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FROM THE EDITOR

This month's article addresses two distance learning issues of increasing interest: the use of web-pages as an adjunct to classroom courses - a step towards transitioning to online delivery, and the student's use of course web pages and student's perceptions of their value.

Enrollment in courses seems to increase exponentially when an online component is added, or a course is converted for totally online delivery.

Frequently faculty who are used to teaching courses limited by the number of available seats in a classroom - even very large lecture halls have a finite number of seats - are now expected to teach the number of students that can be accommodated in "a classroom without walls." Lessons learned from the management of high-enrollment classroom courses can often be turned to the assistance of these faculty.

This month's article discusses the impact on a high enrollment course of the addition of course web-pages. Adding a web-site to a classroom course can be the first of the many steps necessary to transition a course, the faculty and students from classroom to online course delivery.

The other issue is necessary research on students' use of course web-pages.

A lot of time, money and effort is put into building course web sites, and there are mechanisms to count hits on a web site and even on particular pages. But that tells us very little about the perceived value of course web-pages and the course web-site as a whole to the students. Does the maxim "If we build it, they will come" hold true for course web-sites?

More research along the lines of that described in this article will refine

the content and presentation of course-web sites to optimize their value to the target audience - the students.

This article was the basis of a presentation at the NAU/web99 conference held in Flagstaff, AZ in May, 1999.

I would like to publish articles over the next year that will be helpful to faculty who teach high-enrollment courses at a distance with any delivery technology. If you have an article in this area that you would like considered for publication, please send it to the editor at mcollins@odu.org

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DEOSNEWS EDITOR

Assessing the Effectiveness of Web Page Support in a Large Lecture Course

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Introduction

Many instructors have started integrating web pages into their classroom instruction. Web sites vary from a simple posting of the class syllabus to lecture notes, homework assignments, links to other sites, the posting of grades, and class outlines. Having a course-based web site can have multiple advantages and disadvantages for the student and faculty. A dynamic, up-to-date web site is a large amount of work for the professor, and students can find themselves searching endlessly for material they need but can't find. This paper will address how web pages have been used in support of traditional classes, and then look at how accessible and effective one has been in support of a large lecture class at mid-sized state university.

Review of the Literature

Uses of Class Web Sites:

Posting the syllabus

The most basic use of a class web site is a posting of the syllabus, transforming the traditional paper document that is rapidly lost into a dynamic document that students turn to on a regular basis. Posting the syllabus can help students even before they enroll in the class by allowing them to preview the requirements. Brian Copenhaver, provost of the College of Letters and Sciences at UCLA, says posting syllabi is of tremendous value to students shopping for classes: "Students will be able to learn huge amounts about what they can expect in a course before they even take it" (Young 1998).

Once students are enrolled in the class, the web syllabus allows them to easily replace their lost syllabi saving effort for both themselves and the professor. It also allows faculty members to notify students of changes to class times, exams, assignments and scheduled events (Young 1995).

The electronic syllabus can also be used to give students immediate and constant access to the instructor. Whereas the traditional syllabus might give the professor's office hours, the web-based syllabus can provide an e-mail or chat link to the professor during "electronic office hours." Students are no longer required to stand in that line at the end of class to ask the professor a question. They can now jump on the web page and e-mail the question to the professor it makes it a process that inhibits the student to ask the question instead of blowing it off.

Posting lecture notes or outlines

Perhaps the most controversial aspect of class web pages is the posting of lecture notes and/or outlines. Critics argue that posting notes and outlines discourage class attendance and devalue the classroom experience. However, the upside is that when students are unable to attend class, they can easily see what they missed. This is especially significant for student athletes in sports such as basketball and baseball who travel away from campus for significant absences. Among the advantages of posting notes or outlines are:

- Students can preview as well as review class material.
- Students can bring outlines to class to take notes on.
- Faculty can incorporate links, short animations, video clips and information that will enhance the lecture of that day. Photocopied lecture notes don't allow for these enhancements (Chandler & Maddux 1998).

Posting supplemental teaching materials

Web sites can give direction to students who are looking to further their understanding about certain class material by using links provided by the instructor to explore similar web sites that can explain a specified topic in greater detail (Pan 1997).

Posting of grades

The web site allows students to view their grades on tests and quizzes from the privacy of their own home instead of standing in front of a long line of people in front of the classroom (Young 1998). There have been concerns expressed, however, that grades posted on a web page violate student privacy. One professor has gotten around this problem by assigning arbitrary ID number to students in his class and using them to post the scores. So far the senior author of this paper has refrained from posting grades on the net because of privacy concerns, despite repeated student requests for such.

Student Response to Web Sites

Students at University of Washington overwhelmingly found the web site material helpful. On average the web site material were rated very good. The most important positive aspects identified were clarity of presentation, access to other materials, variety of examples, and the usefulness as an addition to the textbook, projects and exercises (Christman & Harvey 1998).

Outcomes of web use

Todd Dunn a professor of Geology at the University of New Brunswick has integrated web sites into his teaching curriculum for the past two years. Dunn has observed a decrease in textbook use, and attendance dropped 40%, but response from the students was that the was a valuable addition to the course structure. Professor Dunn states that for every hour of lecture he spent 4 hours on the web page (Dunn 1998).

Teaching Advantages

Logistical advantages

Web sites can provide faculty with multiple logistical advantages. First, the web site is an inexpensive and efficient way to distribute large amounts of material to students. This can be significant in an age where many schools are limiting the number of pages faculty can photocopy. Another clear-cut advantage of putting class materials on the web is the ability to easily update materials. Discoveries, announcements, and relevant sites that can further assist the students in educational background concerning the topic (Mitchell 1997). It also is a good way to announce schedule changes throughout the semester. This winter, for example, West Virginia University had two snow days. The web site proved to be an ideal channel for distributing updated exam dates.

Student feedback

Another advantage of web-based technology is that it allows for rapid interaction between faculty and students. Coastal Carolina University has successfully used a class assessment form that his students can use anytime during the semester to send feedback, comments, suggestions, and questions (Benjoe 1997). This was based on a form called the "Minute Papers" used by Chizmar and Williams (1996). The student can assess any class by commenting about how the class is going and how the professor is instructing. Also, it can be used to make the instructor aware that the class needs

special assistance on certain subjects.

Richard Mendez, an administrator in the computation center at the University of Texas at Austin, was among the first to see the web's ability to improve communication among professors. Last year, he set up a web service called "World Lecture Hall" as a guide to classes that use the technology. Visitors can find material there for courses in more than 50 disciplines, from the humanities to engineering (Young 1995).

Concerns about web sites

For all the advantages to using web sites with traditional classes, there are also numerous pitfalls in the process.

Increased labor

Many times when universities develop new educational initiatives, it falls on the shoulders of the faculty to implement these changes without having the necessary infrastructure and financial support.

Fall out from the technology requirement isn't limited to just technical questions. Faculty have expressed concern about the amount of time that the wired styles of teaching require. Gregory Ulmer, an English professor, says the new emphasis on technology will "loosen the notion of the traditional class schedule" for professors (McCollum 1998). No more 3-to-4 hours a week for student advising; if you are wired your office is open 24 hours a day. This will assist the students that are too shy to ask the question in class, but it will require a tighter rein on the incoming questions via e-mail, which can be extremely time consuming. (For example, the senior author generally answers student e-mail every evening at about 10 p.m.) "Innovation always increases the work load," says Kenneth Wald, professor of political science at University of Florida. This includes finding web sites, creating pages, and learning how to use new software (McCollum 1998).

There is also the question of whether the creation of web sites is promotable work. At least one professor has gotten tenure based on web publishing, and numerous others are currently attempting tenure on that basis.

Technophobia

Thomas Wortham, chairman of the English department at UCLA, says he's heard skepticism among his peers about developing class web sites. "Within the humanities, there is a little technophobia," he says, adding that the professors wonder when they'll have time to develop the web pages and answer questions on-line. He also, acknowledges feeling embarrassed "to ask a 19 year-old kid how to do my job." But on the bright side, he says, "It's a wonderful way of enhancing our own humility" (Young 1997).

Technological access problems

While teachers may post electronic notes, graphs, images, sound bytes, animation, and the like, this does not necessarily mean that the students will access them. Retrieving this information requires students to have the correct hardware and software. Students may not have access to the internet at home, and students who have to access the web through campus labs may consider using web resources a hassle. Some campuses have found the graphic-intensive sites tend to use up a lot of bandwidth and overwhelm older machines (Bothum 1996). Access can be an especially serious problem for off-campus students who have to use inadequate ISPs.

Trusting a fragile system

Relying on technology requires a certain amount of trust in a system that is hard to understand fully, one faculty member says. He uses the analogy of a spacecraft to illustrate how the business school community has embraced a new approach. "When the astronauts went to the moon, they had to trust that all of the infrastructure was in place, and that if anything went wrong, someone would take care of it," says Richard L. Nolan, professor of business administration at Harvard. They may not understand how every function works, "but they are willing to jump in the rocket and blast off" (Mangan 1996)

Professors say another potential problem is the fallibility of the technology. For example, Susan M. Blanchard, an associate professor of biological and agricultural engineering at North Carolina State University, who has her class online, says a power failure brought an end to her demonstration of class web pages one day.(Young 1995).

The Web and UCLA

UCLA is among the first of the major universities to require that all of its classes have at least a minimal web page. They are creating an infrastructure to put information for about 3,000 courses online. It is a change that requires hiring 60 to 80 technology consultants, most of them students, to construct web pages and teach professors how to use them. It also requires sharply expanding campus computer laboratories, adding at least 200 new computers and upgrading the old ones. Many of the web pages will be made in a cookie-cutter fashion using a computer program called WebCT, which stands for "Web Course Tools." The program provides a template for creating the basic information for each course, such as meeting time, course description, and syllabus. Essentially after the basics are incorporated it is up to the instructor to expand on the page (Young 1997).

UCLA has also been dealing with the financial aspects of integrating web sites for all UCLA courses. The college-wide web proposal was met with some resistance. A student committee reviewed the plan and recommended against it because they opposed the new "materials fee" of \$10 per humanities course and \$14 per science course.

Despite the benefits of class web sites, students aren't necessarily convinced that every class needs a web site. Students are also complaining that teachers are spending more time teaching the technology

rather than the course material. Neelam Patel, a freshman at UCLA said that in her psychology course the professor didn't know how to use the site, and so Ms. Patel never looked at it. "In some it's not even needed," she says. "And you still have to pay the fee" (Young 1998).

Legal implications

Copyright law

Professors are concerned with how much information they can legally place on the web. Some subjects, such as history or classics, use older materials that are in the public domain. In other disciplines, publishers own the rights to many texts and images, and they don't want professors sharing them with the world at no charge. Ignorance about copyright law and confusion over how it should be applied to computer networks are causing problems, says Carol Twiggs, a vice-president of EDUCOM. "Professors are probably one by one violating copyright laws" (Young 1995).

Protection of work

When asked by a UCLA staff member to send in a syllabus, one professor wrote instead: "The big issue is intellectual property rights and their protection from being ripped off. If I choose to make my syllabus available to someone, student or colleague, I do so on an individual basis" (Young 1998). Other professors with similar concerns started to create two versions of their syllabus. A version for their web site and then a more complete version for their students to be handed out in class. Because of these types of actions teaching assistants started to joke at UCLA that professors were afraid to display their shoddy work

Student Centered Learning

The web has facilitated an exciting way to engage students in active learning. Contrary to the traditional lecture and factual information memorization, the World Wide Web as an instructional tool allows student centered learning where exploration and discussion may inspire students to find information and satisfy their curiosity. Web based learning can meet individuals needs, motivate students to find resources, and to publish with a creative mind. It also promotes cooperation and collaboration amongst faculty and students.

Using the Web to Support a Large Lecture Class

Course-support web sites are in the process of becoming a standard part of the academic environment. In fact, some universities have mandated that every course will have a web site. All of these pages have been created under the presumption that web sites are a good thing - improving instruction, student attitudes, and teaching evaluations.

But are they more than mere window dressing? Are they worth the effort and resources schools and faculty are pouring into them? This study attempts to answer these questions by assessing student use of a web site used in support of a large lecture class at a mid-sized state university.

What is the class?

Journalism 1, Introduction to Mass Communication, is a large lecture class taught to between 200 and 350 freshmen at a mid-sized state university. The course faces the expected challenges of a large lecture class - students who miss class, voluntarily or because of university travel; students with learning disabilities; 'distance' between the professor and the large number of students, and a lack of engagement by students in the class.

What is the site?

Approximately three years ago, the author began experimenting with a web page (and other electronic teaching aids, such as Power Point slides) in an attempt to improve the class and increase student involvement. The web site was initially created to serve the needs of students with learning disabilities who were claiming help under the Americans with Disabilities Act and of student athletes who have to travel extensively during the semester. The site has grown over time to include more than 50 individual pages including lecture outlines, study guides, internet links, and an e-mail connection to the professor.

Introduction

The following data were collected as part of the [P.I. Reed School of Journalism](#)'s on-going assessment project.

The first wave of data was collected in the fall of 1997 in a section of Introduction to Mass Communication. Questionnaires were completed by 164 students. Completion of the questionnaire was voluntary; attendance was low on the day the questionnaires were administered. Final grades for the class (on a 100 point scale) were merged with the survey data for students who supplied their student ID numbers.

The second wave was collected in the fall of 1998 on an exam day. This resulted in a much higher completion rate - 280 usable questionnaires were collected. Again, completion of the surveys was voluntary, and grades were only merged for students who provided their student ID numbers on the questionnaire.

The importance of this study is that it is an attempt to move beyond anecdotal responses from students and see if there are measurable effects of web support. When and how do students use the web site? Are students using the web site, as some would charge, as an excuse not to come to class? Does web site use improve student performance?

Findings

Student Internet Use

Students are using the internet, and using it on a regular basis. More than 93 percent of the students in 1998 had ever sent e-mail, and 92 percent had a current e-mail address.

Table 1 - Overall Internet Usage	1997	1998	P
Have you ever sent e-mail?	79.90%	93.20%	0.000
Do you currently have an e-mail address?	82.50%	92.10%	0.002
Have you ever browsed the web?	92.30%	100.00%	0.000
Have you ever sent e-mail to a professor?	40.80%	66.20%	0.000
Did the professor respond?	67.40%	79.40%	0.026
Do you visit any class web pages?	77.50%	96.10%	0.000
Do any of your other classes have web pages?	57.30%	69.20%	0.014
N=424-440			

Technically, 100 percent of the students have a university supplied e-mail address, but presumably those giving a negative response have never used it. Web use was even more common, with 100 percent of the 1998 sample having been on the web. Of those who used e-mail in 1998, 60 percent checked it on a daily basis, 30 percent said they browsed the web at least once a day, and 62 percent browsed the web at least two or three times per week. On every measure of computer and internet use, there were significant increases between 1997 and 1998. Computer ownership jumped from 59 percent to 71 percent, and home internet access went from 43 percent to 73 percent.

Table 2 Home Access

				Average Grade	
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Table 2 - Home Access	1997	1998	P	No	Yes	P
Do you own a computer?	59.60%	71.80%	0.009	80.81	81.70	0.404
Do you have home internet access?	43.20%	73.60%	0.000	80.96	81.58	0.544
N=435-436						

Having their own computer or home internet access did not predict any change in class performance, however. Students are also becoming accustomed to having class web pages, with 69 percent reporting having at least one other class that had a web page. So, in terms of internet access, by 1998 it can now be considered almost universal among the sample.

Use of Class Web Site

If you build it, they will come: 97.8 percent of the students in the 1998 sample had visited the [web site](#) at least once and usage was up significantly from the year before.

				Average Grade		
Table 3 - Using the Class Web Site	1997	1998	P	No	Yes	P
Have you ever visited the J1 web page?	74.40%	97.80%	0.000	80.64	81.52	0.591
Have you had trouble accessing web page?	19.30%	10.30%	0.014			
Which web site features have you used?						
Class Update	51.70%	90.40%	0.000	82.00	81.25	0.532
Lecture Outlines	52.90%	82.10%	0.000	81.28	81.45	0.879
Syllabus	19.20%	46.80%	0.000	81.56	81.15	0.686
Improve Your Study Habits	11.60%	27.90%	0.000	81.46	81.21	0.825

Class Schedule & Outline Archive	29.10%	40.40%	0.015	80.93	82.17	0.213
Link to Textbook Page	8.70%	18.60%	0.004	80.88	84.18	0.012
Exam Study Guides	51.20%	93.20%	0.000	81.56	81.36	0.872
N=435-450						Back to reading text below

The most popular feature, used by 93 percent of the students, was the [exam study guide](#). This was followed closely by the [class news page](#) (90 percent). Some of the popularity of the news page can be explained by the fact that extra-credit assignments get announced there. [Lecture outlines](#), which contain the full text of the class Power Point slides, were another popular feature in 1998, with 8 percent of the students accessing them. This was up from 53 percent the year before.

Students are doing more than just printing these pages out; many are actively using them as part of their regular study routine: 51 percent of the 1998 students using the class outlines brought them to class to assist in notetaking; 79 percent of the 1998 students using the study guides took notes on them.

				Average Grade		
Table 4 - Use of Outlines/Guides	1997	1998	P	No	Yes	P
Ever Use Lecture Outlines?	52.90%	82.10%	0.000	81.28	81.45	0.879
Do you bring outlines to class?	37.50%	51.10%	0.008	81.57	81.03	0.590
Ever Use Exam Study Guides?	51.20%	93.20%	0.000	81.56	81.36	0.872
Do you take notes on study guides?	51.40%	79.40%	0.000	81.71	81.10	0.577

Not surprisingly, given the close-to-universal usage of these resources, there was no significant difference in the grades of users and non-users. Anecdotally, we can report seeing students in the front row taking notes on the outlines so that they don't have to copy down the content of the Power Point slides. The outlines were initially created by to meet the request of the ADA office to provide learning disabled students with copies of the outlines. It seemed that the easiest way to distribute these outlines on a timely basis was over the web. They have quickly become popular among all our students, and if we ever neglect to update the site with the current outlines we will get e-mail complaints!

Interestingly, the one web feature that any predictive value of final grade were the links to external pages. The first of these was the link to the textbook page provided by the publisher. Students who used the textbook link had significantly higher grades (close to half a letter grade) than those who had not ([See Table 3](#)). There are two likely reason's for this. First, this is one of the least used

features on the page (8.7 percent used it in 1997, 18.6 percent used it in 1998); thus, unlike the study guides and outlines, it distinguishes a unique group of students. The second component of the explanation is that the students who use the textbook page (which consists primarily of links to related web sites) are more engaged in the class than students who do not do so. This conclusion is also supported by usage of the Link of the Week feature. In 1998, 45 percent of the students had used the Link of the Week, which relates directly to the topics under discussion in class. (For example, the unit on ethics was accompanied by a [link to media coverage of the news plagiarism and fabrication scandals of the summer of 1998](#). The unit on the news industry was accompanied to a series of [links about woman journalist and adventurer NNellie Bly](#).) Those students who reported accessing the Link of the Week had significantly higher grades (Yes mean = 82.3, No mean = 79.5, F prob. = .0196). It would seem, therefore, that the page provides at least two outlets for that engagement.

When do students use the web page?

One of the biggest criticism of class web sites by faculty is that they would seem to condone students skipping class. The data here would seem to suggest that using the web site as a surrogate for class attendance is not a successful strategy. Between 35 and 45 percent of the students reported using the web site after missing class; these students also had significantly lower grades than the class as a whole (See table 5).

				Average Grade		
Table 5 - When do you use the J1 web page?	1997	1998	P	No	Yes	P
Before class	14.50%	30.40%	0.000	80.99	82.59	0.148
After missing class	34.90%	45.40%	0.028	82.49	80.00	0.010
When confused	11.00%	25.40%	0.000	81.55	80.88	0.575
To prepare for exams	47.70%	84.30%	0.000	81.33	81.43	0.933
To e-mail questions to the professor	10.50%	9.30%	0.681	80.86	86.20	0.001
N=452						

In short, this item is a crude measure of attendance, and while it may help students who have absences, it doesn't put them at the same level as those who do attend class.

The most popular use of the web site was to prepare for exams (47.7 percent in 1997, 84.3 percent in 1998)

E-mail and Engagement

We wanted to provide an additional channel for student/teacher communication; we accomplished this by placing an [e-mail link](#) on the web page and in the syllabus. Using this link, students can contact the professor with questions about tests, assignments and course materials. A number of

students who would have been reluctant to come to the professor's office or call on the phone were willing to send e-mail questions. Students soon learn that that the professor checked his e-mail every evening between 10 and 11 p.m., and they found that if they post a question before 10 at night, they will have an answer by midnight. These "virtual office hours" are very popular the night before exams. We also have had international students who are much more comfortable communicating in writing than in spoken English. While the e-mail and web page are no substitute for interpersonal communication, they provide an additional channel for communication with this large course.

A small number, approximately 10 percent of the total, used the e-mail link on the web page to send questions to the professor. These students had significantly higher grades on average (86.2 v. 81.55 or half a letter grade) than students who did not use the e-mail link ([See Table 5](#)). The exact nature of this relationship is hard to say, but it clearly is another tool for the involved student.

This measurement was consistent with the more general question: "Have you ever sent your J1 professor e-mail?" Twenty percent of the students in the 1998 sample had sent e-mail (either from the web page or their e-mail program), and they had significantly higher grades than non-mailers (See Table 6).

				Average Grade		
Table 6 - E-mail to J1 professor	1997	1998	P	No	Yes	P
Have you ever sent e-mail to your J1 professor?	17.60%	19.30%	0.668	80.19	85.73	0.000
Did you have trouble sending e-mail?	5.50%	11.60%	0.234			
N=423						
How helpful was the response?						
Not at all helpful	0.0%	0.0%				
Somewhat helpful	22.6%	16.1%				
Very helpful	77.4%	83.9%	0.448			
N=93						

By and large, student were happy with the responses they got, with 18 percent finding the response "Somewhat Helpful" and 82 percent "Very Helpful."

Conclusions

Overall, students found the web site to be helpful (See Table 7):

Table 7 - How helpful is the web page?	1997	1998	P	Average Grade	P
Not at all helpful	1.80%	0.00%		87.50	
Somewhat helpful	32.70%	19.20%		81.77	
Very helpful	65.50%	80.80%	0.001	81.28	0.591
N=384					

76.3 percent found it to be "Very Helpful," 23.2 percent found it "Somewhat Helpful," and 0.5 percent found it "Not at All Helpful." And as students become more internet literate, they find it more helpful - significantly more students found it helpful in 1998 than 1997, even though the site was substantially similar between the two waves. (There were two major changes that had taken place: The Link of the Week had been added, and the site had a cosmetic makeover.) Because of the almost universal use of the page, we can say little about what effect it did or didn't have on learning.

In conclusion, we can say that the web site is an appreciated and engaging tool for students. However, the best predictor of success in the course remains showing up for class on a regular basis (See Table 8).

Table 8 - How often do you miss class?	1997	1998	P	Average Grade	P
No more than once or twice a semester	56.8%	49.6%		84.34	
Once or twice a month	29.7%	39.6%		79.19	
Three or four times a month	9.7%	10.4%		74.23	
Five or more times a month	3.9%	0.4%	0.012	77.92	0.000
N=423					

Overall, 53 percent of students self-reported missing class no more than once or twice a semester. These students scored on average between one-half and one full letter grade than students who reported missing at least once or twice a month. So, for the time being, the web site is perceived as a valuable adjunct for students, but it is no substitute for regular attendance

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