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Web-based Instruction: Why and How Faculty Should Get Involved  
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### Abstract

Faculty across higher education campuses are being encouraged to integrate technology into their instruction, especially use of the Internet and the World Wide Web. But is there really a market demand for this type of instruction? And if an instructor were to develop such materials, where should he or she start and what would be some important components. This paper addresses these issues.

### Web-based Instruction: Why and How Faculty Should Get Involved

Faculty across higher education campuses are being encouraged to integrate technology into their instruction. Of special interest is the integration of the Internet, or more specifically the World Wide Web, into classroom activities. The traditional media of lectures, books, journal articles, and conference presentations as sources of academic information are being challenged (or perhaps enhanced, depending upon one's perspective). At issue is whether or not Web-based instruction is a viable alternative, and if so, how Web-based materials should best be integrated into course delivery. More specifically, the issue is how best to use these media to provide learners with opportunities to acquire the important content and skills identified by the instructor.

The purpose of this paper is to review some of the literature on the growth of the Internet and report on the development of materials used in undergraduate and graduate Web-enhanced courses in the area of educational psychology.

#### Is There A Reason For Publishing On The Web?

One of the first issues to address is whether or not to even attempt to develop materials for Web-enhanced or Web-delivered courses. When one looks at the rate of growth of the Internet and the Web, the answer to the question of whether or not there is really a market demand for this type of instruction is a resounding yes.

The Internet and the Web are growing at an exponential rate (Rai, Ravichandran & Samaddar, 1998). According to Reed (1998), the Internet is expanding at an annual rate of 1000%; there will be 200 million computers on the Net by the middle of 2001. The number of people using the Web is likely to grow from about 51 million in 1997 to 174 million by 2001 (Meyer, 1999) and then double again in the next two years. In addition, with the advent of

WebTV, anyone with a TV can access the Web using equipment that costs about \$250 (Philips Magnavox WebTV Plus Internet Receiver, 1998).

In addition, the speed of access is increasing rapidly. Most home users are accustomed to rates of transfer of 28K or 56K. On many networks the rate is double or even triple that speed, but cable modems will offer a transfer rate of 10 times faster (McCracken, 1999). These are now available in most metropolitan areas and will be widely available within the US in the next two years. Satellite dishes offer similar download speeds for users in rural areas (Kassel, 1998). However, by 2004 an asymmetric digital subscriber line (ADSL) will offer speeds triple that of cable modems (Hesseldahl, 1999).

University systems are gearing up to take advantage of this new technology for online course delivery. Connecticut (Jakups, 1999) and New Jersey (Virtual higher education, 1999) are only two of the most recent entries. Connecticut's system allows for five-way video conferencing with the other state universities while New Jersey's system provides an on-line index of higher education distance learning courses offered across the state.

Probably one of the most ambitious projects to date is [Western Governor's University](#), a consortium of 21 universities and corporations that will provide course work exclusively via distance learning (Blumenstyk, 1998; Long, 1998). They have recently expanded the institution by joining with the [US branch of Britain's Open University](#). [The Open University](#) was founded in 1969 and provides video and Internet-based courses to more than 200,000 students around the world (McCollum, 1998). With the increased demand for delivery to meet the demand of life-long learning opportunities (Paye, 1995, 1996), there should be no doubt that Web-enhanced

classroom instruction and Web-based distance learning will be an established fact in just a few short years.

A second reason to publish material on the Web is the same reason scholars publish in journals, present at conferences, and write books: influence. Dawkins (1976, 1982) suggests that the meme (an idea with the capacity for self-reproduction) is the sociocultural equivalent of the gene. Just as genes carry the information that makes living organisms possible, memes carry information that makes societies and cultures possible. Scholars want their ideas, their memes, placed into the flow of information exchange in hopes that they will influence the knowledge-production process.

Traditional publications are isolated pieces of information resources that must be physically accessed to be used. Full-text publishing of paper-based journals is a step in the right direction, but if an article can only be accessed via a subscription service the general public is left out of the information-exchange loop. While this may be fine for esoteric subjects in which the public has little interest, the fields of psychology, business and industry, and education certainly have broad appeal. If academicians desire to have their memes enter the information-exchange arena, they must make their materials available via the Web. For example, this short paper has over 30 references, yet each one is available either directly via the Web or as a full-text article through [Galileo](#) (1995/1999), an online service to multiple databases such as Periodical Abstracts or ERIC. The difference is that everyone has access to the materials published via the Web; only those subscribed to Galileo or a similar service can directly access the other materials.

Accessibility will be increasingly important in the near future. Goertzel (1998) is only one of a number of researchers who are developing software that will analyze Web-based information.

His program, called Webmind, analyzes both text and numerical data to bring order to data and assist in making decisions. This is one of the first forms of intelligent agents that can analyze information according to a specific set of criteria, thereby turning information (raw data) into knowledge (understandings or concepts).

Kurzweil (1999) suggests that this ordering of information into concepts and principles, especially involving abstractions that makeup society and culture, is what has given human beings an evolutionary advantage. We are able to do this because of our superior neuronal capacity, about 1000 trillion neuron connections for an individual human being. A \$1000 desktop computer will achieve this capacity within the next 25 years. Given its superior processing speed (the silicon equivalent of a human neuron will process information a billion times faster in 2025), the computer will eclipse the processing power of a single human brain in a relatively short time. In fact, Kurzweil claims that a single desktop computer will have more processing power than all human beings on earth by the end of the 21st century. And that is only if we consider digital computing; when quantum computing is considered the results are even more startling.

In my opinion, the exponential growth in the number of computers and Internet users combined with the increased speed of access and the potential for substantial increases in computer-based decision making, point to the need, even demand, that scholars present their ideas, their memes, via the Web if they desire to have anything more than peripheral influence beyond the narrow academic community.

### Portal versus Web Site versus Web Page?

After making a decision to get involved in Web-based publishing, the first issue to consider is what to put on the Web and how to organize it. There are at least three different levels of Web materials to consider: portals, Web sites, and Web pages.

A portal is really a connecting system. A user goes “through” the portal to Web sites of interest (The great portal race, 1999). There are generally activities associated with the portal such as e-mail or bulletin boards, but the real benefit is to connect quickly with quality sites. For example, the Western Governor’s University is a portal to distance learning courses offered by faculty at various institutions. [Educational Psychology Interactive](http://chiron.valdosta.edu/whuitt/interact.html) [http://chiron.valdosta.edu/whuitt/interact.html] is my attempt to provide a portal for course offerings in educational psychology. While the majority of links are to resources I have developed, two other faculty’s materials are also linked. The idea is to eventually provide a single starting point for all of the Web-based material for VSU educational psychology faculty. Of course, this portal can grow even more, offering links to educational psychology courses offered by faculty at other institutions. In any case, a developer should either develop a portal for their materials or make certain their materials are tied to someone else’s portal. Otherwise, access by outside sources will be drastically reduced.

The second level to consider is the development of a Web site that includes access to multiple Web pages. Each Web site is generally controlled by a single individual (called the Webmaster) and, in my opinion, should be the minimum level considered. Considerable thought must be given at the initial stages to the development of a site, as the number of pages is likely to grow very quickly. One of the major advantages of using a program such as [Microsoft Front Page](#)

[<http://www.microsoft.com/frontpage/>] is that it assists in the Web site management process. One of the most important Web site management issues is directory structure. A minimum might be a subdirectory for each course to be developed and a subdirectory for common files such as image files and icons. It is probably best to develop additional subdirectories for each topic in each course.

The third level is the development of the Web page itself. Each Web page contains text as well as links to other materials such as other pages, graphics, or audio or video files. It is the linking of multiple pages in a hypertext manner that makes the Web different from print sources. In addition to links to other text, links can provide access to graphics, sound, and video sources. . For example, my [home page](#) provides access to major sections of my web site including the including the Educational Psychology Interactive portal and an organization of links related to psychology, education, systems theory, and other topics in which I have an interest. Developing a single Web page is relatively easy with a program like Front Page; it is the integration and connection of Web pages that is the real challenge. Miller (1999) states that the most important issue in Web page design is proper use of the medium's interactivity.

I believe that considerable thought must be given to the development of a template that can serve as a foundation for each page. Each page should have a common "look and feel" because too much variety can be distracting. Each page should also have a link to at least one other page on the Web site; no page should "stand alone."

In general, the material on any given page should provide an overview of the topic; too much detail will not be read. I have found it is best to refer students to copied articles or a book for required detail. Care must also be taken with the use of graphics or other materials that require

long download times: if it takes too long users will simply skip to the next resource. For example, the page "[Why Study Educational Psychology](#)" provides some basic definitions and some links related to educational psychology. Additional required material in the textbook is identified in the syllabus and optional material is linked at the bottom of the page. A link to a Power Point presentation on this topic is also provided.

When considering whether to use books, articles, or the Web for presenting information, one might want to consider the following advantages and disadvantages.

[Place Table 1 about here]

One of the major advantages of books is that material is covered in both breadth and depth in an organized manner as well as its ease of use. I personally do not see the option of a “paperless” course occurring anytime soon for courses that are “content-dependent”. Computer displays still cause eye strain if viewed too long and even a 5 lb. portable computer is too heavy to be carried as conveniently as a book. However, the cost of publishing a textbook and the limiting linear format are major disadvantages. When exploration of a topic or application of concepts or principles in a decision-making process are the primary objectives, the disadvantages of books may outweigh their advantages.

Journal articles and paper presentations offer the same advantage of ease of use if they are readily accessible. In addition, they can provide an in-depth coverage on a specific topic that is difficult to provide in any other format. Research reports or comprehensive reviews of the literature are probably still best done in this format. Again, however, the cost of producing traditional journals is a major disadvantage (Walker, 1998). In addition, the time it takes to select desired papers and the discontinuity of topics covered often leaves gaps of important material

that the instructor must fill. In addition, if students are off-campus and do not have access to required materials, relying too much on articles to convey required information can leave students at a significant disadvantage.

Web-based materials, at a minimum, provide easy access to those with proper equipment. Access is increasing exponentially and in a few short years should not be an issue. If properly linked, Web-based material provides a breadth of coverage through hypertext connectivity that is unparalleled in the print world. In addition, the opportunities for interactivity and multimedia presentations are simply not possible in print, although they certainly are standard in traditional instruction. For me, the challenge is to provide the same or better quality interaction that a student and instructor would have in a small traditional classroom. The disadvantage of quality variance can be overcome by either the instructor selecting certain materials or teaching students to search for quality. The disadvantage of a lack of depth of individual Web-pages can be overcome by supplementing instruction with books and/or journal articles or by linking materials together so that depth of coverage is provided.

One of the major advantages of developing Web-based course material is the ease with which it can be modified. In a traditional lecture course, an instructor simply collected important information and put it in a lecture format. Until recently, instructors could utilize the same notes for a decade as college textbooks changed little (Anderson, Benjamin, & Paredes-Holt, 1998). Gathering new information was a laborious task, often requiring days spent in libraries thumbing through indexes of periodicals. With today's text publishers printing new editions every three to four years and easy access to full-text on-line resources such as [Galileo](#) (1995/1999), instructors are expected to update materials much more often. With the popularity of Web-based publishing,

the volume of material that can be accessed is sometimes overwhelming. Nevertheless, instructors are expected to keep up with an ever-increasing volume of information.

One technique that professors now use is to identify and quickly review full-text articles on a topic they are researching. If an article looks interesting it is saved to disk for perusal at a later time. Using a utility such as [SeekEasy](#) (1999), one can search for particular topics, phrases, authors, etc. within each document on a disk or a particular subdirectory. This can save a tremendous amount of time compared to the former technique of copying articles and then trying to remember what point was made in which article one read a month ago. Teaching this technique to students can reduce the amount of time they need to complete course requirements.

You might also want to collect data on who accesses the Web site or specific Web pages. Using a Web-based statistics program called [ShowStat](#) (1998), I found that most of [the hits to my home page](#) were actually generated from within my Web site. That is, people were first accessing a particular Web page within my site and then linking to my home page for further exploration. When I developed statistics for individual pages, I found that my pages were being accessed mainly from the [Yahoo](#), [Infoseek](#) and [AltaVista](#) search engines. Yahoo and Infoseek are actually portals; that is, they categorize and classify material rather than simply engaging a raw search. Altavista is a search engine developed and owned by Yahoo. This means that my material is tightly integrated into the most widely used alternatives for searching for Web material.

### The Ideal Syllabus

One example of how a Web-based presentation can be an improvement over a paper-based presentation is in the development of a syllabus. Garavalia, Hummel, Wiley and Huitt (1999) showed that both faculty and students preferred a more comprehensive syllabus. However, it is

easy to overwhelm students with too much information that may be beneficial, but must be provided in a timely manner. The syllabus I provide students looks like a standard syllabus when printed on paper. However, the Web version includes links to many of the features that student desire: detailed course objectives, basic format of examinations, detailed descriptions of out-of-class activities, and samples of required papers and projects. Students are shown the links at the beginning of the semester; they can then refer to the materials at the time they are needed.

### Summary and Conclusions

In summary, it appears as if Web-enhanced and Web-delivered courses are an idea whose time is come. The computer technology, connectivity technology, administrative interest, learner demand, and development software are all coming together to make this possible. In ten years there may still be a demand for the traditional time- and geography-based instructional format with which we are familiar today. However, the demand for just-in-time or learning-on-demand educational opportunities is destined to grow, while the traditional large-group lecture-method is likely to decline. Instructors who get started now will simply be riding a wave that is destined to impact everyone's lives.

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Table 1. Advantages and disadvantages of books, journal articles and Web-based materials

	Advantages	Disadvantages
Books	Depth of information coverage Organized presentation Breadth of coverage Ease of use	Cost Linear presentation format
Articles/ Papers	Specificity Depth on specific topic Ease of use	Cost Access (especially for off-campus) Discontinuity Selection
Web	Access Connectivity (Hypertext) Breadth Multimedia Interactivity	Quality variance Individual Web pages lack depth