would use the website as a resource instead of just implementing what we felt would be a good resource. Perhaps the best validation of this effect was apparent in the open responses on the student surveys after the implementation of the current website. Students were prompted to write in the reason that they used the website. These answers were a direct validation of the content standards that we generated (Table 1) during the front-end analysis.

Additionally, this project would not have been possible without the software solutions that we encountered along the way like Contribute. The cost-benefit analysis in terms of software and training costs ruled out many other potential solutions. One suggestion we encountered along the way was that we should use the campus Course Management System WebCT in order to manage this process. While this answer made sense, the amount of training would have created a barrier for the instructors in this system. Many of the instructors involved with this course are part time faculty and may end up only teaching for one semester. The standard WebCT training on campus is about 1 to 2 days. Additionally, this would require long term coordination with Administrative Computing to maintain WebCT rosters.

Did this website help to alleviate some of the issues that arise in large sections?

Did students gain access to lab materials when the labs are closed? With 3000 hits before the first practical, students were using the website. There is no way to know for sure when and how students were using the website and exactly how helpful the website was for the students. All indications point to the fact that the students were using the website at night and on weekends when access to the labs was limited. Results of the initial evaluation demonstrated that at least 60% of students felt that the website was at least partially responsible for their performance on the midterm (Table 3).

Did this open lines of student communication? Instructor C (Table 5) had the highest satisfaction scores (not statistically significant). Not surprisingly, Instructor C completely integrated the website with the way he taught his lab sections; posting his own quiz and test reviews separate from the generic reviews that were available, making course handouts only available on the website. In fact, Instructor C set up a email distribution list and informed his students when updates and materials were available on the website. Instructor D has students with the lowest satisfaction (again, not statistically significant). Participation on this project was voluntary for the instructors and Instructor D chose not to participate. His students still used the website, but there more students chose not to use the website or had a negative view of the website. While the direct communication lines cannot be elucidated with this evidence, it does demonstrate some line of communication was open between students and instructors through the website.

Did personalized assessment provided for students on a constant basis help the students? A large portion of this website was created with the intent of being separate from the content edited each semester. There are sections with dissection pictures, practice quizzes, and an extensive midterm review. These interactive features increased the possibilities for students to assess their own standing in the course. Anecdotal evidence (Table 2 and 3) shows these self-assessment opportunities help students prepare for in class assessments. There are many possible explanations for this; practice assessment may alleviate anxiety, practice assessment provides a framework for studying, etc. It does seem that the use of the website as a resource for the course was successful.

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TABLE 1

Ideal Objectives Created during Needs Assessment
Content Standards: 1. The website should be a useful resource including: a. Photos (specimens, dissections, models), b. Simulations (dissections, experiments), c. Study guides and handouts, d. Useful external links, e. Review materials (both general in terms of content, and instructor specific reviews), f. Lab objectives.
Design Standards: 1. The site should have an accessible and intuitive user interface. 2. There should be a lack of redundancy. 3. There should be a uniform design (regardless of lecturer/lab instructor).
Sustainability Issues: 1. The resources need to be easily updated. 2. The site should be easily updated by a non-technical user. 3. The site should maintain a uniform design.

Table 1 – This table is a synthesis of objectives identified during the front-end analysis. These objectives were synthesized from a combination of several types of analyses.

Figure 1

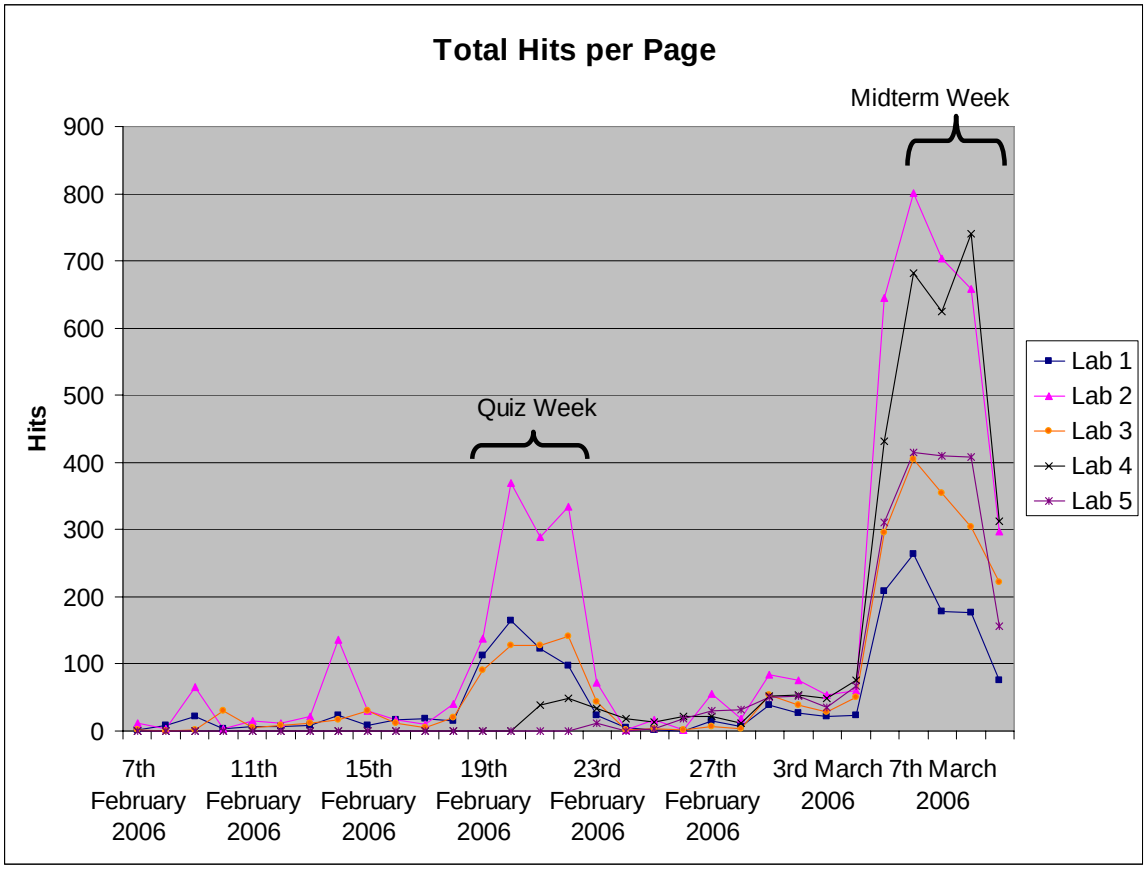

Figure 1 – This figure displays the total number of hits per page for several pages over the course of the Spring 2006 implementation.

Table 2

Were you satisfied

Grade Range	Mean	N	Std. Deviation	Std. Error of Mean
6 - 10	2.00	2	.000	.000
11 - 15	2.00	1	.	.
16 - 20	1.75	4	.957	.479
21 - 25	2.25	4	.500	.250
26 - 30	2.21	19	.787	.181
31 - 35	1.92	24	.717	.146
36 - 40	1.66	29	.553	.103
41 - 45	1.57	21	.507	.111
46 - 50	2.00	5	.707	.316
Total	1.84	109	.669	.064

Table 2 – This table sorts the satisfaction scores based on the range of test grades for the Midterm out of a possible 50 points.

Table 3

Were you satisfied

Website contribution	Mean	N	Std. Deviation	Std. Error of Mean
Least Helpful	2.80	5	1.304	.583
Not Helpful	2.56	9	.527	.176
Neutral	2.06	32	.504	.089
Helpful	1.68	37	.475	.078
Most Helpful	1.41	29	.501	.093
No Response	2.00	3	1.000	.577
Total	1.84	115	.670	.062

Table 3 – This table sorts the satisfaction scores based on how helpful the students rated the helpfulness of the website in achieving their score on the Midterm.

Table 4

Were you satisfied

Lab Instructor	Mean	N	Std. Deviation	Std. Error of Mean
Instructor A	1.85	34	.821	.141
Instructor B	1.81	32	.644	.114
Instructor C	1.71	35	.519	.088
Instructor D*	2.21	14	.579	.155
Total	1.84	115	.670	.062

Table 4 - This table sorts the satisfaction scores based on lab instructor. Instructor D is the instructor that did not post personalized information on the web site.