Course Websites: Are You Giving Your Students What They Want?

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A year-long study of students and faculty members in the engineering program at the United States Military Academy in the 2002 spring and fall academic terms revealed a surprising gap between what the creators of course web content perceived as most useful for students and what the students actually desired or used from various course websites. Students from eleven mechanical engineering courses were surveyed over two academic terms to obtain feedback on their actual usage of the course websites. This information was compared to survey data from faculty members who develop and maintain course web-sites in order to evaluate discrepancies. The results indicate that most students typically used the basic features from supplemental course websites for test preparation and administrative information and did not frequently use more advanced website features such as online tutorials and quizzes. Our faculty members tended to underestimate the usefulness of basic website functions such as homework solutions and syllabi.

As the internet becomes increasingly ubiquitous in society, instructors have an unprecedented ability to touch their students outside of the classroom through well designed and maintained web media. Supplemental course websites (websites intended only to supplement – not replace – conventional teaching) are rapidly becoming more the rule than the exception for undergraduate level courses. We should note that we have a student-body that is fairly tech-savvy and definitely well-connected. Each student has a computer with LAN connection to the Internet from his room, and beginning this year, entering students will have a wireless PDA and wireless laptop computer linked by campus-wide, wireless network coverage. Currently in the Department of Civil & Mechanical Engineering at the United States Military Academy, the majority of courses (57%) currently have supplemental websites. A survey of faculty in 8 major undergraduate institutions by Chen et al. found that 34% already create and manage web pages while 39% were interested in attending a workshop on how to create and manage websites.[1] Due to their increasing role, supplemental course websites should be viewed as important course content and assessed accordingly. Websites should not be burdened with unused or outdated content, nor can faculty afford the time to provide and maintain the entire range of possible website features. One factor that is not an issue for the Academy, and is thus beyond the scope of this paper, is access to the Internet. There is a strong correlation between ease of access and propensity of the student body to use course websites at all.

Much of the literature on the use of the internet for undergraduate education deals with using the internet to replace traditional lecture and textbook instruction, such as the

study by Dutton, Dutton and Perry[2], instead of simply supplementing it. Studies which have been conducted about supplemental website content, such as the study by Poindexter and Allen at Northern Michigan University, indicate that a significant disparity exists between the content students expect and the content provided by course websites.[3] Although studies such as Poindexter and Allen address what content students expect and what content they rate as useful, they do not assess to the same extent what content students actually use.

This study attempted to determine what online features students found useful as well as what online features they actually used in comparison with faculty perceptions. The goal of the study is to assist the faculty in our department in making the most effective use of their limited time and resources to develop course websites which students will actually use.

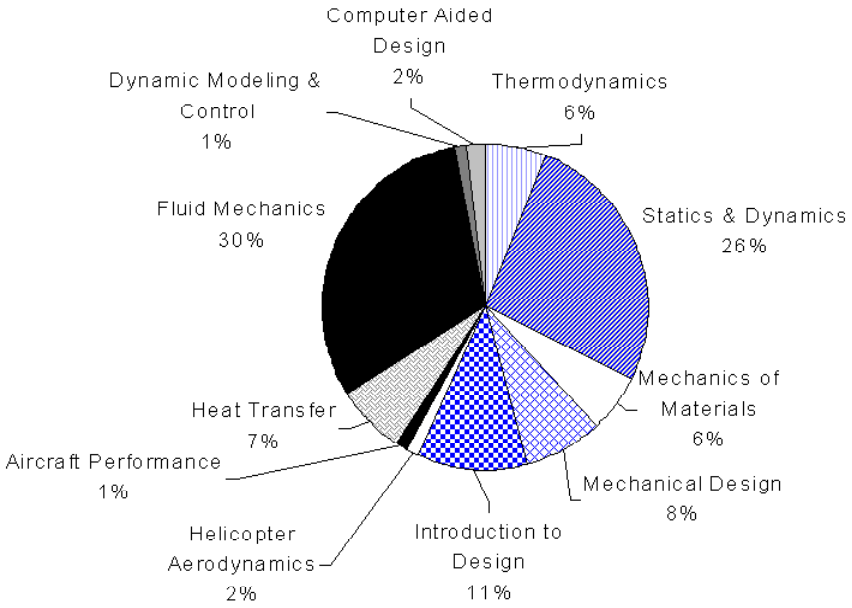

FIGURE 1: Survey Data by Course

Surveys of both engineering students and faculty were conducted. The student survey had 645 respondents from 11 engineering courses with active websites as shown in Figure 1. The United States Military Academy curriculum is unusual in that it requires all students, not just those majoring in an engineering field, to take a series of engineering courses. Therefore, while most respondents were civil or mechanical engineering majors, at least 82 respondents (13%) were not. Student responses were taken from the spring and fall 2002 academic terms. The breakdown between terms is 196 responses or 30% of the total from spring 2002 and 449 responses or 70% of the total from fall 2002. The spring 2002 and the fall 2002 surveys had 7 and 8 questions respectively. The first 6 questions were identical, but the seventh question on the spring 2002 survey asking students to list the URL for the best website they had ever used was

replaced by two questions on the fall 2002 survey asking students to rate how much they actually used all of the listed website features on a recurring basis and to list any additional features they would like to see added to their course website.

The faculty survey was given only in the fall 2002 term and had 11 respondents. Each of the respondents was either an instructor for one of the courses shown in Figure 1 who developed and managed his or her own course website, or was a senior faculty member having experience teaching several of the courses shown in Figure 1.

All of the surveys were completed electronically through a website on a strictly voluntary basis. All of the surveys were intentionally brief in order to get the largest possible number of student and faculty respondents.

The student survey data shows that students frequently used available course website content and preferred to get out-of-class information from the internet. Figures 2, 3, 4, and 5 below demonstrate the degree to which students use and prefer to use the internet for academic work. 80% of students used the internet at least 1-2 times per week for academic purposes. 75% of students said they agree or strongly agree that they like to access course information through the internet. Over half of students used the website for the course in which they completed the survey at least 1-2 times per week, while 70% of students used other course websites at least 1-2 times per week. Since students are clearly using the available internet content frequently, instructors have the important opportunity to assist their students in learning outside-of-class through web media. Website content therefore should be viewed as an important extension of the course and carefully examined.

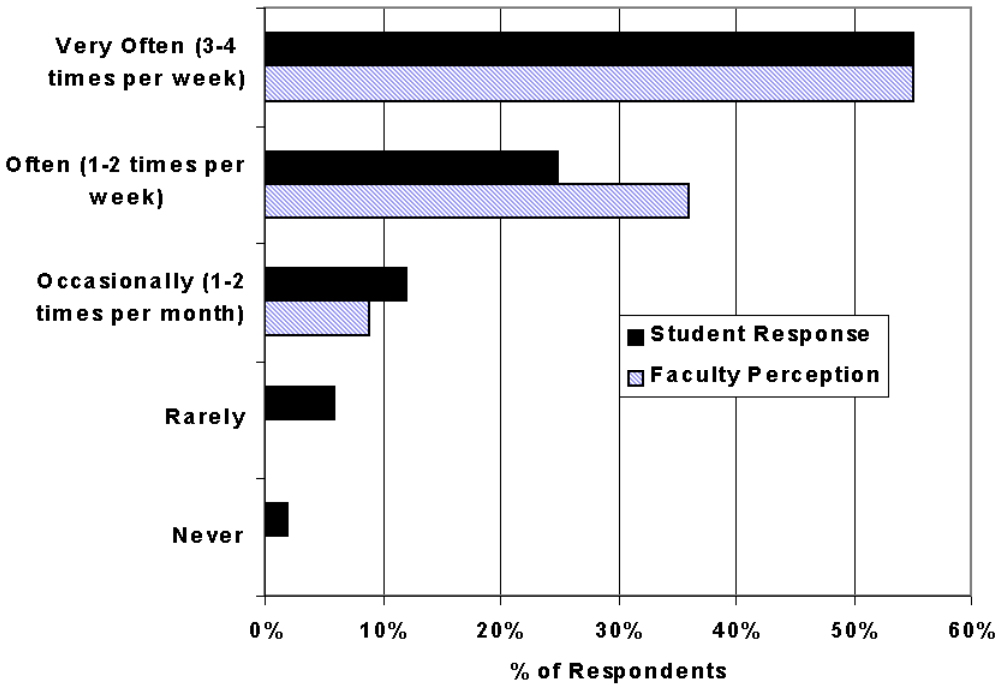

FIGURE 2:
How Often Do You Access the Internet for School Work?

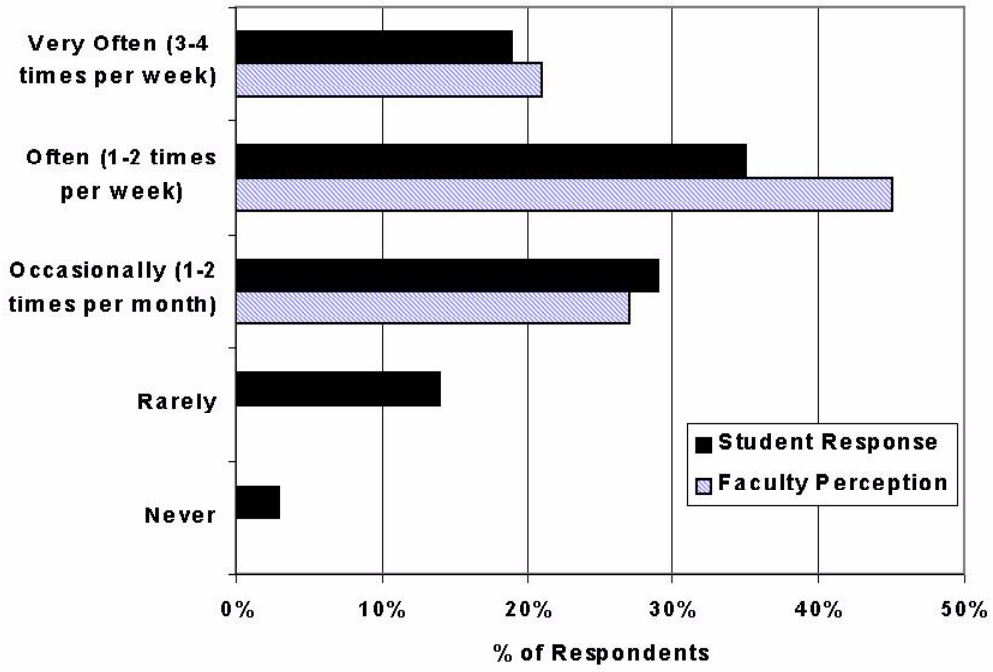

FIGURE 3:
How Often Do You Access the Web Page for This Course?

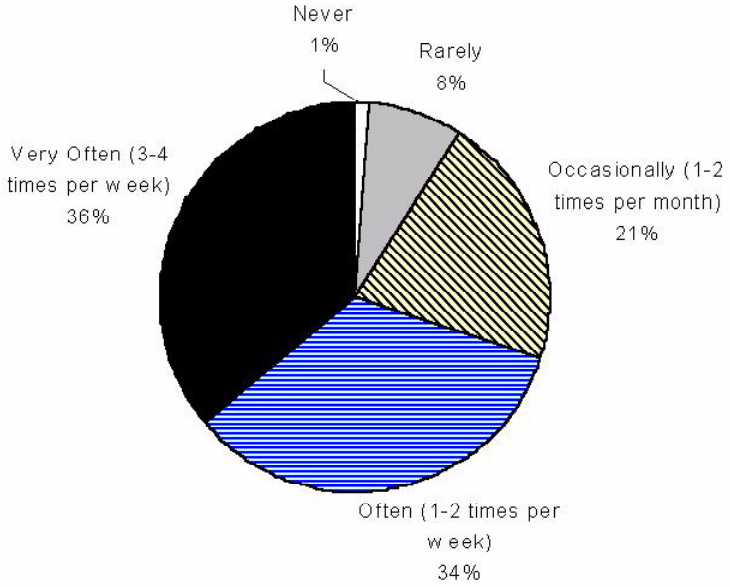

FIGURE 4: How Often Do You Gather Information From Web Pages In Other Courses?

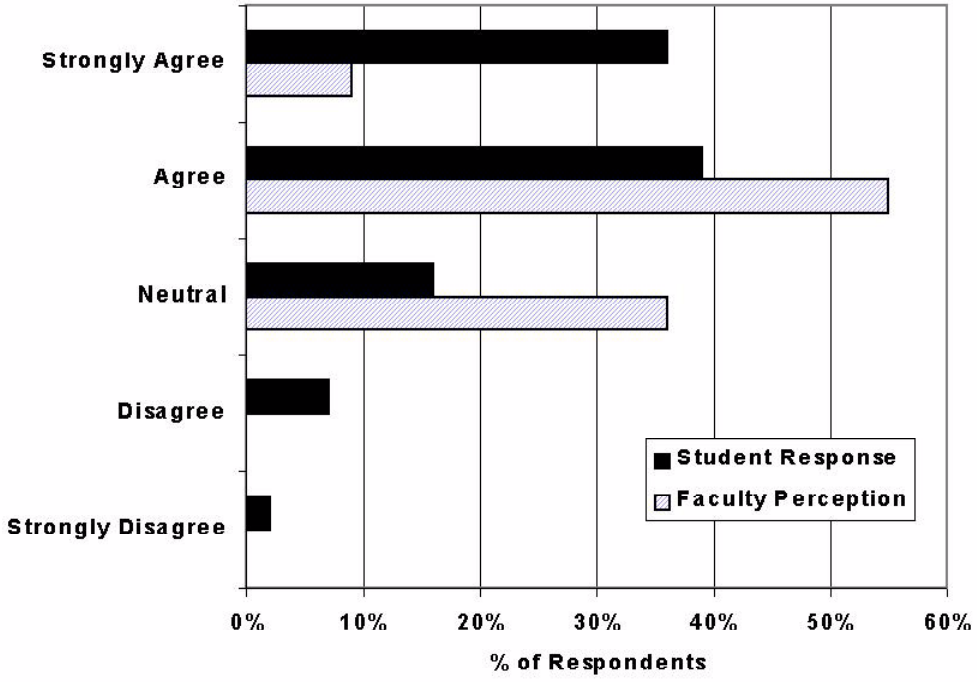

FIGURE 5:
I Like Accessing Out of Class Information Through the Internet

Overall, faculty perception of general student use of the internet correlated well with the student responses, except that faculty members underestimated the degree to which students prefer to use the internet. 36% of students strongly agreed that they liked to use the internet for course work while only 9% of faculty members strongly agreed that students like to use the internet for course work.

When considering the usefulness of various specific website features, it is first helpful to classify the different types of features. Schweitzer and Reed divide course websites into three levels: basic, intermediate, and advanced. Basic websites supply course information and links to associated interest material. Intermediate websites supplement and reinforce concepts learned in the classroom, while advanced websites promote increased active learning in the classroom.[4] Poindexter, Heck, and Ferrarini divide website features into communication supplements (email, chat, bulletin boards, etc.), course management aids (administrative information), and course content supplements (interactive tutorials, simulations, virtual laboratories, etc.).[5]

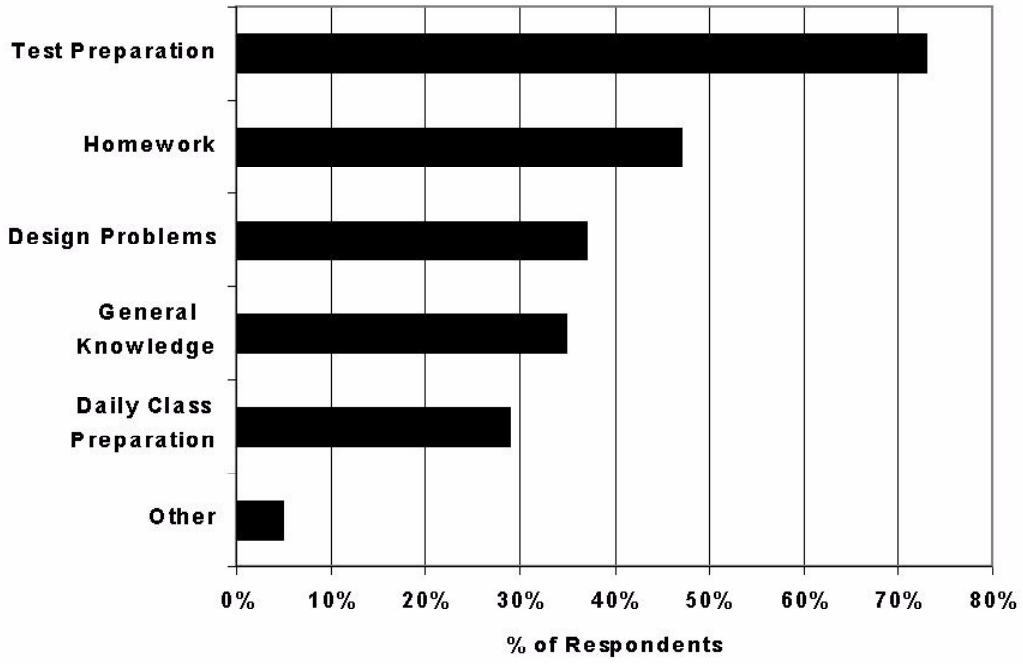

FIGURE 6: I Find the Website of Great Assistance in Working On:

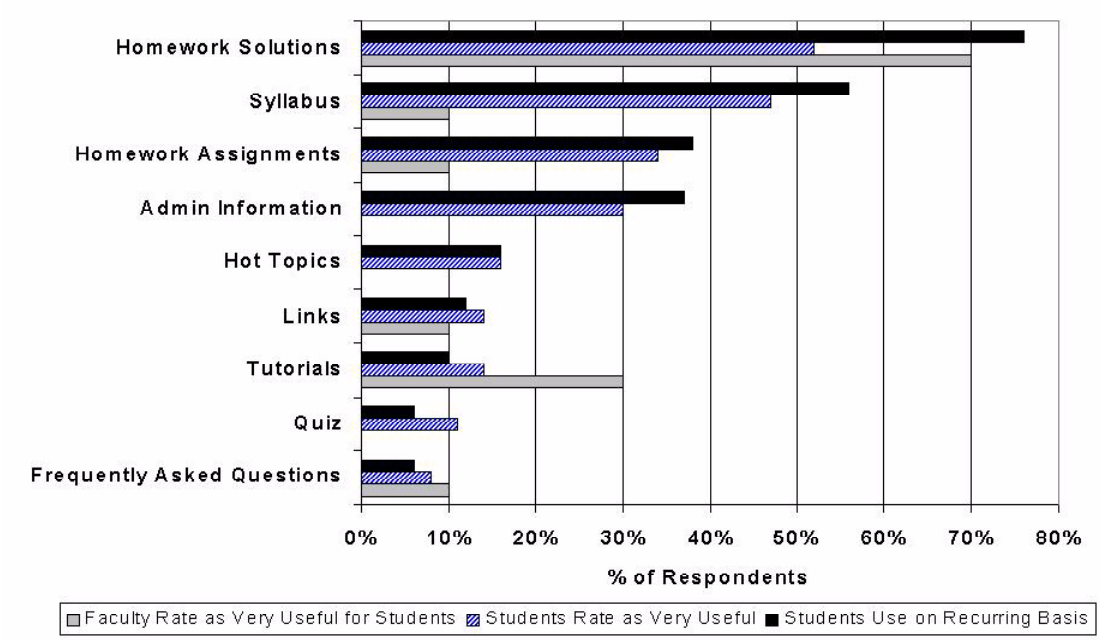

FIGURE 7: Course Website Feature Comparisons

In examining which website features our students used most, we generalized our results across all of the courses shown in Figure 1. Clearly course format has an impact on what website features students actually use. However, the engineering courses surveyed for this study all had generally similar formats in terms of the approach to student learning, the methods of instruction, and the types and the numbers of graded requirements. As a result, the overall trends from course to course were similar.

From the survey results it is clear that our students find course management (basic) features such as the syllabus far more useful than course content supplements (intermediate/advanced level features) such as interactive tutorials and quizzes. Figure 6 clearly shows that the majority of our students find websites most useful for test preparation. Figure 7 indicates that students actually accessed homework solutions and syllabi the most, 76% using homework solutions and 56% using syllabi on a recurring basis. Furthermore, 56% of students rated online syllabi as "very useful" and 52% of students rated homework solutions as "very useful". Administrative information and homework assignments were also rated "very useful" by 30% or more of the student respondents and used on a recurring basis by more than 35% of students. Note that the "students used on a recurring basis" data in Figure 7 is from fall 2002 survey only. Furthermore, on the free response question of the fall 2002 student survey, "List any features you believe would be useful that you would like to see added to your course web page," students overwhelmingly requested more administrative information. The most common write in request was for additional old exams and quizzes and their solutions. Other student requests included access to current grades, glossaries of terms and symbols, review sheets, and pre-lab

handouts.

One possible reason for the fact that our students seem to prefer basic website features is the fact that they are under enormous time pressure, and course management features reduce their own requirement for organization while more advanced course content supplements are typically not required and are above and beyond the graded course requirements. On-line quizzes and advanced tutorials in the courses we surveyed were provided as additional learning material and were not graded or required. A recent study of the effectiveness of a course website by Masten et al. at the Michigan State University concluded that intermediate website features such as tutorials were not used unless their use was mandated.[6]

While our students and engineering program are very unique, our findings do not appear to be as unique and are supported by other current research. Poindexter, Heck and Ferrarini found that putting course administration documents online was beneficial by assisting students with their organization. Whereas paper copies of administrative documents were quickly lost or buried in folders, electronic copies could be accessed at will and were reviewed weekly by most students.[7] Schweitzer and Reed found that for administrative documents (assignments, syllabi, etc.) engineering students typically preferred to receive them in electronic rather than paper form. This study shows that the format of documents such as the syllabus is extremely important in terms of how useful they are to students. A poorly organized electronic syllabus is no better than a paper copy.[8]

Poindexter and Allen found that the majority of students desired online syllabi and assignments but not more advanced features such as online practice tests, group chat sessions, virtual labs, etc.[9] The study by Masten et al. of a single course website over four academic terms came to a similar conclusion as well. The study noted that graded online quizzes were discontinued due to overwhelmingly negative feedback from students. They also noted that the vast majority of student respondents in every academic term found the posting of practice exams and solutions to be "often" or "very often" helpful, while up to 53% of students rated online tutorials as "never" helpful.[10] Furthermore, as noted by Poindexter, Heck and Ferrarini, many students who requested advanced features such as interactive practice tests did not actually use them.[11]

Despite the fact that the majority of students in this study did not rate more advanced features as "very useful," it would be incorrect to automatically conclude that more advanced website features have no place. Studies have shown that intermediate and advanced website features can be very useful and effective when properly integrated in the course and emphasized by the instructor. [12,13,14] Instead, individual instructors should carefully consider more advanced features in terms of the cost in time, effort, and resources required versus the benefit of perhaps reaching a small number of students such as introverted self-learners who might use and gain significantly from such features.

Our student and faculty survey results also indicate that instructors can be more efficient and more effective in the creation and maintenance of their course websites by focusing on the content students want and use and by eliminating unused content. As shown in Figure 7, the

faculty tended to significantly underestimate which features students considered "very useful", particularly the syllabus, copies of homework assignments, and other administrative information while overestimating the usefulness of interactive tutorials and frequently asked questions. Although 90% of the course websites offered features students considered most useful (syllabi and homework solutions), 30% of the websites included features used regularly by only a very small percentage of students such as tutorials and online quizzes. When asked why they do not offer additional features on their websites, 82% of respondents listed lack of time. Faculty members were asked to rate the time associated with several tasks required to create and maintain various website features. Given the choices of significant, moderate, minimal and none, the majority of respondents indicated that while posting, organizing and updating course management features such as administrative information required moderate time and effort, creating and maintaining more advanced course content supplements such as tutorials and quizzes required significant time and effort. Thus, there is time to be saved by focusing on the more frequently used course management features and eliminating or scaling back the more advanced and more time consuming features.

From the survey results presented in this study and several other studies, it is clear that engineering students frequently use available website content and often prefer to get course administrative information from the internet. This presents instructors with an important opportunity to use web-based media to assist and enhance out-of-class learning. However, instructors should carefully consider the content they use in their course websites to avoid features which are time consuming to create and maintain and are not typically used by students. The results of our study indicate that significant numbers of students used the course management features (basic level tasks) of websites, including homework solutions and administrative information (syllabi, assignments, grades, posted solutions etc.) on a recurring basis, while neglecting more advanced features such as online quizzes and tutorials.

While the specific web features listed herein apply very directly to our engineering courses, there is a trend emerging from the literature which suggests that instructors can be more efficient and more effective with their course websites by focusing on the basic course management features that students want while at the same time eliminating or reducing the more time consuming content students do not typically use. Instructors creating or maintaining supplemental course websites might be advised to start with the basics and build from there with periodic feedback from students. In terms of website content, more is not always better.

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[1] Chen, J., Ellis, M., Lockhart, J., Hamoush, S., Brawner, C., and Tront, J, "Technology in Engineering Education: What Do the Faculty Know and Want?" *Journal of Engineering Education*, July 2000, pp. 279-283.

[2] Dutton, J., Dutton, M., and Perry, J, "Do Online Students Perform as Well as Lecture Students?" *Journal of Engineering Education*, January 2001, pp. 131-136.

[3] Poindexter, S., and Allen, D., "Using the Internet in Your Courses: What Do Students Think?" paper presentation at *1999 Stop Surfing – Start Teaching National Conference*, Myrtle Beach, S.C.

[4] Schweitzer, S., and Reed, S, "Developing Effective Course Websites to Supplement Traditional Classes," paper presentation at *2002 American Society for Engineering Education Annual Conference & Exposition*, Montreal, Canada.

[5] Poindexter, S., Heck, B., and Ferrarini, T., "Hybrid Courses: Determining the Effectiveness of Using the Internet."

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Introductory Environmental Engineering," *Journal of Engineering Education*, January 2002, pp. 69-80.
[7] Poindexter, Heck, and Ferrarini.
[8] Schweitzer and Reed.
[9] Poindexter and Allen.
[10] Masten, et.al.
[11] Poindexter, Heck and Ferrarini.
[12] Schweitzer and Reed.
[13] Masten, et.al.
[14] Poindexter, Heck and Ferrarini.