Applications of WWW technology in teaching finance

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Abstract

In this article we discuss the need for a personal Web page in finance education, some of the ways Web pages can be used to benefit students, and present a survey of Web page use. We follow with a discussion of how to create and modify a Web page using commonly available computer programs. This information allows faculty the ability to provide valuable and timely information and materials for students. © 1999 Elsevier Science Inc. All rights reserved.

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1. Introduction: Why start a Web page?

In the spring of 1998, a class was informed that e-mail would be used in the fall semester to provide better communication between instructor and students. The students encouraged the instructor to use a Web page instead because it was much easier for them to access and use. They cited benefits such as: computer availability on campus, not needing access to e-mail accounts or software, ability to access course files as necessary on their own schedule, irregular checking of e-mail, and dislike of university e-mail accounts.

With this charge from the students the instructors decided to take action to create a Web page during the summer. One coauthor offered to set up a basic Web page for each of the Finance faculty. With a basic page, each faculty member was able to make changes to meet individual objectives. It was amazing that creating and maintaining a Web page was as easy as word processing.

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In the next two sections we present a review of the literature and discuss some of the ways we have used the Web pages to benefit students and faculty research efforts. In the fourth and fifth sections we present results of a survey and discuss examples and applications for teaching with Web pages. In the sixth section of the paper, we discuss creating and modifying a Web page using commonly available computer programs.

2. Literature review

The literature on the Internet is fairly recent, but rapidly expanding. In this section we review several current articles published in this area. Anthony Herbst (1996) presents an interesting discussion on the fundamentals of the Internet and describes the opportunities and challenges for financial engineers on the Internet. Russ Ray (1996), in "An Introduction to Finance on the Internet," presents a background on the history and evolution of the Internet, as well as providing a description of financial resources available. In "A Guide to Locating Financial Information on the Internet," James Pettijohn (1996) provides a guide and extensive list of financial resources available on the Internet. Brian Grinder (1997) discusses recent developments on the Internet and provides an extensive list of financial service Internet sites. Smith (1996) reviews the use of EDGAR as a resource for SEC documents and applications for classroom use. There are several additional articles that provide information about the use of the Internet in teaching and education in the accounting and economics areas [for example see: Agarwal and Day, 1998; Debreceny, Smith, and White, 1996; and Manning, 1996]. Most of these articles provide lists of finance-related Internet sites, many that can be described as extensive, but none can be totally comprehensive. The Web and the Internet are changing and expanding so rapidly that most lists of resources become incomplete as soon as they are published. In fact the Web becomes a natural resource for publishing lists of relevant links, since a Web page can be updated on a continuous basis. The purpose of this article is not to provide a long list of Internet sites, but rather we attempt to describe the benefits, uses, and applications available for a finance faculty member's Web page.

3. Web page organization and content

A typical method for organizing Web pages is to develop a simple home or index page that provides basic personal, professional, and course information. Then, each major topic area is a separate, linked page off of the main home page. Examples of linked pages include: separate pages for each course, pages for relevant links grouped by topic area, pages for class notes and assignments, schedules, resume, and so forth.

In teaching, common applications such as syllabi, lecture notes, schedules and class assignments are used. One of the most important elements to incorporate on a Web page is a continuously updated schedule. The class schedule links to information on class lectures, examinations, teaching notes, project and term paper assignments, and related items, for example, articles and sources of information on the Internet. Students have responded positively to these uses.

There are many other links that could be provided on the Web page. There are free databases and links to proprietary databases, for example, Moody's Online, and proprietary bibliographic research tools, for example, ABI/INFORM and ECONLIT. The proprietary links will usually require an ID and password to access, since most are available by subscription. Other links include interesting articles and recent reports on bank profitability, real estate lending, consumer credit, commercial lending, credit reporting and scoring, trusts, international lending, mergers and changes in delivery of products and services, and interest rates, stock prices, and domestic and international market indexes. Additional links include banking publications with free online access, for example, *American Banker*, federal and state regulators of depository institutions, and national and state trade associations for depository institutions.

For the study of financial markets, links include information on finance companies, life and property and casualty insurance, pension funds, investment companies, mortgage markets and securities, and stock, bond, options and futures markets. Most of the fact books and other data related to these areas had previously been obtained in hardcopy. From the Web page the latest information can be accessed very quickly at no cost and reduce the space needed for this data in hardcopy, as well as make this information easily available to students.

The Web page can be an excellent "Information Organizer." Examples include links to the most recent government statistical releases on interest rates and other market factors. These links often provide easily downloadable current and historical information. Many articles and reports by government bodies are now available on the Internet. Links to these sources of information can be developed easily by highlighting the article or statistical release title and typing in the address (Uniform Resource Locator or URL) for the respective data source.

Links to investments Web sites include individual mutual fund pages, financial markets (NYSE, AMEX, NASDAQ, CBOT, CME, etc.), brokerage pages, sources for quotes on various markets, as well as sources for obtaining firm specific financial information. Another common application is to provide current market index information regarding specific stocks or other financial instruments. These links can be organized or grouped as the instructor may desire.

There are many relevant links in the area of corporate financial management. The most obvious are links to the individual firm's Web pages, as well as government links, such as Edgar, the SEC, and proprietary sources, such as Hoovers (portions are currently available without a subscription). These links provide the annual and quarterly statements filed by each corporation.

In class, the Web page and another organization and access management tool (such as WebCT) can become a site for official course information. Students may be required to regularly check the Web site for course information or risk missing important information or updates on assignments, meetings, and data sources. Within a day of posting new information on the Web page, we typically receive feedback from students indicating their response to new information, as well as notification that they have passed the information on to their "technologically-challenged" classmates. For a "media enhanced" class, which might not meet regularly, this is an excellent communication tool.

The instructor may also post student grades continually updated throughout the semester

on the access protected Web page. The access management tool, WebCT, can be password protected, with a unique user ID and password for each student. This allows each student to login to his/her own secure area and view only his/her grades. Selected statistics on the exams, including mean, median, standard deviation, and a histogram can also be included. This facility allows each student to gauge how they performed relative to the rest of the class. Another vehicle for posting grades is to use an Excel spreadsheet saved as HTML. Saving the spreadsheet using random student identifying numbers as student ID's allows privacy in posting. Instructors can also provide graphs and statistics generated by Excel on the page. Examples of these applications may be accessed at: http://www.bus.ucf.edu/ssmith or http://www.bus.ucf.edu/michelson.

4. Teaching and learning with Web pages: a survey

After one semester of use our student evaluations contained several comments that the Web page and links were among the "most liked parts" of the course. The graduate students were even more emphatic about their approval of the Web page. Comments indicated that many graduate students planned to use these Web pages after graduation and that they would maintain a membership in the alumni association, since membership includes access to some of the proprietary links on the Web page.

We recently surveyed two classes of about equal size on the use of the Web pages and the results were very interesting and positive. The sample consisted of 90 students, with about 94% seniors and 6% juniors. All of the students were finance majors. The students indicate that about 45% of their university classes use Web pages. We found that 98.8% of our students use the course Web pages. The primary uses of the Web pages include:

Links 71%
Syllabus 80%
Download PowerPoint Slides* 80%
Project Instructions & Examples* 98%
General course information 56%
Other 12%
*These data are for one class only because this content is just provided in the one class and the statistic is zero for the other class.

The majority of our students (89%) found our Web page very easy to use and very helpful.[#] They indicated that the Web pages definitely provide additional material or content (81%).[#] On average these students used the Web pages 11–20 times during the semester and they accessed the Web pages one-to-two times per week. We found that 81% of the students "definitely like" the Web pages.[#] [#1 & 2 on a five point scale.]

Several students provided additional comments on their surveys; the following is a brief summary:

- "The Web pages are very helpful, especially for a night student that has very little access to campus during the day."

- "The links are great, they helped with job interviews."
- "The links were extremely helpful in this class and for other classes."
- "The links to the library resources were helpful as well."

The students also provided suggestions for improvement of the Web pages:

"Add more links to job sites for the banking industry."

"Post grades on Web page." (This is currently done in one class, but not in the other.)

"Provide more job and career links."

"Rearrange your Web page with the class information at the top.

The results of the survey indicate that students are very receptive to Web page use in our classes. They are extremely positive on Web page use, they use the pages frequently, they feel the pages provide valuable information, and they freely make suggestions regarding additional information to be added to Web page content.

5. Teaching and learning with Web pages: project examples

Within our finance department, four faculty members teach five different undergraduate and graduate courses in the financial services area. Some of these faculty members use the authors' Web pages as a resource for their classes. Projects are assigned and students are informed that they should review the authors' Web pages to access data sources that may be useful. Students from another class will often inform us that one of the links was not working. The link can usually be updated in a few minutes while the student is in the office. This is an opportunity to get feedback from the student regarding use of the information. Changes that will be useful to the students in the other classes are shared with other faculty so their students can be informed.

Another interesting side effect resulted from mentioning or demonstrating the Web page in interacting with area bankers. One bank has indicated that the Web page has been recommended as a resource to some of its employees. As a consequence, a bank research analyst advised us of additional potential sources of information.

Three examples of using the Web page in class projects will be described. The first is a term project that requires the student to conduct a financial analysis of one of the top 100 U.S. bank holding companies (BHCs). Each student selects a different BHC. The project introduction material is presented with "Measuring and Evaluating Bank Performance" in a Commercial Bank Management class. The project provided realistic applications in the course material using real BHCs to lay a solid foundation for more specific topics discussed later in the course. The students present their analyses allowing comparisons among BHCs with respect to lending portfolios, fee income sources, funding sources, capital adequacy, and market measures of risk and relative values over time.

The following discussion highlights areas within the project that describe links to other information in the Web page and outside resources. The project utilizes different reports from the Federal Reserve System's National Information Center of Banking Information (NIC) at <http://www.ffiec.gov/nic>. At this location click on the Top 100 Bank Holding Companies to pick one of the bank holding companies. To obtain the Performance Report—*Summary*

Ratios for BHCs for the BHC, under Type of Information, select Performance Ratios and the latest end of year date, for example, 3/31/99, then submit. The summary ratios for 3/31/99, 12/31/98, and 3/31/98 should appear. The students are required to attach this information as an appendix to the project. The students also print out and save to disk additional reports for the company that will be used later in the semester for lectures and daily exams. These reports and examples include consolidated balance sheet, consolidated income statement, securities, loans and lease financing receivables, and deposit liabilities for the last four quarters.

The students retrieve a Company Profile from Yahoo. Using an internet browser, for example, Netscape, they enter the address http://biz.yahoo.com/p/first letter of TICKER/ TICKER.html. The TICKER refers to the company's stock trading symbol, for example, STI for SunTrust Banks. For example, for SunTrust the address would be <http://biz.yahoo.com/ p/s/sti.html>. A two-page company profile should appear. A small stock performance chart appears at the end of the Profile. When students click on the chart and 1 year link it produces a large chart of the company versus the S&P 500 Index. The profile and the chart are required to be included as an appendix to the project. Students are required to deliver a formal presentation and a written report.

This project has evolved over time. In 1996 this project was similar to a project for nonfinancial companies that is described in one of the first articles about using the internet to teach finance and business classes (S. Smith 1996). The project was limited to producing financial ratios from information in the company's 10K annual reports or the 10Q quarterly reports and analyzing the performance of the company over time. There were no peer comparisons and the relative market performance analysis was less detailed. Using the National Information Center data, the information is much easier to obtain because links are provided for specific reports and a standardized form is used for all the BHCs, unlike the 10K and 10Q reports. Most of the common ratios that are used in banking analysis are provided for different time periods with peer group percentiles and means relative to specific banks. The Yahoo link mentioned earlier, http://biz.yahoo.com/p/first letter of TICKER/ TICKER.html, allows comparison of betas, price/book and price/earnings ratios, and graphic comparisons of the stock performance against the S&P 500 Index over various time periods. As the World Wide Web evolves, additional sources become available offering the potential for improved data, leading to better project results.

A second project example includes using Web page links to describe the project and to access available proprietary databases of the library. This project requires the student to prepare an outline or paper on "Management of a Financial Product or Service." Each student selects a different product. The major sources for recent articles and reports is *FirstSearch*, which allows access to different bibliographic search tools such as ABI/INFORM, BUSINESS & INDUSTRY, WILSON BUSINESS ABSTRACTS, ECONLIT, and so forth. The major type of search is based on key words related to the selected topic. These search tools provide very current information on most of the major practitioner and academic publications in the financial services area. The objectives of the project are to gain a deeper understanding of managing a specific financial product and to learn how to conduct research using more advanced research methods. Before this project, most students think that research is using a common search engine like Yahoo. They are very impressed with the power of the

bibliographic search tools. At the graduate level, an interview with an executive related to the product is also required as part of the paper.

A third example in the financial services area is to have students select a money market instrument, predict a future growth rate or price based on a financial model developed by the student, and track the performance during the semester. The prediction models are usually based on one or more financial instruments or economic data, employing a regression model using one instrument's interest rate as the independent variable and the selected instrument's interest rate as the dependent variable. Web pages are used to provide links to up-to-date databases for this information. Online Federal Reserve Statistical Releases *(http://www. federalreserve.gov/releases)* are often current within one business day and historical interest rate information can be easily downloaded for research purposes.

A question typically asked is, "How much time and effort does this take?" The initial creation of the Web page takes very little time and is discussed in the next section. One can add to the Web page over time as schedule and opportunities allow. Adding one or a few links takes very little time. When a faculty member or student has a question, it is typical that we access a link on our Web pages for a source of information. The Web pages have become a library and information organizer. As components are added to the Web page, the benefits are more than worth the small investment of time.

6. Designing and maintaining a Web page

One intention of this article is to provide information to allow faculty to easily design and maintain a Web page. The authors, working together, were able to use these methods to allow a "Web novice" to quickly navigate the learning curve and efficiently design his first Web page.

The first thing to consider when developing a Web page is what editor to use to create the page. In other words, what software will actually put the words, pictures, and graphics on the page?

There are many choices in software, but the first that come to mind are Microsoft Word, Netscape, and Microsoft FrontPage. While FrontPage is an extremely powerful Web page editor, we will not discuss it in this article because it has a steeper learning curve. That leaves MS Word and Netscape, fierce competitors, but similar in use and application. We suggest the use of MS Word for readers who anticipate that their Web page will be viewed more frequently by Internet Explorer. For those who expect Netscape to be the primary browser, we suggest that Netscape serve as the editor. Note that good Web page design calls for testing the Web page for accurate viewing under both Internet Explorer and Netscape.

We begin our description of creating a Web page by using Netscape as the editor. The application of Word will be very similar in principle. Several key points or questions to consider when designing a Web page layout:

- What is the important, relevant information to include on the Web page?
- Consider the content carefully to avoid a cluttered page.
- Design the page for efficiency and ease of use.

- Be aware of the loading time for modem users. Pictures, sound files, videos, and Java script may load very slowly over a 28,800 baud modem.

With Netscape version 4.01 (or higher) running, go to *File, New, Blank Page (or Page from Template or Page from Wizard).* [The standard notation for this article will use italics for commands to select from the editor.] This will produce a blank page to start editing. Now simply type in the content on the new page. Typical pages include name, position, contact information, course information, brief resume, and links to other pages. For now, don't worry about formatting; simply type in the content. Also notice that it is necessary to press enter at the end of each line, since the editor does not "line-wrap" automatically.

Web page design templates are also available using most editors, including Netscape, Word, and FrontPage. Usually they provide a content outline, a graphical background, and preformatted pages. Many universities also provide templates for faculty use to allow standard formatting across all university Web pages.

Next, format the page similar to a word processing document, with a few differences. To make the page clear and easy to read, make the font large and provide plenty of white space around the text. First (with the mouse) highlight the text that forms the title of the page, then click on the desired font size. Notice that in some programs the selection is for actual point size, although in others the font choices are limited to small, large, extralarge, and so forth While the text is still highlighted, click on the icon for bold text and the icon for centering text (under alignment). If the icons are not apparent, these commands may be found under *Format* on the tool bar. To change the color of the text as desired, click on the color icon. Now format (size, typestyle, bold, italic, colors, centered, etc.) the remainder of the text in a similar manner.

With this work completed, the next step is to save the page. Go to *File, Save As*, and then name the file. Most Web file servers have a required default name for individual home pages, such as Home.HTML or Index.HTML. Check with the institution's resident Web manager or technology resources personnel for this information. The Web manager may also specify a location (or folder) to store (save) files. Note that Netscape asks for a title the first time the file is saved, and this title will show up in the title bar of many Web browsers.

Netscape has a nasty habit of occasionally changing the file name or location when saving an existing file. For this reason, we recommend always saving Web pages using *Save As*, rather than *Save*, to verify that the file name and location are correct.

If the Web operating system is Windows 95 or Windows NT, save the file to a folder as described in this article. If the operating system is Unix, readers will probably need to use FTP to transfer the file to proper directory for Web server access. Even though this is an extra step, the Windows version of FTP (file transfer protocol) is fairly easy to use.

Once the Web page is closed, to make further modifications click on *File*, *Edit Page*, while viewing the Web page in Netscape. Note that this method may be used for editing the page any time in the future.

Now it's time to dress up the Web page. Readers may want to link specific words in their Web page to another Web page. Highlight the designated text then right click the mouse. Choose the selection "*Create link using selected*," then fill in the input blank ("*Link to a page location or local file*") with the Web page location, for example, *HTTP://WWW.UofS.EDU*.

Now the designated text should be a different color and underlined. Scroll the mouse over the text to see the link location at the bottom of the screen. Alternatively, highlight the text and then click on the Link icon and follow the steps above. Another method to add a new link requires clicking on *Insert, Link*, and then filling in the input boxes for "*Enter text to display for new link*" (this is the actual text to link on the page) and "*Link to a page location or local file*" (the link location). Readers can use these same methods to link to other pages, for example, individual course pages, other Web pages, link pages, or links to take browsers back to department or college pages.

It's also easy to add a graphic or picture to a page, perhaps a graphic of the school's mascot or insignia. First obtain a copy of the graphic or picture, which are normally in GIF or JPEG format. These are standard Web page graphic formats and are usually not very large files. Copies of the GIFs or JPEGs are typically available from the Web manager or by copying. To copy them, go to the Web page with the graphic, then right click on the graphic and click on "*Save Image As*." For the file location, specify the same folder that contains the personal Web page. Now that the graphic is in the correct folder, position the cursor on the desired location of the personal Web page to place the graphic. Click on the Insert icon and either type in the file name of the graphic (*under "Image location"*) or use "*Choose file*" (much easier) and highlight the name of the graphic. After closing the input box, the graphic should appear. Note that images may also be linked to another page or image. To do this, click on the "*Link*" tab (while inserting the image) and fill in the "*Link to page location or local file*" input box. When one clicks on the graphic (and the cursor changes to a hand), the graphic can be appropriately placed on the Web page. Note that when moving the cursor to the edge of the graphic, it changes to a two-sided arrow that allows for resizing the graphic larger or smaller. Right click on the graphic, select *Image Properties* and the *Image* tab, to select choices with respect to text alignment and text wrapping.

To further improve the Web page, dress up the background. Right click a blank area of the page and select *Page Properties* and *Background*. From this input box select the background colors and designs or a graphic GIF or JPEG if available. One can also access the same background menu through *Format* and then *Page Colors and Properties*. Remember that the background should not be so cluttered as to interfere with reading the content. As a final reminder, remember to save the page frequently to avoid losing work. To view the completed Web page, exit from the Netscape editor then go to *File, Open Page*, specify the file, or *Choose File*, check the *Navigator* blank and view the new home Web page. For an example of a completed page see either http://www.bus.ucf.edu/ssmith or http://www.bus.ucf.edu/michelson. Recall that to edit the Web page further, click on *File*, *Edit Page*, while viewing the page in Netscape.

7. Conclusions and recommendations

This article provides information on uses and applications of Web pages for finance education. Suggestions are provided for class-related use and three example class projects are described. The results of a survey of students indicates that the majority are receptive to Web page use, found Web pages helpful and easy to use, and encourage faculty to develop

additional Web page applications. Our survey results suggest that students want faculty to utilize the Web for distribution of information and for providing relevant resources. Faculty members who are hesitant to incorporate course Web pages and resources in their classes may be in danger of not staying current in their teaching.

In this article we also provide the information necessary for someone new to the Web to easily develop a basic Web page. It is impossible to cover all of the many facets of Web page development without unduly complicating this discussion. There are many manuals on Web design and development available in the bookstores. Therefore we have subscribed to the principle of "keep it simple" to allow the reader to quickly develop his/her own Web page. This knowledge will allow the reader to provide valuable and timely information and materials to their students now!

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