A PROTOTYPE HTML TRAINING SYSTEM FOR GRAPHIC COMMUNICATION MAJORS

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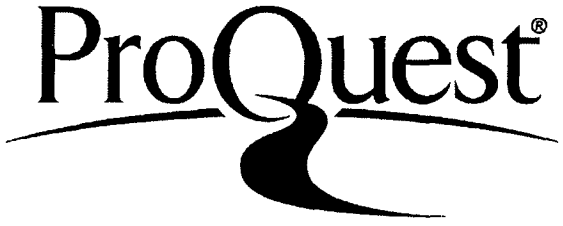
A Dissertation Submitted in Partial
Fulfillment of the Requirements
for the Degree of

DOCTOR OF EDUCATION

Department of Curriculum and Instruction

ILLINOIS STATE UNIVERSITY

2010



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207 Pages November 2010

This design research demonstrates a prototype content management system capable of training graphic communication students in the creation of basic HTML web pages. The prototype serve as a method of helping students learn basic HTML structure and commands earlier in their academic careers.

Exposure to the concepts of web page creation early in their academic career allows more time to hone their newly acquired skills, prior to joining the work place. Students with experience in creating web pages may be placed in careers that require them to work in one of the many tasks required in web page development. Their experience in creating web pages can prove to be an asset if this is the path their career takes.

The study involved the creation of a self-guided HTML training system that provided module-based instruction on devel oping webpages using HTML and Adobe® Dreamweaver®.

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ACKNOWLEDGMENTS

I would like to thank my committee members for their patience and understanding in helping me to complete this long quest for a terminal degree. I appreciate Dr. Bassoppo-Moyo for his expertise and guidance and Dr. Al-Bataineh for his time, vision and insight. I thank my family, specifically my wife, Joyce and my children, Jessika and Taylor, for all of the understanding you've given me, as well as the support that only you could provide. I look forward to making up the time with you that I missed while completing this degree. I would like to thank Dennis Carson for his years of mentoring me in both teaching and life. I would like to thank Dr. Mandeep Singh for understanding, guidance, ability to keep me focused on the goal and most of all, friendship. Above all, I would like to thank Dr. Rhodes who worked with me on countless occasions and always made me feel that I could accomplish this goal. I was always treated with respect, commitment and compassion by Dr. Rhodes. Dr. Rhodes should truly be considered the educator we should all aspire to be.

R. L. R.

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CHAPTER I

THE PROBLEM

Introduction

The print industry is an enterprise that must adapt to new technologies in order to stay competitive in the global marketplace. Traditionally, jobs found in the industry have fallen into three basic categories: 1) prepress, which prepares a piece for printing, printing, 2) where the final image is transferred to some type of substrate such as paper, and 3) bindery, which is virtually any work done to a printed project after it has been printed, such as cutting, numbering and collating (Cutshall, 2002). Dharavath (2003) suggests another job category- that of print management.

The print industry has made some notable adaptations. The industry now encompasses multimedia and design, such as web page development, animations and instructional design, direct imaging, including digital photography, digital illustration and video production, and the replication of graphic images and pages, using methods that include screen printing, offset lithography and gravure printing (Cutshall, 2002). As the tools used in the development of printed pages has evolved, so have the range of uses. Photographic processing that used to be quite time consuming in the darkrooms of yesterday now only take a few minutes

in an image-editing program. With the right tools, the product to be printed can be outputted directly on film, on a printing plate or directly to a digital printing press.

According to Wilson (2001), when it comes to dealing with technology, the print industry is in a constant state of change, which is further complicated by the fact that not all industries readily accept an advance in technology. Companies involved in the graphic communications industry may choose to stay rooted in traditional technologies instead of embracing advancements in the industry.

Performance Problem

The instruction of students majoring in Graphic Communications in higher education must also be responsive to the advancements in the industry as well as continue to teach traditional printing skills. As the industry changes and develops, the curriculum and the instruction must also reflect these changes.

An exhaustive literature search of performance problems involving graduates of graphic communications programs returned no results. In response to this lack of available literature, a survey of graduates of a graphic communications program was conducted to assess if they believed there were shortcomings in their own skills after graduation. Appendix A includes a copy of the survey instrument administered to a small group of graphic communications major and minors of Western Illinois University. Respondents were asked what skills should be enhanced in the university's graphic communications program. All of the survey results are listed in Appendix B. The responses were analyzed to see where graduates believed weaknesses in the program existed. Of the 22

responses, six mentioned the need to gain more experiences in the area of web page design and development. Respondent comments included:

> **Josh:** Web page development and design, Multimedia development (Flash®, Director) Of course I just minored in GCOM so didn't take every class available.
>
> **Brian:** More Web Design built into program
>
> **Mohammed:** Web Design, Actionscript
>
> **Patrick:** More work with Flash® and Dreamweaver®
>
> **Brooke:** Everyone is looking for web designers! Maybe a web design class could be offered in the earlier level classes so the concept could be learned more in-depth.
>
> **Don**: ...In the web aspect, I would have a CSS class because it seems that is getting more and more popular in the web environment. I don't know if we had a class like that or not, I cant remember, I was taking 19 hours with 2 web classes at that time that I got D's in. So, I didnt know my ass from my elbow that semester. Also HTML codes must be known. At least basic codes, because not every company uses Dreamweaver®. Tables, style sheets and basic html are good things to know.

Based on the survey responses, some graduates believed that there should be more focus put on hypertext markup language (HTML) and the creation of web pages. HTML is the language used to build web pages (Niederst, 2003). While it is not considered a program language, it does provide structure and layout information to the web browser.

The current program at Western Illinois University has a single, upper-division course that focuses on the use of Adobe® Dreamweaver® and Flash®. This course is required for those pursuing a degree in Graphic Communications. An additional class that utilizes more advanced skills in the use of the web (such

as web forms, dynamic web pages and databases) is also offered as an elective. Both of these courses focus on Web site creation and development and are offered as senior-level courses. Some of the respondents to the survey believe that these website creation skills should be introduced early in their academic careers and that these skills should be expanded upon throughout the Graphic Communications program.

Educational Challenges

The survey suggests a variety of performance problems experienced by the respondents as practicing professionals. Some respondents mentioned the desire to have additional courses in software skills that focus on digital imaging (Adobe® Photoshop®) and illustration (Adobe® Illustrator®). Others would additionally like to have courses in pre-press and press operations. Several of the respondents felt they would be better prepared for the workforce by having World Wide Web skills introduced earlier into their academic careers.

The Accrediting Council for Collegiate Graphic Communications (ACCGC) deals with accrediting graphic communications programs that offer Bachelor's degrees in this discipline. According to the criteria established by the ACCGC, the courses currently offered at Western Illinois University are in alignment for accreditation and reflect what is currently expected from an accredited graphic communications program. Based on these accreditation standards, there are no curricular deficiencies. As with many universities, however, the curriculum is often slow to reflect the changes and trends that are occurring in the industry,

suggesting the performance problems students are having relates more to the instruction than to the curriculum.

To alleviate the problem with fitting web content into the curriculum at an earlier stage, the survey asked respondents what the likelihood was of their completing modules designed to enhance their skills in the industry even if they were not going to receive credit for completing the modules. The following are the results of that question:

> **Josh:** Most definitely, especially now, with my job I know I could have used more drill and practice and learning skills.
>
> **Brian:** Yes, any additional course material would be useful.
>
> **Brooke:** Yes
>
> **Diane:** Yes I do - if my schedule would have allowed it. I love the printing industry and am pretty fascinated by it.
>
> **Nicholas:** No, because you don't as a student believe that enhancing your skills in say Photoshop® are necessary. As I look at it today, I wish I knew everything about the program. I have used it for about 9 months on a daily basis and still only know about 80-85%. Honestley the G-comm classes, are by far the most time consuming classes that i have taken to date. Asking a student to take more time out of a project filled schedule would take too much time for a student with a full school schedule.
>
> **Shaune:** As a student that entered into the department with little computer and graphics knowledge, no. However, it is necessary information that is needed.
>
> **Brandon:** Looking back, I wish we would have done something similar as I wish I could have learned so much more. It's different with graphics people as you have to love what you're doing and the programs you use. In my case, I loved the design side of the curriculum and would have jumped on any chance to dive deeper with Illustrator®, InDesign®, and Photoshop®.
>
> **Dawn:** Yes.

Adam: Truthfully...no. The "want" to learn can only push a college student so far. The credits helped drive the "want". Does that make since?

Christy: Yes, when I was in school with graphic design I loved new challenges. There is just a huge amount of different skills learned at other schools that I found that I didn't possess b/c I never learned them. I would definately complete learning module

Nannette: Yes

Steven: It would depend on the content of the module, but I would certainly look at them. If it was an area I didn't know, or felt I could improve on, I would have completeed them.

Patrick: Depends on the content and subject matter, if interesting YES!

Don: Without a doubt.

Jennifer: I think so. I was very interested in my major and doing anything extra to enhance my design ability. I belonged to AIGA for one semester, and I wished that the club was more active. The more practice for "real life" situations, the better. The internship was very beneficial.

Mohammed: Yes

Jeff: I would have personally. I have created several modules as a teacher. There are benefits and disadvantages. Benefits include: the ability to explore in more depth than regular classroom instruction can allow; a big disadvantage can be the motivation level of the individual as you can only get out of it what you put into it. A tendency with the modular approach is to simply computerize the experience. Every attempt should be made to use hands-on experiences as much as possible. This is why I came away from WIU with such a rich experience that lecture, books, etc, alone can not match.

Gary: I think so.

Andrew: If I thought that these modules would help enhance my career after graduation. Also, if the modules were offered at times that didn't interfere with my other GCOM classes.

From these results, it would appear the majority of respondents would have completed the modules if they were offered even if they would not receive credit for them. Some respondents felt the modules would not have been

appealing because they did not value the information that could be gained by the modules. Respondents also felt the topics must be interesting and that they should be offered when it is most convenient for them.

Instructional Problem

In many cases, students do not realize they have any skill deficiencies until they have been exposed to the working environment. From survey comments, students who have graduated from the Graphic Communications program at Western Illinois University feel the use of HTML should be a more pronounced part of the educational model in the graphic communications discipline. At this university, students feel they are not adequately prepared to deal with the demands of the job market and are not as competitive as they could be if they had more experience developing and maintaining web sites. Graduates should be able to feel comfortable as they gain experience developing web sites.

The Graphic Communications program at this mid-western university has a problem of opportunity. Although the curriculum is aligned with those required by an accrediting agency, the instruction being provided to these students should be refined to offer them the opportunity to learn and develop web skills earlier in their career. If the students were introduced to these skills earlier, they would have the opportunity to practice and develop these skills throughout the rest of their academic careers.

From a curricular standpoint, students of this Graphic Communications program are all expected to complete the same coursework while working on their degree, with the exception of some elective courses. However, the course

work may not be relevant to the career choice the student is pursuing. Because of limited resources, both in equipment and faculty, some of the skills that would be beneficial to students are ignored and remain underdeveloped.

The small number of faculty, three serving over 120 majors and over 40 minors, makes it difficult to have time in the curriculum to give students a broad understanding of all the facets of the printing and publishing industries. Instead of being able to help students develop new skills, faculty is put in the position of focusing on the broader traditional skills. By having students learn and develop new skills, the graduate will be able to better compete for jobs in the graphic communications area as well as be candidates for jobs in other information technology (IT) fields.

This study focuses on dealing with the issue of learning to create and publish web pages to enhance the skill set of students in the Graphic Communications program at Western Illinois University. As such, this context-specific problem needs to be resolved through the development of a self-guided HTML training system. The creation of such a training system would assist in alleviating the following issues:

- Current curriculum cannot support the additional courses needed.
- Students enrolled in the Graphic Communications program experience skills-based learning in all courses in the major and therefore expect to be able to experience skills-based learning in all facets of their graphic communications education.

- The need for graduates to acquire the necessary skills to be successful in the workplace.

Objectives of the Study

The following are the objectives for this study:

1. Identify the optimal self-guided HTML training system that can be made available to students currently enrolled in graphic communications courses at Western Illinois University.
2. Design a self-guided HTML training system to help graphic communications students begin to learn how to create websites.
3. Develop an operational prototype of the self-guided HTML training system.

Research Questions

The following research questions will be investigated:

1. What are the components necessary to create and publish a basic website? This will require the investigation of three items:
    a. What is the optimal software needed to create and publish a website?
    b. What is the optimal hardware needed to create and publish a website?
    c. For students enrolled in the graphic communication courses at Western Illinois University, what is the most available, adaptable and flexible method of creating a website?

2. How can appropriate design methodologies and technologies be used to design a self-guided HTML training system for graphic communication students at Western Illinois University?
3. What are the principal features of an instructional prototype for a self-guided HTML training system for graphic communications students at Western Illinois University?

Methodology

A variety of texts will be consulted to answer the first research question referring to the components necessary to create and publish a website. This will include such texts as Web Design Tools and Techniques (Kentie, 2002) and Learning Web Design (Niederst, 2003).

The second question looks to find the optimal software to use for creating and publishing a basic website based on the components identified in the first research question. The hardware and software requirements should be assessed to ensure availability to graphic communications students. As needed, online, independent reviews and professional websites will be consulted to help determine the optimal software.

The third research question applies the information found in the two prior research questions to determine which system would optimally fit the needs of the graphic communications students at Western Illinois University.

Delimitations

The limits of this study are a result of the focus implied in the instructional design problem. This research study will not attempt to alleviate issues of

motivation or serve to overcome the issues of capability on the part of students or instructors.

In order to ensure the instructional objectives can be tested and implemented, all technology utilized will be readily available to graphic communications students at Western Illinois University. This will include technology supported by the University's infrastructure and is readily available to the students (e.g. students will utilize University-supported resources to host their websites, as opposed to discussing the steps necessary to host a website through an external service).

Significance of the Study

The development of this self-guided HTML training system should positively impact the learning and experience of graphic communications students. Areas of impact could include:

- Students will become more familiar with the creation of HTML pages which will serve as a foundation for more complex website building techniques.
- Students will be provided with the opportunity to create websites that promote their skills and can reflect their individual design talents. A website promoting a student could be useful for a potential employer to become familiar with the software and design skills a particular student possesses.
- Students will have ample opportunity to explore and practice creating websites for coursework.

CHAPTER II

CONCEPTUAL FRAMEWORK

Components Necessary to Publish a Website

The first research question takes into account the components necessary to create and publish a basic website. This will require making the following determination:

a) The optimal software needed to create and publish a website
b) The optimal hardware needed to create and publish a website
c) The most available, adaptable and flexible method of creating a website for students enrolled in graphic communications courses at Western Illinois University

In order to ascertain the optimal hardware and software, it is first necessary to have a basic understanding of the types of web pages that can be created. Generally speaking, two types of web pages can be created for sharing information on the web. The most common type of page is called a static page. For a static page, content and layout rarely changes and when it is it is manually updated using a text processor (e.g. Microsoft® Notepad® or Apple Inc.'s Textedit® software) or a robust web page editing tool. The other type of web page is the

dynamic page. A dynamic page can change based on a users interactions and/or changes made in a database. Generally speaking, the content of a dynamic page is generated, at least partially, through a series of server and client commands (Lynch & Horton, 2009). While dynamic pages offer a great deal flexibility, they are often more complicated to create. Since the target population is that of students new to creating web pages, it is reasonable to assume static pages will be the focus of the research study.

Static pages are usually built by a web author using Hypertext Markup Language (HTML). HTML is the basic framework and provides a method for formatting and building layouts. Without the use of HTML, web pages would merely appear as plain, unformatted text pages with no multimedia elements or clickable links.

While some people may prefer to create web pages directly using HTML code, others find HTML coding to be non-intuitive (Spanbauer, 1996). As shown in the following example of HTML code, a web programmer can create a block of bold text as:

This will create bold text

Elements contained between the greater-than and less-than symbols are called "tags". Web browsers read tags and then format the text appropriately. Creating HTML by entering manually entering tags provides quite a bit of layout control, but can become a time-consuming task. This requires the programmer to memorize a large number of tags or continually look at reference materials,

which would prove to be inefficient. Further, some tags can have a multiple commands within one tag. A tag used to change a font face and size, for example, could look like <font face="Arial" size="18px">. Not only can such coding can be time-consuming but are also more prone to errors.

Dynamic pages are pages that are processed in some manner before they are delivered to the user requesting them. The content of a dynamic page is created on demand. Consider a company selling a large number of goods through an online store. It would be time consuming to generate a unique page for each item in the online catalog. A dynamic page could be created, however, that pulls the product information from a database and creates the product page as it is requested. Instead of maintaining a static page for each product, one dynamic page is created with access to a database that holds product details. In addition to possessing the knowledge and use of HTML to format the content of these pages, creating dynamic pages may also employ the use of scripting or other programming languages. For this reason, the proposed study will look at the development of static pages as a building block to the development of dynamic pages.

Thomas Dowling (2003) suggests that web page editing software plays an important role in the development of web pages. HTML editors can assist the author by ensuring the creation of properly structured/formatted HTML. More advanced presentation editors allow the author to focus on the visual look of the web page instead of the structure (p. 11).

Dowling continues by categorizing editors as either text editors or as graphical editors. Each type of editor has an advantage over the other. Text editors have strengths in flexibility and availability. While a web page may be created on a given computer, it is usually uploaded to a web server. Text editors are generally available on any type of web server or computer and as a result, pages can be edited directly on a server or on any other system. Text editors also offer the flexibility of being able to create and edit other types of programming scripts beyond traditional HTML. The same text editor could be used to create a purely HTML page or to create a page using an advance scripting language such as PHP. By using such an editor, web authors become quite familiar with creating and using coding techniques necessary to build pages.

As Dowling suggests, some web authors prefer to utilize a graphical editor as opposed to a text editor. A graphic editor allows authors to pick HTML elements from formatting palettes and menus similar to those of traditional word processors of today. A page is edited in a window that looks quite similar to the final web page. Text is formatted by selecting it with the mouse and then selecting the appropriate menu item to create the desired format. The author is able to view the change in format on the screen. In a text editor, the author sees tags and often must save and view the file in a web browser to see how the web pages looks, though these steps could be automated.

To the question of what editor is the best, Dowling concludes, "Making blanket statements about which single editor is best for all authors is not possible. As with choices in hardware and software, adopting institutional standards where they exist is more useful, as is learning to use them rather than insisting on a particular program against the wishes of purchasing and support departments" (p. 13). This suggests the editor to be used is the one readily supported in a given organization.

While it is impossible to determine what HTML editor will be used by the students once they graduate, it is logical that the optimal HTML training system be conducting using commercially popular software and usable on multiple computer operating systems (e.g. Macintosh or Windows).

Access to the software is equally as important as the type of software. Students need to have reasonable access to the software during the training to practice and hone the skills being discussed.

Once the issues of commercial popularity, cross platform operability, sufficient product support, and accessibility are considered, Adobe® Dreamweaver® stands out as the logical choice. The software is readily available in graphic communications labs and at other areas on campus. It is commercially popular and runs identically on both Macintosh and Windows platforms. Students enrolled in the Graphic Communications program are familiar with other Adobe® products through their use in introductory classes.

Microsoft® FrontPage®, another popular web page editor, is also available to students on the Western Illinois University campus, but is not as widely used in the commercial industry as Dreamweaver®. FrontPage® also does not offer a cross-platform solution for Macintosh and the computer labs provided to the students enrolled in the Graphic Communications program are Macintosh.

Another option or alternative web editing solution would be open source software. Open source software is developed, created, and maintained by a rather large community of global developers (Wray & Mathieu, 2008). Perhaps one of the most successful and widely known open source software programs developed is the web browser Firefox. Prior to November of 2004 Firefox was largely unknown, but since then it has captured 8-10% of the market share worldwide and has proven to be a safer alternative to Internet Explorer® (*The Economist,* 2005).

A key feature of open source software is that it allows the users to have access to the source code of the program, which in turn allows them to modify and develop the software to suit their own needs. Because of the openness and willingness to share, open source software is available free of charge and users are allowed to freely modify the program functionality as they desire (Madey, Freeh, & Tynan, 2002).

While there are several advantages to using open source software, it also has some inherit problems. Godfrey, Micheal, and Quiang Tu (2000) mention a few of these disadvantages. These include a lack of quality standards and

unstable computer code as well as local issues of installation and maintenance of an open source web publishing system at Western Illinois University.

Adobe® Dreamweaver® is a full-featured web editing software. The user is able to use a built in text editor and a graphic editor either individually or in a split-window view. In the split view, the author can move seamlessly between editing modes. Using both views allows the user to quickly apply tags in the graphical editor as well as view the actual HTML tags being used to create the specific format. This allows students to become a bit more familiar with the tags as they are learning to create web pages. Further, if some relatively simple changes need to be made to a specific tag, (e.g. changing the color of a block of text from blue to red), it may be quicker for the author to make the change in the tag rather than select the text and locate the given format in a palette or menu.

Dreamweaver® is a full-featured web editing software that offers a variety of tools including a built-in link checker to help determine if hyperlinks are valid and page validation, which is useful in ensuring compliance with Federal Rehabilitation Act section 508 rules. Dreamweaver® also offers built-in templates that can serve as a starting point for the development of a web page. Dreamweaver® can connect to a variety of web servers and handle the management of files that are placed on the web server or downloaded for editing. Dreamweaver® also supports the development of advanced web development features that utilize programming with a variety of technologies including PHP, ASP and Javascript.

In order to publish a website and make it accessible through the World Wide Web, the content that is developed by the web author must be placed on a web server. This process is referred to as web hosting and is a service that is typically offered through web hosting companies for a fee and the file management between the user and the host is often unique to that particular hosting service. Alternatively, Western Illinois University provides web space for each student enrolled at the University. The methods used to upload files are consistent from one user to the next. To this end, the HTML prototype will operate under the assumption that students will be utilizing the web space provided to them by the university.

Contemporary Literature Related to Training Associated with HTML and Dreamweaver®

An extensive review of the educational and technology-related literature databases resulted in minimal sources related to teaching HTML and Dreamweaver®. Of the sources found, people who teach in the graphic communication industry wrote none. Further, the majority of the technology database references were from conference proceedings and not peer reviewed research journals. The following summarizes some of the research studies relating to HTML and Dreamweaver®, as well as online guides, books, and PC-based computer training software designed for training on those topics.

Research Studies

Hatter (2007) utilized a Dreamweaver® 8 tutorial in a research study

focusing on interface design. The tutorial developed for discussion offered three different interfaces based on the experience level of the user. The study focused on how long participants spent using the tutorial and how successful they were in completing the steps described in the tutorial.

The Hatter (2007) research study focused heavily on the design of the interfaces rather than the use of HTML and Dreamweaver®. Further, the study failed to provide a comprehensive tutorial; instead, the developed Dreamweaver® tutorial focused on configuring Dreamweaver® to upload files and then how to view those files from the Georgia State University student server.

A more relevant study was performed by Voegele (n.d.) who sought to find the best method for teaching people who knew nothing about web design how to build websites based on standards created by the World Wide Web Consortium (W3C). The process of instruction involved students working directly with a business owner who wished to have a website created. Through the study, Voegele determined the most important element in designing a website based on W3C standards was in the design and planning phases.

While the approach discussed provided a description of a unique method of teaching how to design a web site that recognized standards, lectures and a knowledgeable instructor facilitated student learning. The HTML training system proposed for the purposes of this development study looks at developing a method of instruction that does not require lectures or teacher intervention.

Adams (2007) stated students require a good foundation in a variety of technologies to become proficient web programmers. Technologies required by those in the profession included HTML, CSS, Javascript, PHP, Perl, CGI Java applets, Java servlets and MySQL. Adams stresses that teaching about the web is different than teaching traditional computing topics because a basic understanding of the entire application cycle is necessary - from browser to database back-ends.

The Adams (2007) article goes on to discuss a class created and taught by Adams and the techniques he utilized in the course. The course allowed students to gradually build a web blogging software. Lectures and course content centered on the development of a web blog and included building basic HTML and PHP pages, styling pages, using web forms, creating a secure area for logging into the administrative pages of the blog, and other more advanced topics.

Adams (2007) represents another project-based approach to teaching how to create more elaborate web sites. As with the Voegele (n.d.) study, the process fails to meet basic requirements of the proposed study - that of being a self-guided training tutorial. Adams' proposed technique allows students to explore technologies currently beyond those discussed in the prototype training system and could serve as a point of reference for enhancing the system in the future.

Online Guides

To help individuals learn to use Dreamweaver® effectively, a number of resources are available both through the web and in print. Many of these

resources can be used to fill a short-term gap in skills or they can be used to provide a self-guided study of the creating web pages with HTML and Dreamweaver®.

The website Teacherclick (http://www.teacherclick.com/Dreamweaver8/index.htm) offers a comprehensive series of pages on a variety of Dreamweaver® topics. Learners can access topics from a table or contents, which also provides an overview of how the pages "fit" logically together. During lessons, the user is able to access online video tutorials and step-by-step lessons.

Material offered through Teacherclick (http://www.teacherclick.com/Dreamweaver8/index.htm) has a variety of limitations however. First, the content provided only addresses Dreamweaver® version 8 and interactive components on the website appear to be non-existent beyond unit testing. Material discussed in the lessons is written for the absolute computer novice and discuss simple procedures such as opening the program. Also, the content is not customizable to working in the development environment provided through Western Illinois University.

Lengel (n.d.) provides a limited approach to instructing how to create a basic webpage using Dreamweaver®. The web resource explains how to open Dreamweaver®, add text, images, and multimedia and how to build links.

While the purpose of the site is to allow students to quickly build a web page, it fails to instruct them on how to add visual appeal, such as color to their

websites and most importantly, fails to instruct the reader on how to save files to a web server so they can be shared with others. While the content probably serves the purpose for the instructor, it fails to provide the in-depth instruction needed by someone looking to publish an entire website as opposed to a single web page. While the instruction seems well-written and concise, it fails to provide any use of images or other multimedia to help better explains concepts and procedures.

Reese (2007) presented a paper concerned with demonstrating the steps involved in the creation of a website with Dreamweaver®. The steps outlined described how to create a basic website using both tables and frames, how to create a homepage, and how to create additional pages.

The Reese (2007) document is designed to provide the user with the basic information necessary to create a page. The document presented is based entirely on text. As a guide, the paper presented offers no images or screen captures to assist a learner. Further, only the most basic steps are outlined.

Another guide entitled *Dreamweaver®: Creating Web Pages* (2009) was created for the University of Kansas and offers a fairly comprehensive set of steps useful in creating web pages with Dreamweaver®. Of the online guides reviewed for this study, this document provides the most comprehensive set of instructions. While the online guide offers a fairly comprehensive series of steps, it was designed for a specific audience. The online guide would offer no user support if it were to be used by a graphic communication student at a different

institution.

Books

A large number of books attempt to cover topics related to web design. However, in technology-related topics, many published books become quickly outdated since the modality does not allow updates as software and standards continue to evolve. Further, books can be cost-prohibitive to some students. Finally, books are rarely customized to a given audience, such as graphic communication students, or, as in the case of the training proposed in the research study, to recognize unique attributes like the settings necessary to upload files to the web server located at Western Illinois University.

Bulletproof Web Design, written by Cederholm (2008) provides a comprehensive narrative focusing on the creation of web pages that appear the same regardless of the web browser being used. Topics include creating flexible web sites using properly created HTML and properly applied cascading style sheets.

The text provides valid and focused instruction on the use of styles sheets. While styles are important in the creation of web pages, the book fails to cover the basic topics such as creating a basic web site and suffers from not recognizing the beginning reader.

Creating Web Pages for Dummies, written by Smith and Bebak (2007) combines humor with a well-organized approach to teaching web pages to the novice web designer. The authors discuss various services available for hosting

web pages including Google Page Creator, GeoCities (a Yahoo service), and America Online (AOL). Discussion transfers to instructions on building HTML, adding graphics, and using animation.

As with the previously mentioned text, *Creating Web Pages for Dummies* (Smith and Bebak, 2007) allows provides a good baseline level of knowledge but suffers from quickly becoming out-of-date. GeoCities, for example, is no longer available through Yahoo and the web sites have been closed out or discontinued. The book also fails to provide varying approaches to instruction. In the prototype training system, a large amount of content it presented as text with accompanying interactive multimedia to clarify ideas and provide more interaction with the user.

Pro CSS and HTML Design Patterns (Bowers, 2007) was designed to help readers already somewhat familiar with the creation of basic web pages. The goal of the book is to further the reader's understanding of cascading style sheets. The book utilizes excellent examples of coding that can be used to stylize pages.

The book is designed for intermediate web developers and therefore would not be an appropriate option for entry-level students. Further, the book addresses one very specific topic in web site design and does not address the processes needed for a beginner to create and publish a website.

The text, *The Design of Sites* (Duyne, Landay, and Hong 2007), offers a discussion of how the layout of the web pages of a given web site is an important

part of the web site. The topics of the text are varied but include looking at the different web sites of various nonprofit organizations, community organizations, education organizations, and e-commerce businesses. The book also discusses how to build effective navigation and how minimize the load time of your web site.

As with many of the aforementioned texts, Duyne et al. (2007) fails to address the actual coding behind the implementations that are proposed. The intended audience for the text would be individuals that are already moderately familiar with the process of creating and posting web pages.

Software

Individual Software has created a series of computer-based training programs to help the novice user learn to create web pages. One software, *Professor Teaches How to Create Web Pages & Graphics 8.0* (n.d.), includes topics on creating HTML and includes instruction on using software such as Dreamweaver®. During the instruction, the user positions a small, floating window over the software as it is being discussed. The user is then provided training through the small window. Questions are used to enforce learning, and the software includes a comprehensive index of terms.

The software mentioned above does offer the user a unique and useful way of presenting information. They are able to practice in the software as instruction is received. However, the software is fairly costly ($29.95) and only is written for Microsoft Windows users.

Summary of Contemporary Literature

As is evidenced by the discussion above, a variety of approaches exist to help those inclined to learn about HTML and Dreamweaver®. However, none of the approaches serve the graphic communication student audience directly.

Research studies found during the literature search are concentrated in the computer science discipline and are centered on instructor-based lectures and guidance. Online guides appear to be brief and many offer very little interaction or meaningful feedback. Books and texts are difficult to update because of the nature of the modality. Tutorial software seems to offer some benefits, but may be cost prohibitive and specific only to certain platforms. The proposed prototype system seems to offer several advantages over these traditional learning methods described above.

Appropriate Design Methodologies

The second research question focuses on determining how appropriate design methodologies and technologies can be used in the development of a self-guided HTML training system for graphic communication students at Western Illinois University. Kierns (1999) suggested that self-guided instruction should be built upon four basic principles that include:

1. Active responding: Providing the user with a constant set of choices and interactions as opposed to simply requiring the user to simply read content or observe.

2. Immediate feedback: Provide immediate feedback to the user and thus allow them to interact with the content.
3. Small steps: Information should be presented as small, manageable pieces of information.
4. Self-pacing: The user should be allowed to manage their own pace throughout the learning system.

To help ensure these principles are met, a variety of design methodologies exist. Rothwell et. al (2006) recognized that many of the instructional systems design models have many similarities to a generic system design known as ADDIE. ADDIE is the acronym for a system that uses analysis, design, development, implementation and evaluation to construct a useful and usable system. This method of design is the instructional design model used in the development of online courses at Western Illinois University.

The first phase of the ADDIE model involves an analysis to identify the learning problem, the needs of the population being addressed, the goals and objectives of the instructional model being designed and the environment in which the instructional module will be implemented as well as the constraints of the instructional environment. Rothwell et. al (2006) suggests that there are two main goals of the analysis step of the ADDIE process. The first involves using a performance analysis to determine which problems that can be solved by training and which can be solved by other means, such as administration. The second goal of the analysis stage is to fully understand the learner and their skill set as

well as the environment and conditions under which the worker is expected to perform.

The second phase of ADDIE is the design phase. This process involves the development of the "look and feel" of the instructional piece including how the training should be planned in order to meet the desired instructional needs. The design phase can include the interface design as well as the graphic design. Content is also determined at the design phase. Seels and Glasgow (1998) suggests the design phase should answer three questions:

1. What should be assessed and what form should the assessment take?
2. What should the organizational structure of the information be?
3. What should the instruction look and sound to the user?

The third phase is known as the development phase. The development phase is the actual production of the learning materials based on the design phase. The development phase can involve the creation of new training materials as well as the revision of existing materials.

The fourth phase of the ADDIE process is the implementation phase. This phase is sometimes known as the delivery phase. It is during this phase that the development plan is actually implemented. This includes the delivery of the materials to the student(s) or learner(s). Rothwell et. al. (2006) suggests that it is during this phase that the trainer needs to be concerned with determining what the most effective training methods are for the trainees and how to engage the

interests of the learner as well as how that interest can be maintained throughout the training.

The final phase of the ADDIE process is the evaluation phase. The evaluation is both formative and summative. Although a formative evaluation is performed at each stage of the ADDIE process, a summative evaluation is also performed at this final phase to provide opportunities for feedback from the users. Revisions are made as necessary. It should be mentioned that continual feedback has been mentioned as a way to improve the ADDIE process and many instructional models implement the continual feedback model.

While the ADDIE system and its derivatives are widely used methods of instructional development, Palmer and Rhodes (1997) offer a more comprehensive framework. Derived from both training theory and practice, the Palmer and Rhodes framework utilizes ten categories: supportive environment, meaningful application, opportunities for choice, manageable tasks, performance examples, performance opportunities, knowledge of progress, opportunities for success, multi-sensory techniques, and intuitive appeal.

Supportive Environment

Palmer and Rhodes (1997) suggest the multimedia system being developed should offer a supportive environment for the user. This means the system should provide guidance for the user, including instructions on navigating the system. Ideally, this would include a personalized responses and assistance in helping the user overcome any improper navigation that may have taken

place. Being able to guide the user and to provide sufficient instruction and navigation assistance is crucial to building a supportive environment. It is also important to provide the learner with the freedom to make choices about the direction of their training. Milano and Ullius (1998) stress that the learner should be allowed to make choices about focus, objectives or learning activities whenever possible.

To help encourage a supportive environment, Palmer and Rhodes (1997) recommend the use of a program map that would allow the user to pursue different pathways through the instruction. It is also helpful to provide an overview of the information in the instruction to help the user recognize the "big picture" and to help them better understand the content. Another suggested method of helping to build a supportive environment is to allow the user to readily define important words and concepts through the use of a hypertext glossary.

Meaningful Application

Arguably, one method of motivating learners is to make the instruction meaningful to them. Relating the instruction to what is or will be expected in the workplace is one method of accomplishing this goal.

Palmer and Rhodes (1997) suggest making the instruction meaningful and/or relevant to the user by ensuring the benefits are specifically stated. If the intent of the instruction is to help solve a problem, the problem should be stated so that the user is made aware that the intent of the instruction is to solve or alleviate the problem rather than acquire knowledge.

Simply stated, it is important for the learner to understand the relevance of the instruction. By providing this direction, the user will be able to understand where the instruction fits into their pre-existing skills or knowledge.

Opportunities for Choice

The Palmer and Rhodes (1997) framework describes the need for offering the learner choices for control over the interactive media.. The user should first be allowed to make choices about how to navigate through the instruction and guide their own instruction instead of following a path of instruction driven by the program.

Opportunities for choice concentrate directly on how much control the user has over the instruction. This control includes the navigation, the pace of accessing the content, and even the control the user has over the playback of media.

Manageable Tasks

Palmer and Rhodes (1997) discuss the need to keep the instructional tasks at an appropriate level of difficulty and, in the case of workplace education, those tasks should reflect the steps expected to be performed on the job. Ensuring the tasks of instruction are manageable also involves looking at how the assigned tasks fit systematically with each other.

It is important that the system also presents materials in a context that ensures the necessary pre-requisite skills have been met. One way of ensuring this is by providing a preliminary assessment. One primary goal of the instruction

is to make sure the learner has the skills that are necessary to complete a task before asking them to do so.

Performance Examples

A variety of examples should be used to illustrate the instructional objectives. Palmer and Rhodes (1997) suggest both positive and negative examples be used; positive examples are used to illustrate how the task should be performed and negative examples can be used to show incorrect procedures. The best examples are those that are realistic and presented in a context that is easily recognizable by the learner. Borderline examples can also be used to help illustrate the objectives. Borderline examples allow the learners to discriminate for themselves how well a task is being performed.

Knowledge of Progress

Another component of the Palmer and Rhodes (1997) framework is providing the user with the knowledge of their progress. It is often helpful to provide feedback to the user so they understand how well they are progressing and how well they understand the material. The feedback should be able to be provided to the user upon demand.

Knowledge of progress can also be corrective and/or confirmable in nature. Ideally the feedback would be personalized for the learner and made printable to serve as a method of documenting performance.

Opportunities for Success

The Palmer and Rhodes (1997) frameworks suggest multimedia

instruction should allow the chance for the learner to be engaged with the system and be allowed to make mistakes without a penalty. It is further suggested that multiple assessments be made available and multiple levels of difficulty could be implemented in the system that offers incrementally more complex tasks to be completed.

Multi-Sensory Techniques

In order to add variety and appeal to a multimedia training system, Palmer and Rhodes (1997) suggest making use of the many different modalities that are available. A good balance of different types of media indicates a higher quality program and provides the learner with more variety. The content should also be made available in more than one single format. For example, a text transcription could be made available with a digital audio recording.

Intuitive Appeal

The intuitive appeal is perhaps the most difficult category of the Palmer and Rhodes (1997) framework to define. It can be created by keeping the process upbeat and positive as opposed to uninteresting.

Intuitive appeal can also be concerned with consistency of visual elements and design such as text sizes and lead to a more professionally designed training. This is also consistent with the standard practices in graphic design.

As previously mentioned, a wide range of methodologies can be used to produce multimedia training. The ADDIE method is widely accepted but is fairly brief in its focus. While the ADDIE method could provide a decent framework, the

Palmer and Rhodes method requires more planning at the front-end of the project and should result in less revisions when the multimedia-training program is tested.

Instructional Prototype Principal Features

The third research question looks to determine the principal features of an instructional prototype for a self-guided HTML training system for graphic communications students at Western Illinois University. Since the proposed training system is readily available to these students, it seems relevant that the training system should be implemented on the hardware and software that is available through the University.

Learning/Course Management Systems

Western Illinois University currently utilizes a commercial course management system known as Blackboard® Vista® to deliver its full online and technology enhanced courses. The intent of this content management system is to facilitate the structuring and delivering of a variety of content for faculty and their course offering. Further, Blackboard® allows the instructor to incorporate various interactive components. These interactive components include assessments and exams, e-mail, threaded bulletin boards and discussion groups, and synchronous chat.

The Blackboard® implementation at Western Illinois University is known as Western Online. Each semester, faculty members must activate a course section to hold the materials they are making available for the course. During the

activation process, students enrolled in the given section are automatically added to the course and a course start date is set.

When the course begins, students are allowed access to the materials that are made available to them at the control of the faculty. Faculty can hide and show tools and content based on a variety of criteria. It is also possible for them to set "release criteria" which allows them to release materials based on date, the individual, or a given score on an assignment or assessment. Using a given score allows the instructor to structure the material in such a way that mastery is required to advance though all parts of the instructional material.

While a commercial course management system has several strengths, its implementation at Western Illinois University also has numerous shortcomings, making it somewhat less optimal to use in the creation of an HTML training system. In the commercial course management system, students are only allowed to access course materials for courses in which they are officially enrolled. Once the student has enrolled in the course, an automated process automatically enrolls the student in the course for which they are registered. In other words, the enrollment of students in the course management system is an automated process based on their official university enrollment in the course. A course would either have to be established for the HTML training in order to make the enrollment process automated or an administrator to the course management system could enroll students. However, this latter option would be a cumbersome and time-consuming process. This requirement of enrollment for

automation creates a significant problem stemming from enrollments in the course. Depending upon administrators to handle ever-changing enrollments would be unduly cumbersome.

Palmer and Rhodes (1997) suggest the training system should offer the learner realistic tasks. While the content management system allows for interactions, the types of interactions are somewhat limited. Using multiple-choice questions, for example, would not satisfactorily serve as a realistic scenario in the process of learning to program HTML.

An Optimal Training System

In order to provide an optimal training system, the delivery mechanism should provide flexible and reasonable navigation and allow for a variety of interactive media elements. Since the focus of the training is on the development of web pages and HTML, it would be reasonable for the training system to utilize web page technology to deliver the instruction.

Western Illinois University provides web server space and a variety of other web-based technologies. Many content management systems use a web database to manage content. One popular type of database software is MySQL. MySQL is provided with an open source license and has been made available to the Western Illinois University campus community.

When information is requested from the database, a scripting language such as PHP is utilized. A script programmed in PHP connects to the database, performs a search (query), and then processes the results. A standard way of

processing the results would be to build an HTML page, which is then displayed in the web browser of the user.

PHP and MySQL are used when a large number of pages are needed but which follow a very similar structure. Consider, for example, an online catalog containing a large number of items, each with unique details. It would be inefficient to create a unique HTML page for each of the items in the catalog. Likewise, updates affecting all catalog items would also be difficult.

Using a database for the same project, however, would be much easier. Each catalog item along with their appropriate details would be loaded into a database. Using PHP, a single page could be created that would display the image and details of the catalog page being displayed. While the images and details change, the overall page structure remains the same. Updates to this type of system are easy to implement because the page could be made to automatically build the navigational structure.

CHAPTER III

PREPARATION AND FORMULATION OF THE PROTOTYPE

Methodology

The broad-ranging objective of this study is to investigate how good instructional design principles and techniques can be used to create a technology-based prototype to train Graphic Communication students in the proper use of HTML. The knowledge gained through the instructional program can be used to strengthen the skills of students enrolled in the academic program and in turn improve their ability to use the technology in the job market. The prototype system employs a variety of features to aid in the development and delivery of the content.

The following section discusses how the HTML prototype system was developed. The chapter also addresses how the Palmer & Rhodes (1997) methodology was utilized in the development of features for the HTML training system prototype. The chapter concludes with the results of usability testing that was performed by students using the prototype system and the webmaster of Western Illinois University.

Prototype Development

HTML Training System Development

During initial planning for the development of the HTML training system prototype, different factors had to be considered. First, it was determined that the system should be maintainable on the hardware and software available to Graphic Communication students. Second, it should be presented through a system offering flexibility and ease of updating.

As mentioned in Chapter II, initial development was going to be done through Western Illinois University's learning management system known as Western Online. Western Online is the commercially licensed software known as Blackboard® Vista®.

Major drawbacks to the use of this system for the development of the prototype were immediately evident. These drawbacks included: the lack of allowing scripting in the course management system, lack of flexibility in navigation, and how enrollments are handled for courses in the content management system at Western Illinois University.

The Blackboard® system would not support the use of some of the desired scripting used heavily in the prototype. While Blackboard® would provide a method for navigation of content, it would not easily allow for the flexibility of an alternative navigation system.

The method of granting student access to the Western Online system also would prove to be problematic, as the student names would have to be added manually to the system by a system administrator. Although the proposed

prototype requires a login and password, the system can be easily modified to allow students to use their university assigned login and password, eliminating the need to maintain a list of students who can access the training in Western Online. For the reasons above, an alternative had to be found.

The HTML training system could have been developed using static web pages. This approach would complicate the updating process, however. As content is changed, the navigation built into each static page would need to be updated as well. Through the use of dynamic pages, adding, removing and editing of content is greatly simplified.

The following summarizes how dynamic web page technology was used in the creation of the prototype system:

MySQL and PHP

Two major technologies served as a framework for the prototype: MySQL and PHP. These frameworks are industry standards, widely accepted and are readily available and supported at Western Illinois University. Additionally, adequate support can be found through publications and/or online resources.

MySQL is a leading online database technology. A database is useful for the storage and rapid retrieval of related information. In MySQL, a database is created for a given project and is comprised of either a single or multiple tables of information. The tables are designed to hold a collection of related information, such as names and addresses, called "fields". A person's name and their related address would be considered a record. A table would hold several records of information - one record for each person's name and address.

The developed prototype system makes use of a number of database tables. A summary of these tables is shown below:

Table 1: Content Categories

Table 2: Main Content

Table 3: Tracking Information

Table 4: Evaluation Results

Table 5: Usernames and Passwords

Table 1 is designed to simply hold the name of categories and a unique identification number. The module identification number is used in the grouping of content pages in the navigation structure presented to the user.

Table 2 holds the content that is displayed to the user and is comprised of several fields. A unique identifier for each record is maintained by the database. A page title, module/category and content are mandatory items held by the database. Each record can hold a description and up to four related links. The order or rank of a given page is used to control the page order of the content page.

Content pages were designed to keep displayed content at a minimum to help with readability. Therefore, it was necessary to create sub-pages. The database is capable of holding up to six additional sub-pages and their related titles.

Table 3 is used by the prototype system to track pages that are requested by users. A record of each content page that is accessed is stored by the system.

The time the page was accessed and which module the page was part of is tracked as well.

Table 4 has been created to hold the results of evaluations that are offered at the end of each content module. This includes the date the module was evaluated and any scores and/or qualitative comments offered by the reviewer. The electronic assessment information is described further in Chapter IV.

Table 5 was used in the development of the prototype to store assigned usernames and passwords.

Adding Content to the Prototype System

Content was uploaded to the online database using two different methods- content was either added directly to the database or added through the use of web forms that were created to ease the process of adding large amounts of information to the database. The method of writing information to the database varied by the type and amount of information that needed to be written. If there was only a small amount of information needing to be stored in the database, such as a username and password, the data was written directly to the table through a program with a graphical user interface. The program, Sequel Pro for Macintosh is a freeware licensed program. The same program was used to make small/simple modifications to the database.

A large amount of information was needed for the content pages displayed to the users of the system. To facilitate the addition and modification of the content need for module pages, dynamic web pages were developed in Adobe®

Dreamweaver®. The dynamic administrative pages allowed content to be added, updated and deleted from the system.

The following figure shows a listing page that was used for editing web pages in the HTML training system. While the page design is utilitarian, it is not designed to be seen or used by the students or others viewing the content pages. Each item stored in the database table is listed including a few identifiable elements of each record. The identification number of a given record/content page, the page title that is displayed in the content system, and the option to update or delete a given page is presented. Additionally, clicking the page title of a given record displays the page as it will appear to the user.

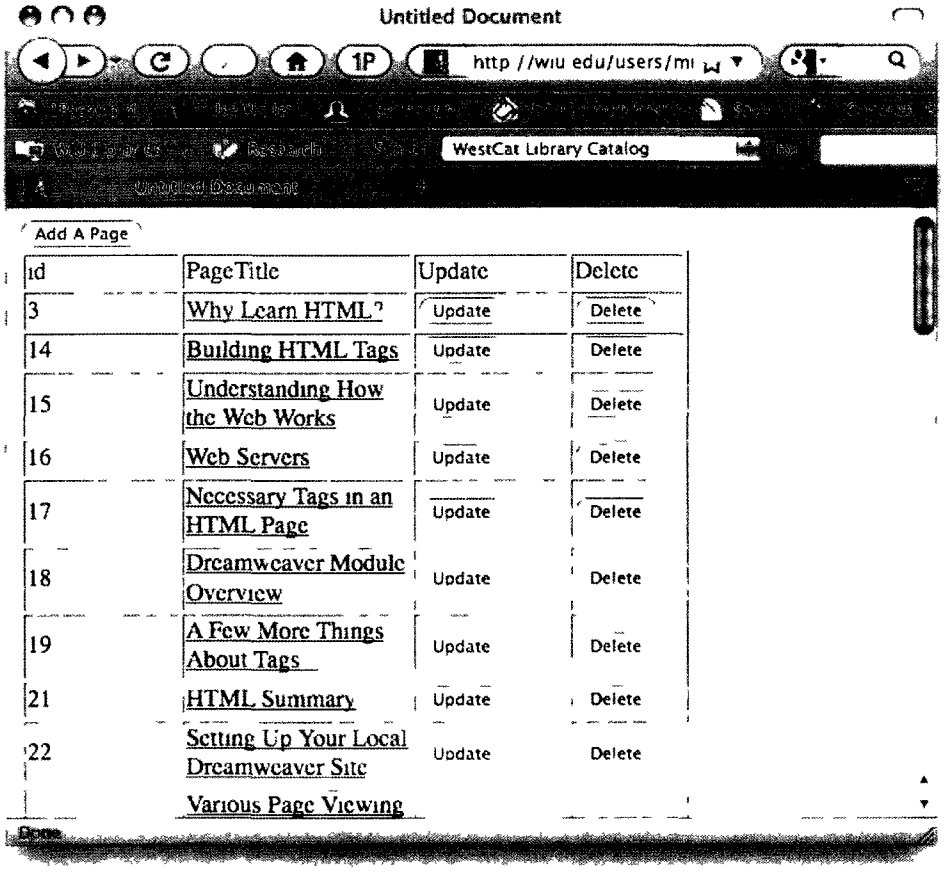

Figure 1. Administrative interface.

In the top-left corner of the listing page is the option to add a page. Clicking the "Add a Page" button results in what is shown in figure 2.

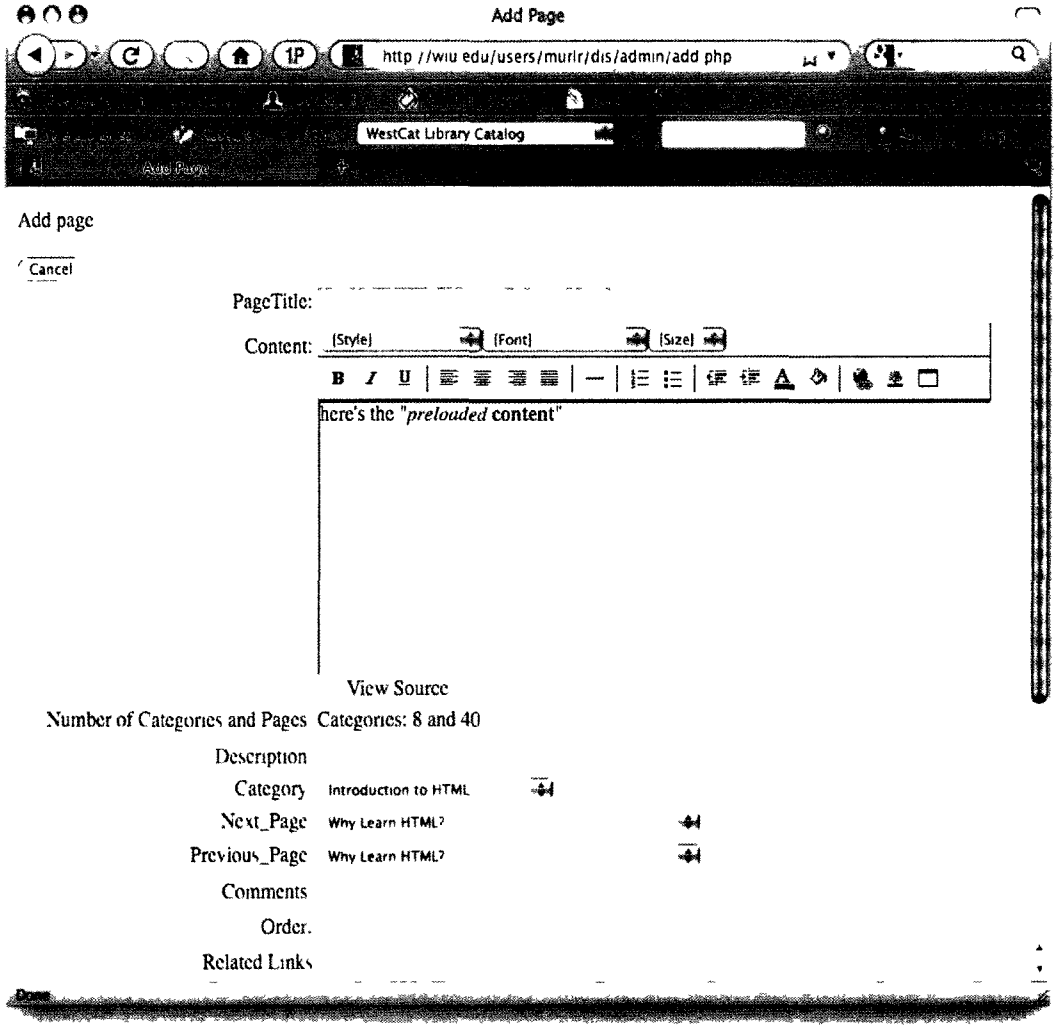

Figure 2. Add a page interface for administrative pages.

Clicking the "Cancel" button returns the user to the listings page. The user of the inserted page adds the necessary details for the content page. Notably, the "Content" option is where the page content is entered. To properly format the content for the student, HTML is used. To facilitate the creation of the HTML content, a basic HTML editor has been integrated into the system.

While entering the required information to create a page, the user of the system selects a page category and sets an order for the content link to control where the link to the content page will appear in the navigation.

If the user of the administrative pages chooses to update a given content page, a page similar to the figure above is shown without the HTML editor. Content to be edited is preloaded into the form fields. The editor was not implemented in the page because of the complexity involved in making it functional. This is a feature that could be implemented in upcoming versions of the content system.

Displaying Content

The content of the system is presented through a combination of both static and dynamic pages. As discussed later in Chapter IV, introductory content is displayed through static web pages. These pages introduce the user to the system and explain how the system works. Eventually the user is prompted for their assigned login and password. Once the user of the system has authenticated successfully, they are directed to the page "http://www.wiu.edu/users/murlr/dis/cms.php". By default, the page displays a message and the main navigation appears. The main navigational structure is known as an accordion panel. The accordion panel described in detail in Chapter IV displays information through a series of panels or drawers that can hide or show portions of information at a time. Links to all of the pages in the prototype system are displayed through this page and the navigational structure it contains. Appendix C shows the PHP code created to display the content and navigation.

The page accesses the database of content and selects a specific record. The record is retrieved based on a unique record identifier. The requested record identifier is embedded in the web address. For example, if the user was to see page 12, the web address changes from "http://www.wiu.edu/users/murlr/dis/cms.php" to "http://www.wiu.edu/users/murlr/dis/cms.php?id=12". Without an identifier, the default directions are displayed.

To assist the user in keeping their place in the training system modules, the system automatically keeps the accordion panel open to the current module. To help the user keep track of their location in the prototype system's navigational structure, the category panel is left opened to allow the user to navigate to another page of content in the learning module. The panel number is also embedded as part of the web address. Each accordion panel corresponds to a module and each module is assigned a number. If the page to be viewed was stored as page 32 which is part of the third module, the web address would appear as: "http://www.wiu.edu/users/murlr/dis/cms.php?id=32&panelcat=2", since the system begins numbering the panel categories and modules at zero.

It was desirable to keep the content of the pages minimal, easy to read, and easy to understand. To this end, it was necessary to break some pages into sub-pages. If a content page has sub-pages stored in the database record, the system displays an "Additional Pages" navigation based on the record information.

The system utilizes other unique features discussed in detail on Chapter IV. These features include Lightbox and tooltips. A Lightbox is used to display multimedia content unobtrusively on a web page. A tooltip is used to display a pop-up window when the mouse cursor hovers, or is over a certain area of the screen. Both of these features utilize Javascript and were made functional based on scripts available in open-source and are careful integrated in the dynamic page used to display content.

Page Content

Determining the page content to be included in the training was the result of consulting several publications and the teaching experience of the developer. While the order of delivery varied from one publication to another, common themes between the publications served to provide a framework for the content.

While users of the training system ultimately have a choice about the order in which they access content, it is organized in a linear fashion, with basic concepts leading to more complex ones. For example, the first module of the training system provides the user with basic information about how the web works. This information includes what web servers are and how web addresses work. The next module introduces HTML to the user. The user transitions from acquiring a basic understanding to how the web works to finding out how web pages are actually created. Once the user has become familiar with the notion of HTML tags, the content transitions to illustrate how to become more proficient at developing web pages.

Development Problems and Resolutions

The development of the HTML prototype system was the result of a lot of experimentation and necessity. When originally conceived, content was going to be delivered through the learning management system at Western Illinois University. Figure 3 shows the layout as it would have been presented to the users through the learning management system.

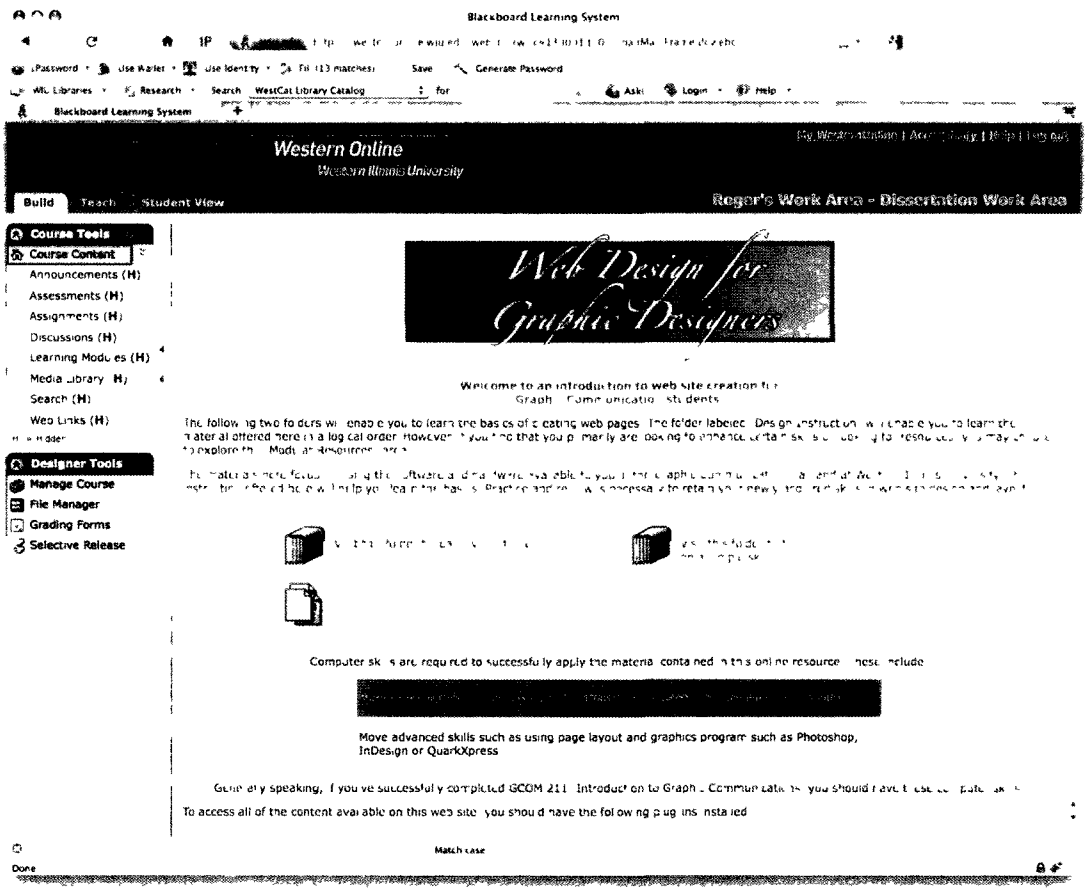

Figure 3. Learning management system interface.

While the learning management system can be useful in developing modules of content and for providing some interactive components, it became

very difficult to create content that was appealing and easy to navigate. For example, the learning management system provides navigation of content within a module. However, to move from one module to another would require the user to navigate back to the home page to select a different module. This would violate the Palmer and Rhodes (1997) concept of intuitive appeal. Further, the learning management system did not allow for the use of Lightbox and tooltips. Therefore, the delivery of items presented through these two features would either have to be done on the same page as the content or done through a hyperlink. If done through a hyperlink, navigation back to the content would be awkward or would have to become a page of the content module. Doing so would negatively affect the Palmer and Rhodes (1997) concept of opportunities for choice, since the content would be integrated as a page of content.

Page development in the learning management system was also cumbersome. It was difficult to keep the page design appealing and interesting.

An example of a page designed in the learning management system is as follows:

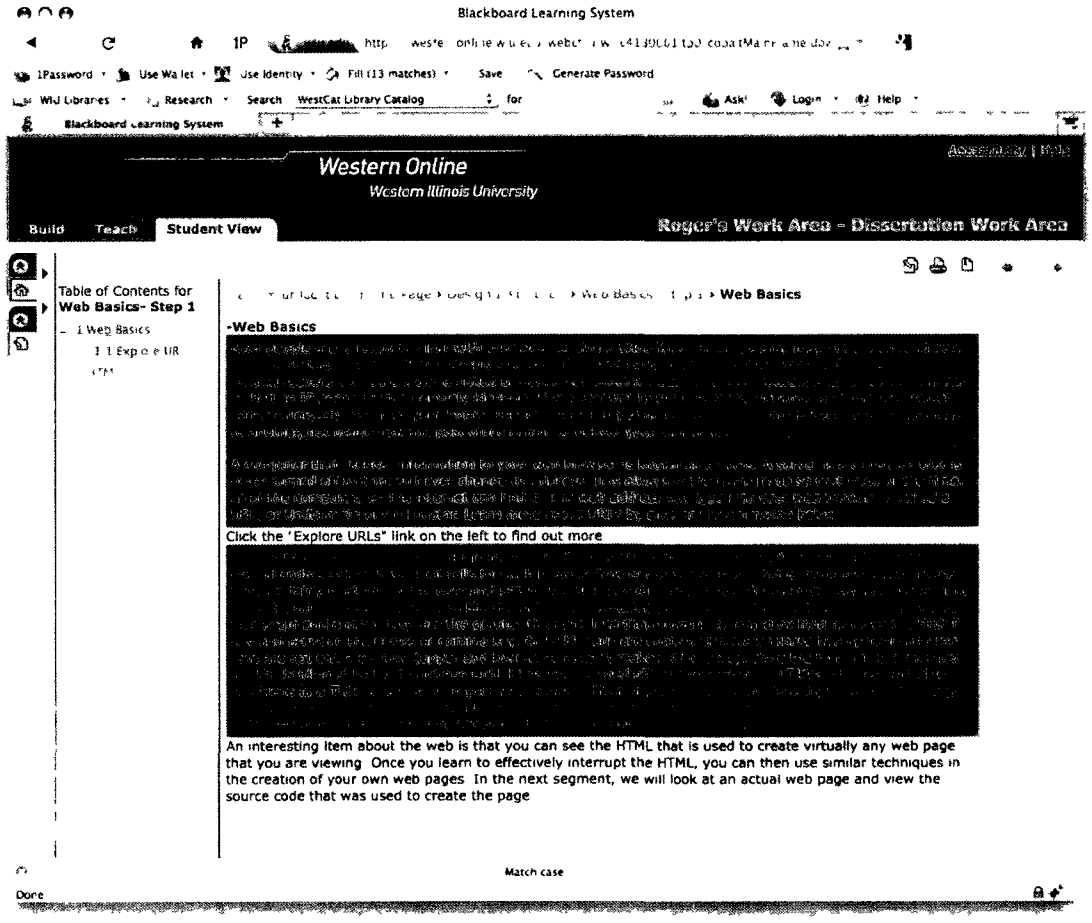

Figure 4. Content in the learning management system.

Without some type of screen design, the pages would appear boring and uninteresting. It should be noted that the content could have been broken up through several pages, but visually there is still a large amount of uninteresting text presented to the user.

After the decision was made to remove the content from the learning management system, a variety of HTML pages were created. A template for the content pages were developed in Dreamweaver® and content was initially

developed. Lightbox and tooltips features were easily integrated into the system. However, it became difficult for the developer to organize content and modules appropriately. For example, once a page is added, it would be necessary to adjust the navigation on a master template page. Any page set to follow the template would then need to be modified and then changed or updated on the web server. By utilizing a database (MySQL) and a scripting language (PHP), there was no longer a need to continually update multiple HTML pages.

The display of content of the prototype system pages also evolved out of necessity. As pages were developed, it became evident that some content would need to span multiple pages or force the user to scroll a large amount of content. To alleviate this problem, navigation of sub-pages was developed and implemented. Sub-pages provided a method to keep the content on a given page low, yet keep related information together.

The system utilizes various multimedia elements. In the beginning modules, Adobe® Flash® was used to create some interactive Lightbox content. However, some cross-platform operating system issues made this software difficult to work with and inefficient to develop content.

Eventually, multimedia movies saved as QuickTime® were implemented. After trying a variety of software programs to capture screen actions as movies, the program ScreenFlow® was determined to be the most effective because of its flexibility and built-in editing capabilities. The editor provided the ability to zoom/scale parts of the screen, highlight the mouse, and add text annotations. Other screen capturing software lacked such an editor or capabilities.

ScreenFlow® could capture computer audio and video as it captured screen actions. At the time the prototype system was being developed, many of the programs captured only low-resolution versions of the screen, resulting in poor quality video in the finished piece.

Prototype System Significant Features

Keeping with the Palmer and Rhodes (1997) framework as discussed in Chapter II, the salient attributes of the prototype system and the framework components are discussed below.

Supportive Environment

One key component of the Palmer & Rhodes (1997) methodology involves creating a supportive environment for the user. This can be created by offering instructions on navigating the system and allowing the user the freedom to make choices about their own navigation behavior. Further, a supportive environment can be achieved by offering the user an adequate level of support to deal with problems they may experience while using the training system.

The online training system prototype attempts to create a supportive environment for the user in a variety of ways. For example, a footer is located at the bottom of every page which allows the user to contact the system creator/administrator.

A more elaborate method of creating a supportive environment is achieved through providing a brief orientation/introduction to the prototype system. The beginning pages of the system carefully instruct the user on how to proceed to the next page of content. The orientation to the system specifically

involves welcoming the user to the system, provides information and links to plug-ins, provides a list of skills necessary to complete the training, and explains the text styling used for emphasis in the system. In this section, the user is instructed to click web links to proceed through the introductory content. After the introductory material has been viewed, the user accesses the system using their assigned login and password.

Once the user enters their login information successfully, the menu for accessing the main content is displayed and directions for navigating the system are provided. The navigational structure allows the user to quickly access content pages of the system. This structure contributes to building a supportive environment by providing the user with a comprehensive overview of the modules and pages to be completed. The menu structure, known as an accordion panel, is provided on all pages of the system after the user logs in. Chapter IV utilizes figures and discusses the accordion panel in further detail.

The material presented through the HTML training system is done at a basic level and provides the user with rudimentary building blocks needed to successfully create and publish web sites specifically at Western Illinois University. The material can be accessed in the order that it is provided or through more meaningful content utilizing the accordion navigation. For users who are relatively new to the web, simple explanations provide them with the background necessary to understand more difficult content, thus helping the user feel less anxious about difficult material that may be discussed.

A supportive environment is created by:

- Allowing the user ready access to the system administrator on all pages of the system
- Guiding the user through a brief orientation to the system
- Providing a comprehensive overview to the content, and by presenting content in small, meaningful blocks.

Meaningful Application

The second component of the Palmer & Rhodes (1997) methodology looks at keeping the instruction related to what is expected in the workplace and the user aware of the relevance of the instruction that is about to take place.

Content of the instructional prototype system is organized with related pages arranged in modules. The content is designed to inform the user of the relevance of completing a given module. For example, the first content page of the "Introduction to HTML" module addresses why the user should learn HTML, stressing that HTML serves as a basic building block to creating web pages. As an additional example, later in the training the user is informed of the advantages of using Dreamweaver® for their web page development. The advantages that are emphasized include the various views available in Dreamweaver® that are useful in development and capabilities of saving files to the web server.

The content of the HTML training system prototype is designed to provide the user with a level of understanding of the importance of the material being discussed. While the intended audience is not currently involved in developing web pages as a profession, it is desirable for them to understand the rationale of why creating web pages is considered important to their future success.

Opportunities for Choice

Another component to be evaluated from Palmer & Rhodes (1997) involves offering the user a variety of choices. One consideration is how the user will be able to access and navigate the content.

The main content of the system is designed to lead the user through the instruction in a linear fashion. However, the user of the system is allowed to access the content in any order they desire (e.g. by topic).

The prototype system is also designed to provide the user with additional choices. As described in detail in Chapter IV, a Lightbox is used to display multimedia elements. Each Lightbox that is displayed to the user is based on whether or not the user decides to click a link. The multimedia available as Lightbox includes graphics, movies, interactive (Adobe® Flash®) movies and text related to the content being discussed. A mouse click is required by the user to access the content of the Lightbox. In the case of multimedia movies, the user can control playback.

Providing the user with the ability to make choices in how content is accessed provides them with an increased level of flexibility to find and access the content that is most relevant to them.

Manageable Tasks

Palmer & Rhodes (1997) suggest keeping the instructional tasks at an appropriate level of difficulty. The prototype system is designed to allow the user to decide the content they should access based on their skill level. Beginners

should enter the content from the beginning, but more advanced users may decide to access content that is discussed in later modules and content pages.

Additionally, the majority of the content of the modules is written in a simple and concise format designed to specifically address small pieces of content. For example, a content module addresses how to upload content to Western Illinois University's web server. Each content page of the module is broken down into a small number of manageable steps such as activating web account space, configuring Dreamweaver® for uploading, checking links and spelling, and uploading and testing the web site that has been developed. Each content page is a manageable task.

Performance Examples

Offering a variety of examples to illustrate the instructional objectives is also a vital component of the Palmer & Rhodes (1997) methodology. It is suggested that examples can be used to demonstrate the correct procedure for accomplishing an instructional task.

In the developed prototype, a variety of performance examples are given to illustrate the proper procedures and processes to build web pages. One content page, for example, discusses the steps that should be followed in order to save web graphics. The proper technique to create a web-ready graphic is presented textually and through a multimedia movie. The user is also able to see the proper techniques to be followed in order to prepare their own graphics for the web.

Knowledge of Progress

Palmer & Rhodes (1997) suggests providing the user with an indication of their progress as they proceed through the training. Knowledge of progress is helpful in letting the user understand how he or she is progressing through the instructional content and should be made available to the user at anytime.

In the HTML training system, the user's knowledge of progress is self-determined. For example, the accordion menu represents a listing of content modules available for the user to complete. The user determines for themselves how well they are progressing through the material based on the rate they are completing modules. The user can also determine for themselves how well they are progressing through a given module.

Opportunities for Success

Yet another component of the Palmer & Rhodes (1997) model is the need to provide opportunities for the user to try new things without risk or penalty to the system. This encompasses the need of the user to complete a relatively simple task before being given a more complex task to achieve. For example, once a user learns the basics of HTML tags, they are then exposed to commonly used tags and then how tags are used to help provide structure to an HTML page. Quite simply, the user is exposed to the information, shown various examples, and then shown how the tags are used in practice.

The HTML training system prototype does not provide any mechanism for rating how well a user is completing most tasks. Since the user is completing the training based on their own internal motivations, implementing a penalty/reward

system is seen as detrimental to the motivation passive learners simply wanting to become familiar with the content contained in the training system.

While the system does not require the user to complete a task before proceeding, they are given opportunities to try new things. For example, at one point in the HTML training system, the user is allowed to use an interactive HTML trainer. The trainer, described in detail in Chapter IV, allows the user to try a variety of different HTML tags and to see the results of the tags they created. If a tag is improperly structured, there is no penalty. Likewise, the user is not required to build any specifically structured tags in order to continue through the training system.

Multi-Sensory Techniques

A variety of delivery modalities are suggested by Palmer & Rhodes (1997) to make the training more engaging for the user. It is helpful to give the user a variety of choices for the delivery of the given content.

While the major portion of the content in the prototype system is text-based, the prototype system provides multimedia examples throughout the training. For example, text may be used to describe the steps to be taken in uploading a web page as well as a related movie clip via Lightbox showing the steps performed.

A variety of multimedia content is used to compliment the text throughout the prototype. Multimedia examples could be in the form of interactive, Adobe® Flash®-based animations and movies with and without audio. While the movies are playing, text is displayed on-screen to help the user identify when a given

step or task is being performed. Attempts have been made to directly mimic the text provided to the user when they first accessed the content page.

While the prototype system is primarily text-based, a variety of methods of delivery are provided to the user. In doing so, the user is able to select a method of delivery to help them better understand the concepts necessary to make them proficient at developing and publishing their own pages.

Intuitive Appeal

The final component of the Palmer & Rhodes (1997) methodology looks at providing the user with intuitive appeal. It is important to keep the content upbeat and positive throughout in hopes of keeping the user engaged. This can also assist in keeping consistency in design and layout.

The content in the prototype system was developed to be positive in nature. For example, the content is designed to provide the user with a sense of accomplishment as they proceed through the system. All content pages are designed to be succinct to help prevent the user from becoming overwhelmed with content.

In terms of design consistency, the use of dynamic web pages accomplishes this goal. For example, although the majority of content is actually delivered through a single web page, the content of that page changes through the use of a database as well as maintaining persistent page elements such as the module navigation mentioned earlier. Doing so helps ensure a consistent delivery of content.

Usability Testing

A number of methods of evaluation were used to determine the overall effectiveness of the training system. These methods include user evaluations for each module as well as the overall system, a page tracking system that helps determine the number of pages accessed by those participating in the study, and an evaluation of the training system by Western Illinois University's webmaster, (who could be considered an expert in both HTML and the process necessary to publish a website through services provided at the University).

Assessment by Graphic Communication Students

Since the primary audiences for the HTML training system are students enrolled in graphic communication classes at Western Illinois University, it was determined to be necessary to involve them in assessing the overall effectiveness of the system. Prior approval for the study by Western Illinois University's Internal Review Board (IRB) was required and courtesy approval provided by Illinois State University. The forms and approval necessary for IRB compliance are included in Appendix D.

In order to fully comply with the IRB process, the following steps were taken. First, the developer of the prototype training system visited upper-division (300 and 400 level) Graphic Communication classes to recruit students, excluding students from his own classes to reduce the risk to reliability.

Students wishing to participate were asked to sign an informed consent document. The purpose of the document is to inform participates of the risks involved in participating in such a study and process for questions or ending their

participation in the study. The risks for this particular study were considered very low.

Once the signed informed consent document was returned to the developer, the participant was assigned a unique number and password to be used for entry into the HTML training system. They were also sent the web address necessary to access the training system. As mentioned previously, participants in the study were asked to respond to each module upon completion. Responses to each module are offered in Appendix E. The following is a discussion of some of the qualitative comments received in each module:

Module 1: Web Basics

When asked to respond to the strengths of the module, students participating in the study found the material presented to be informative, simple and easy to follow. Students believed the amount of time to complete the module was appropriate.

Of the eight responses received, four felt there were no weaknesses to the first module. It was suggested that key words in definitions be highlighted to make them easier to remember. One respondent mentioned that they felt the layout should be changed a bit to make it appear more polished and streamlined. Another response mentioned the desire for including more visual effects, but really felt things flowed together well. Another mentioned the need for a more in-depth explanation of "folders on a server" because they felt this was an important concept many people didn't understand.

Module 2: Introduction to HTML

A variety of strengths were highlighted in the qualitative comments. Many found the explanations and examples helpful, clear, and straightforward. Some appreciated the list of popular HTML tags and one student stated they found the HTML trainer very helpful.

Respondents would like to have had more examples of how tags worked. Two students cited a technical difficulty in one of the Flash® modules presented, which was later fixed. One student responded they would like to see a link for the next content page instead of having to click the appropriate link in the accordion navigation structure.

Module 3: Getting Started with Dreamweaver®

Comments showed the respondents appreciated the exposure to Dreamweaver®. Three of the six responses stated that they appreciated the images that were used during the discussion of Dreamweaver®.

Weaknesses appear to be contradictory. Two respondents would like to have more in-depth explanations of Dreamweaver® and its tools, but another felt there was too much reading.

Module 4: Setting Up Dreamweaver®

The fourth module discusses how Dreamweaver® should be set up before it is used. Respondents found the module easy to follow and the images used as being useful.

One response stated the tutorial was quite useful. Another response said they would like to have seen more comprehensive material. Based on the

feedback received, additional material was added to the module to better explain the steps and processes involved in setting up Dreamweaver®.

Module 5: Building a Basic Site

Respondents mentioned the usefulness of the videos used in the delivery of this module. However, one student had a specific inquiry regarding the content in the lesson, asking if it was possible to move text underneath their image. Instructing students what to do was not discussed as part of the lesson. It was also requested that additional material be added about customizing the attributes of hyperlinks.

Module 6: Web Graphics

Students responding to the survey stated the module was useful because it discussed the need to keep file sizes small. Further, students appreciated being able to understand the differences in file types of graphics used on the web. One student would like to see additional information added about optimizing images. Another student felt that the information was helpful but there seemed to be a lot of reading involved in the chapter.

Module 7: Uploading Your Site

The final module discusses how to post web pages using Dreamweaver®. While the module was found to be helpful, it appeared to be incomplete to two of the users who felt the training material was incomplete. Additional material was added to the chapter to better illustrate the process of configuring Dreamweaver®, including a step-by-step process and video to help illustrate the process.

Page Access Counts

When participants accessed the prototype training system, they were asked to log into the system. As previously stated, each user was assigned a unique identification number. When a page would be accessed, the identification number of the user, date and page being accessed would be stored in a database for analysis.

The following summarizes the page tracking information. At the point of final testing, there were approximately 34 pages of content available in the prototype system. The following table shows the user number and the total number of pages accessed.

Table 1

Number of Pages Accessed by Users

User Number	Pages Accessed
754	2
225	2
643	13
565	21
512	29
885	38
758	46
685	54
843	57
616	63
123	67

From Table 1, it is evident that participants often returned to materials available in the prototype system. The top-most accessed pages are found in the table below:

Table 2

Top-Most Accessed Pages

Page Title	Number of Accesses
Files and Folders	34
Understanding How the Web Works	24
Building HTML Tags	24
A Few More Things About Tags...	22
Web Servers	21
Why Learn HTML?	18
Commonly Used HTML Tags...	16
Dreamweaver® Module Overview	16
Web Addresses	15
HTML - A Universal Format	15

Webmaster Evaluation

Western Illinois University's web master was asked to view the prototype system and to provide feedback for improving the system. The following summarizes the comments of the web master:

With regard to the modular approach of instruction, the webmaster said, "Modular-based training is easy to navigate and peruse via the right sidebar.

One recommendation I would make would be to add a 'Next' and 'Previous' link to each page so allow further ease in navigating through topics and modules. Occasionally I would get lost when clicking another topic as, at a glace, I wasn't sure which topic I was currently reading."

Echoed by many of the students was the desire for additional options to guide users from one page of content to the next. The addition of such features will be discussed in more detail in "Future Enhancements" section of this chapter.

The web master found the evaluation of each module favorable. He stated, "The ability to evaluate each module individually is valuable; this is much more preferable than simply having one evaluation on the entire training at the end."

The web master felt the digital videos available in the training system were also a useful part of the instruction, stating, "The videos are very helpful, especially when explaining concepts such as adding and formatting text. The visual representation of the instructions helps the user better follow along with the training".

Some of the main concerns expressed by the web master dealt with accessibility, both for a user using the system and the lack of content discussing the topic.

Summary

The methods used in the development of the prototype system were often driven by a variety of factors. The Palmer and Rhodes (1997) framework provided a standard by which to compare what was being done to what would be most desirable for the end user and therefore dictated proper interface design

and elements. Requiring the user to navigate the course management system structure, for example, would be unintuitive.

Some of the prototype elements were implemented to keep the experience interesting for the user and allow them to have the same content presented to them in a variety of ways. This includes presenting concepts through text and then allowing the user to see a video of the process.

The development of some features of the system was the result of necessity. For example, the original implementation of Adobe® Flash® was soon found to be cumbersome. Not only were the interactive movies time consuming to create, but using them in a cross-platform environment created additional challenges. Chapter IV summarizes the content found in the prototype system in detail.

Usability tests indicate the system performed as expected. Problems with the system were resolved after they were identified. Suggestions were proposed for additional features and content. Items of this nature will be addressed in Chapter V.

CHAPTER IV

PROTOTYPE OVERVIEW

The following chapter summarizes the prototype system created as a result of this developmental study. The chapter also serves to offer a comprehensive overview of the features and content pages. Although the user is able to access the content pages of the prototype in any order, the chapter presents the pages in a linear, top-down approach; the same order a user is expected to access the material.

Prototype Features

To keep the training system efficient, a variety of features are used for presenting content and navigating the training system. The desire was to keep the page information compact and easy to read as well as simple for the user to navigate. To do so, a variety of features were implemented into the pages. These features are listed below:

- **Lightbox**: Some content and most multimedia used by the system are presented in a Lightbox. Once activated by a user-click, the Lightbox dims the HTML page and presents the user with a new window containing the additional content to be presented. The window can be easily closed by clicking a "Close" link and allows the presentation of additional information without the need for the user to leave the context of the page.

- **Tooltips**: As with Lightbox, tooltips are used to present additional content to the user. Tooltips are used to define words or phrases that require additional explanation. Hovering over a word with a tool tip automatically opens a text bubble on the user's screen and displays the additional information.
- **Persistent accordion navigation**: After the presentation of basic information to the user on the system requirements and how to navigate, the user accesses the main module content. All of the content can be navigated by an accordion navigation system offered on the right side of the user screen. The accordion system features "tabs" that organize the content into modules. Each accordion tab then features "pages" of content. The user navigates the system through the accordion by clicking a tab and then a desired page. The module tab stays open to the current tab to help the user track where they are in the training module.
- **Persistent page titles**: The title of the content page the user is on is presented predominately at the top of the page as well as in the title bar of the of the web browser.

The following summarizes the features and content of the developed prototype HTML training system.

Accessing the Content

The pages and underlying database system are accessible by using a web browser and entering the following web address:

"http://www.wiu.edu/users/murlr/dis/". Accessing this web address reveals the "Welcome" screen as shown in figure 5.

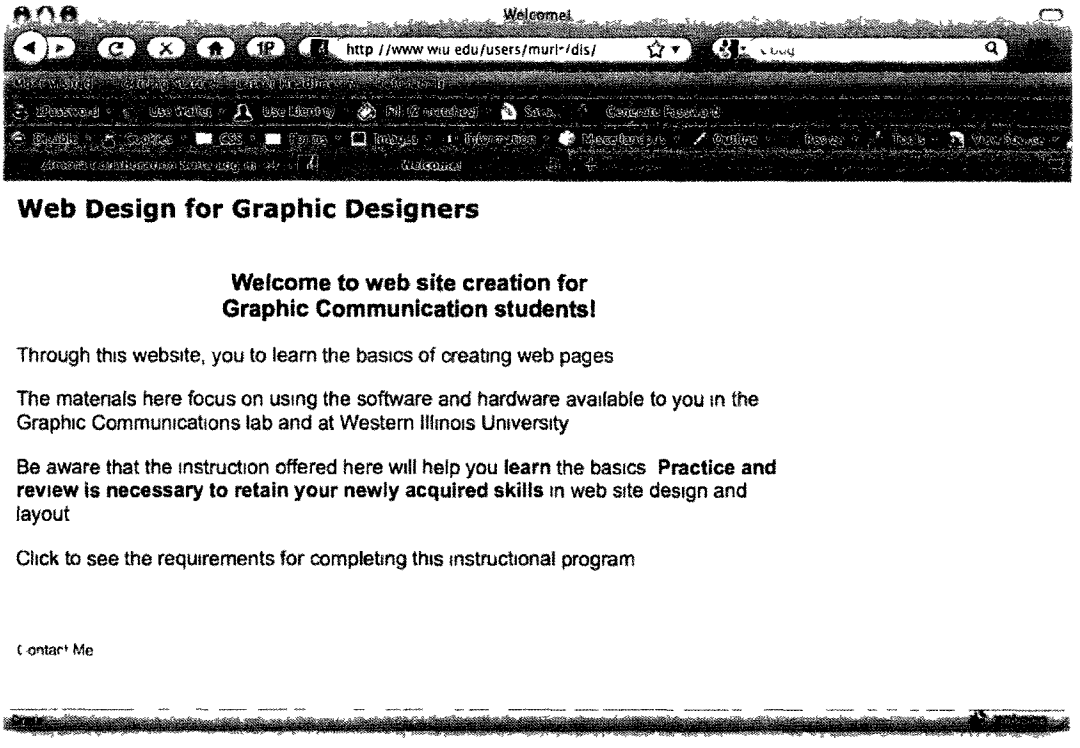

Figure 5. Introduction and welcome to the HTML training system.

Information contained on the page summarizes the purpose of the website. One persistent screen element to note would be located in the footer. The footer on each page contains an E-mail link to contact the developer. Visitors to the page follow the appropriate link to proceed to the next page.

The welcome page above offers none of the aforementioned features but serves to welcome the user to the system what to expect next.

Requirements to Complete the Training

Following the welcome page, students are given the requirements that are needed to complete the online training as shown in figure 6. This includes both the computer skills necessary as well as the web software required to complete the training.

Computer skills indicate that a basic understanding of using the mouse and keyboard are required. Likewise, it is assumed the learner is able to save files and is expected to have some advanced computer skills such as those needed to produce a page layout and/or graphic. Ideally, they will have completed the Graphic Communication 211 course, which covers these baseline skills.

The user is required to have three software components installed in order to successfully complete the training. The components are relatively common and most will already be installed. The components consist of Adobe® Acrobat Reader® (for viewing PDF information), Adobe® Flash® Player, for interactive animations, and Apple Quicktime® for the viewing online movies. Links are provided so users can quickly download and install any required components.

The user is prompted to continue to the next page to learn how text is stylized and the significance of the styling. Again, being an introductory page, none of the aforementioned features are utilized.

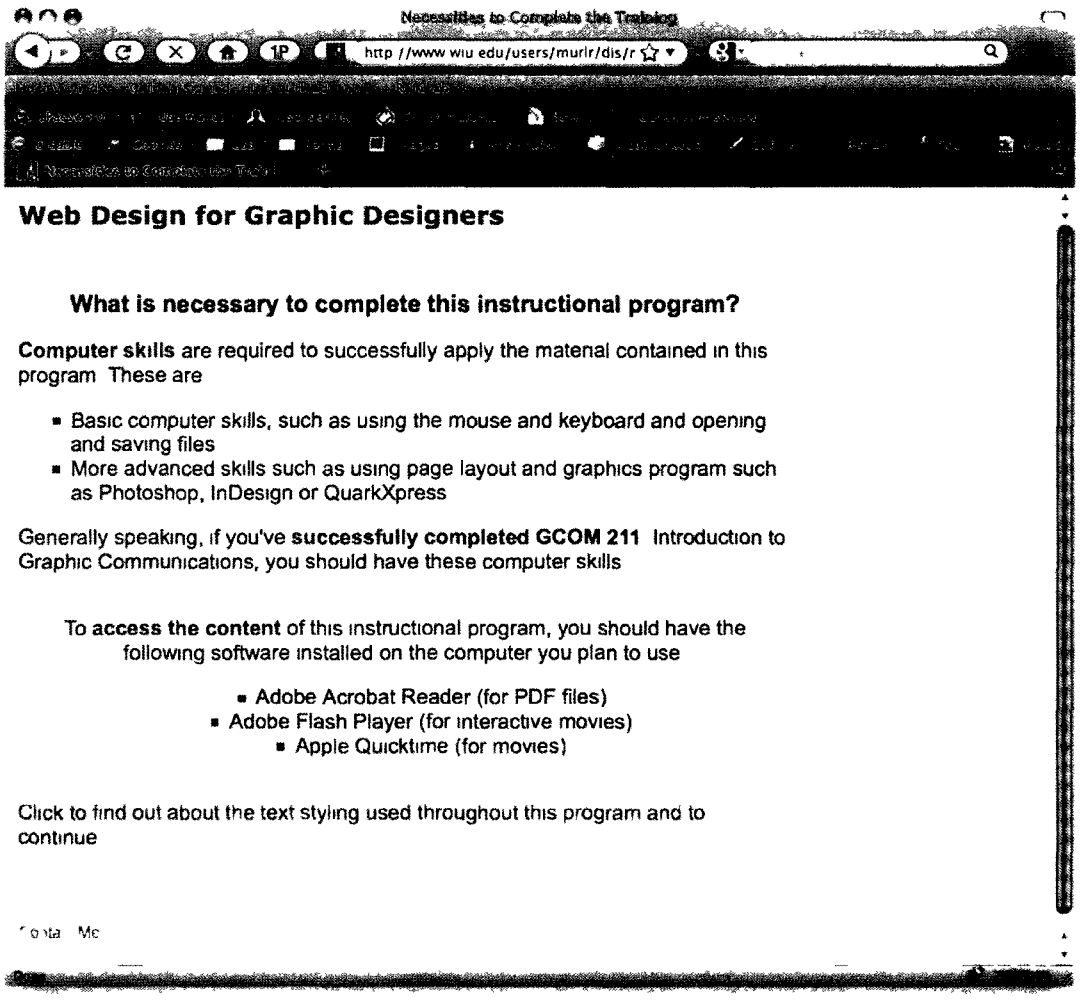

Figure 6. What is necessary to complete the instructional program?

Text Styling Used in the Training

Three different text styles are used to designate specific items in the training (figure 7). They utilized unique color, typeface and/or style. While most will be able to interpret a change in color, a change in the type or style was also used to assist users that may be unable to distinguish colors.

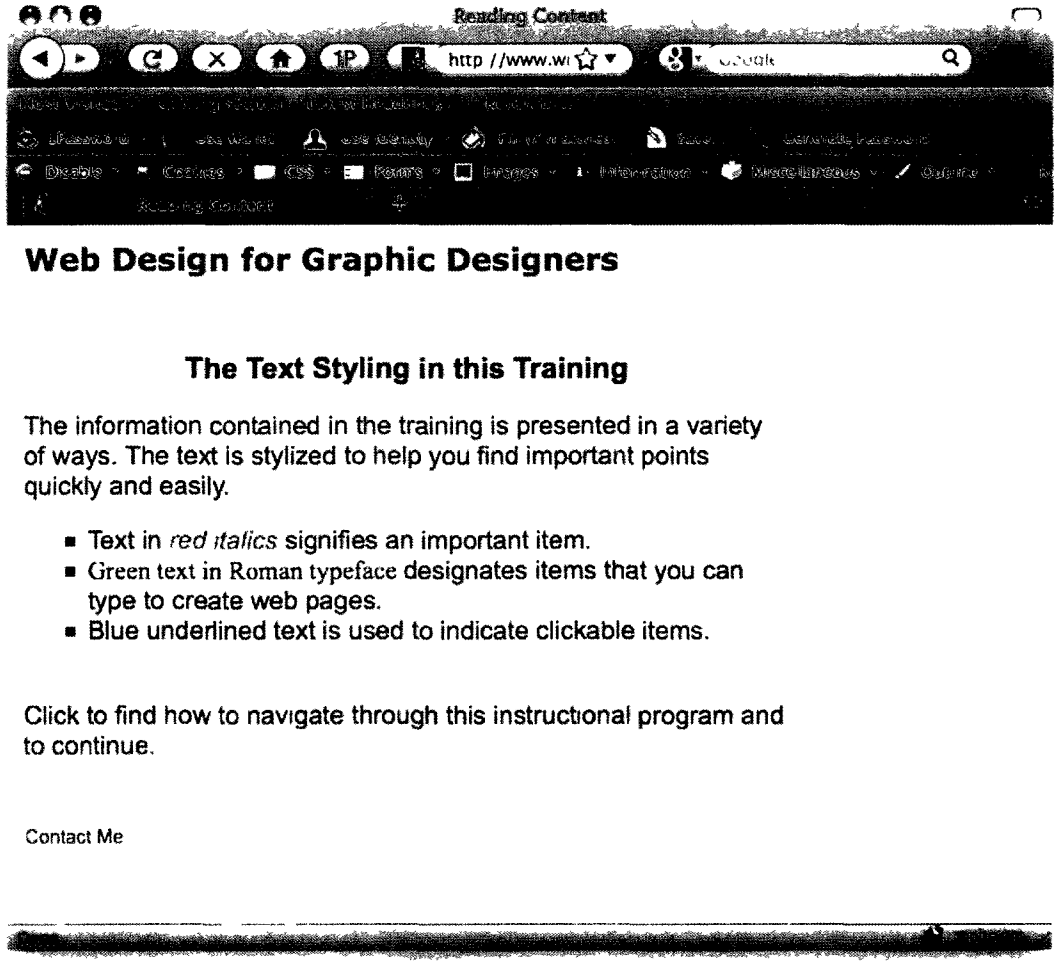

Figure 7. Text styling used in the prototype training module.

Red italics text is used to designate an important item. Green text set in a Roman-style typeface is used to designate text items that can be used in the creation of web pages. Finally, blue underlined text is used to designate hyperlinked or clickable items.

The user is prompted to continue through the program and how to navigate the information contained in the training. In order to track users through

the training system, each user is assigned a "Participant Number" and password. In order to access any additional information, the user is prompted for this uniquely identifiable information. The login screen (as shown in figure 8) contains no navigational or content features.

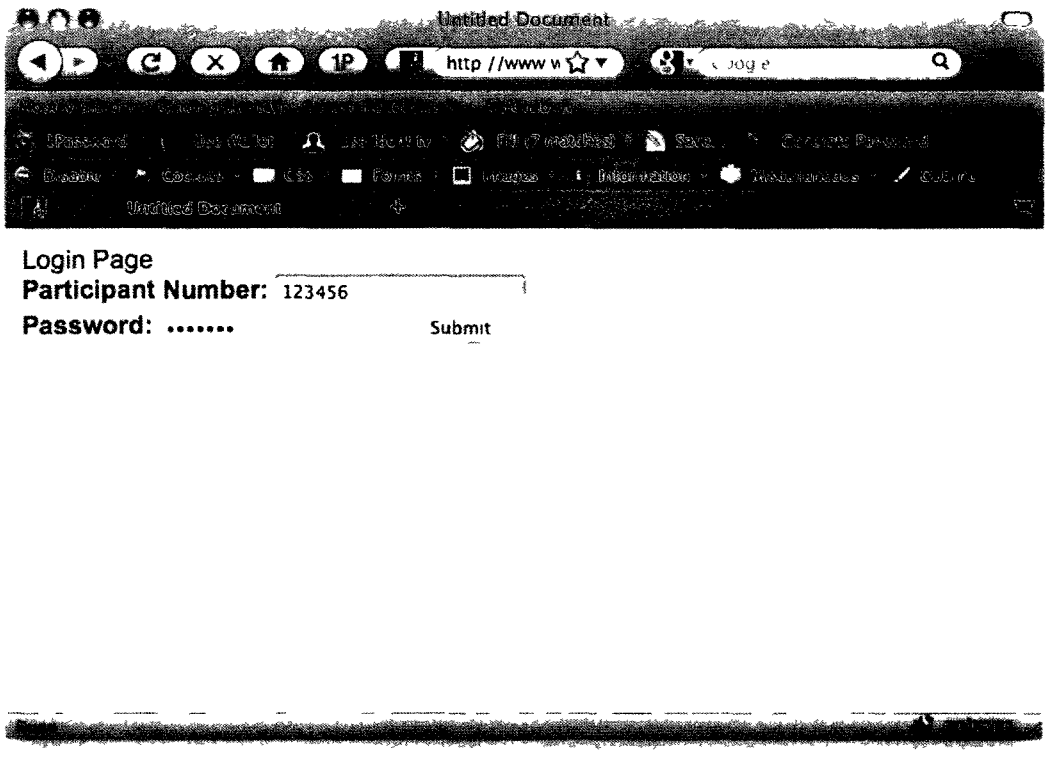

Figure 8. Login page to the prototype training system.

Navigating the Instructional Program

Once the user has successfully logged into the system, the layout of the page changes with the addition of the accordion navigational structure on the right-hand side of the screen.

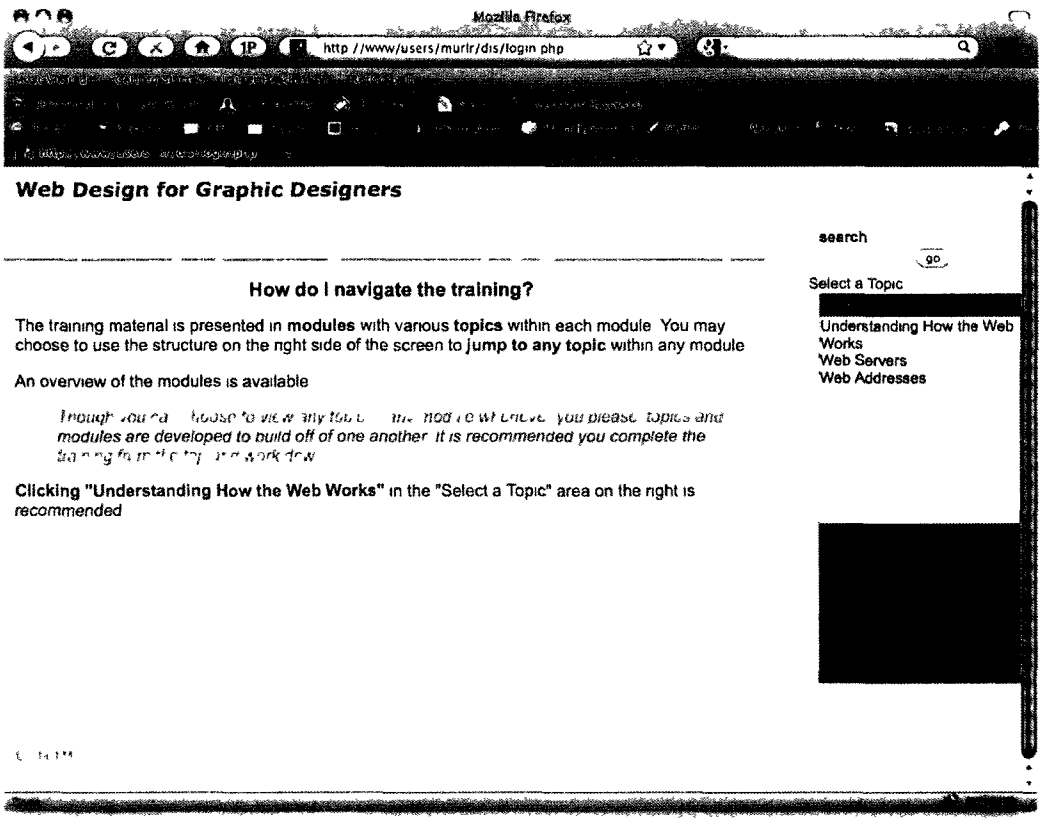

Figure 9. Navigating the training.

Explanation on the page (figure 9) informs the user that the content of the training system is organized into modules and sub topics. Clicking on the appropriate title from the accordion menu allows the user to access each subtopic or page of content.

The user can also view a brief module overview by selecting the appropriate hyperlink. In order to keep the pages visually compact, a Lightbox effect is used to display auxiliary information as shown in figure 10.

The user is prompted to select "Understanding How the Web Works" from the accordion menu to continue. Doing so will prompt the user to transition from using the system to accessing the subject matter content of the training module.

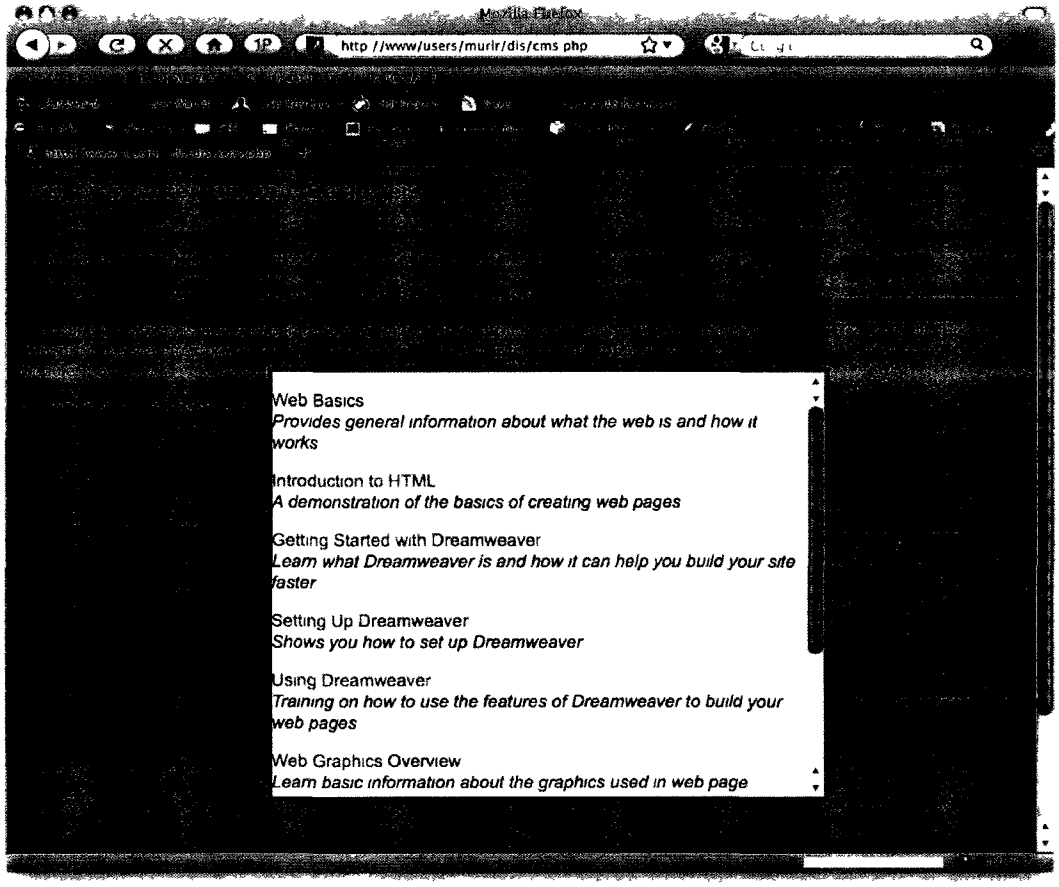

Figure 10. Modules overview in a Lightbox.

Understanding How the Web Works

Understanding How the Web Works is the first page of content in the Web Basics module. This page contains many of the features explained at the

beginning of the chapter and utilizes persistent page titles, a Lightbox, Tooltips, and persistent accordion navigation.

The basics constructs of how the web functions are reviewed in this section. Two important ideas are presented and defined on the page: Hypertext Markup Language (HTML) and Hypertext Transfer Protocol (HTTP). The appropriate definitions for these terms are presented in tooltips (e.g. figure 11). A link to a Lightbox is available on the page in case the user chooses to learn more about the concept of hypertext.

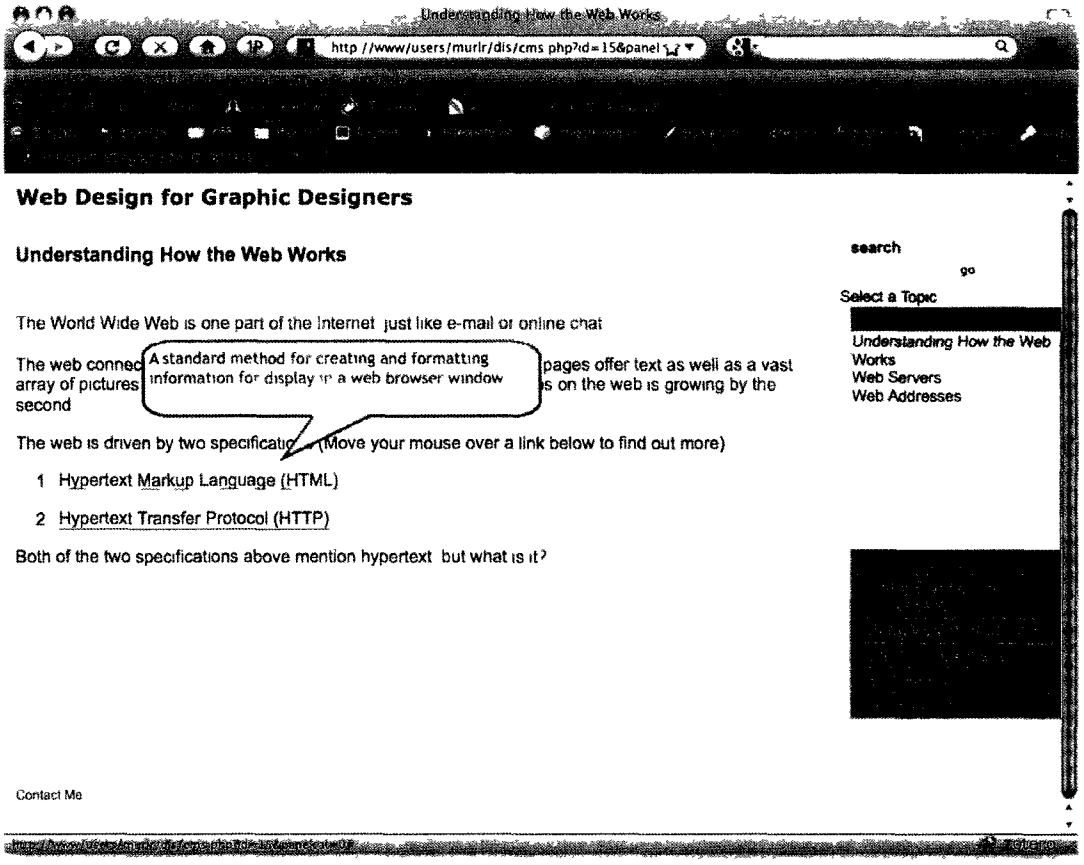

Figure 11. Understanding how the web works with tooltip example.

Web Servers

The second page of the Web Basics module examines the concept of a web server and how web information is passed from the server to the client. An important element for the student to have clear is that HTML files and multimedia files (images, movies, etc.) are stored separately from one another.

One multimedia element available on this page is the option to view an Adobe® Flash® interactive animation. When the user chooses to view the animation, a Lightbox is used. The user will see the client request an HTML page from the server which then sends the page, including the graphics needed to build the page back to the client computer as shown in figure 12.

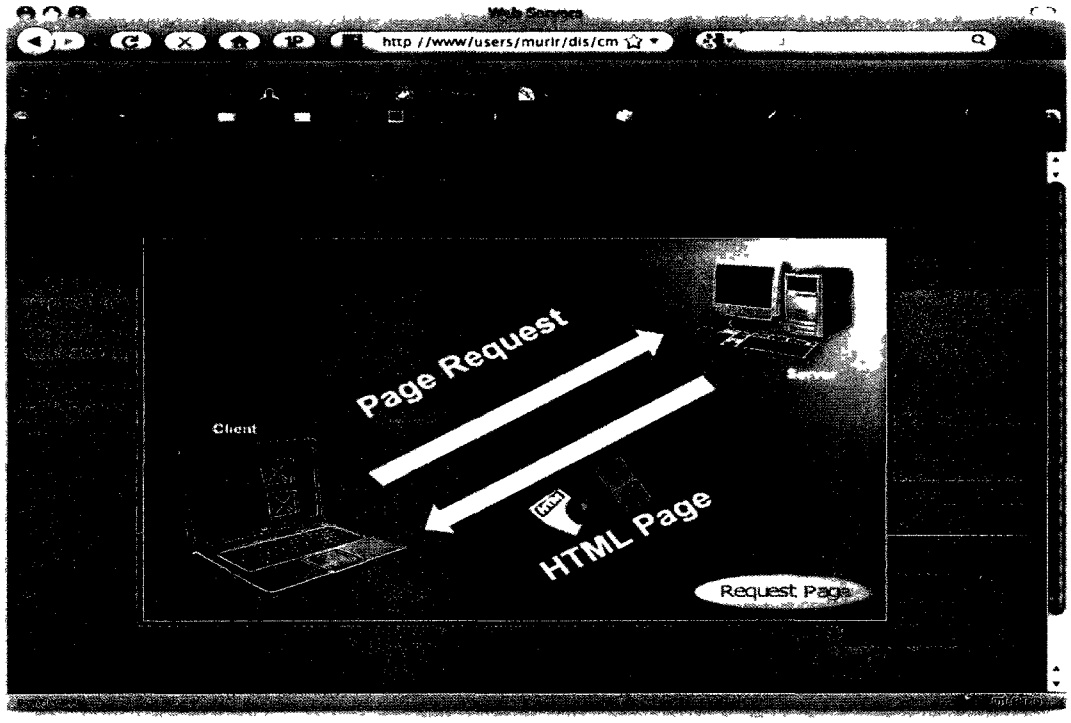

Figure 12. How web servers work Adobe® Flash® example as a Lightbox.

Web Addresses

The next page of the self-guided training system focuses on Web addresses. It is fundamental for the student to understand how the folder structures they choose in their websites are used to make links to other pages or multimedia.

As with the previous page, the Web Addresses section features an interactive multimedia element created in Adobe® Flash®. Once the user chooses to view the Flash® file, they are presented with information about how a Web address is built. A Web address is displayed on the screen and the user can roll over the elements to uncover the components necessary in making a Web addresses and recognize why the order of the address elements is important. An example of this use of the interactive Lightbox is shown in figure 13.

This page of content completes the first module. In order to provide feedback for further development, the user is asked to complete a brief questionnaire at the end of each module.

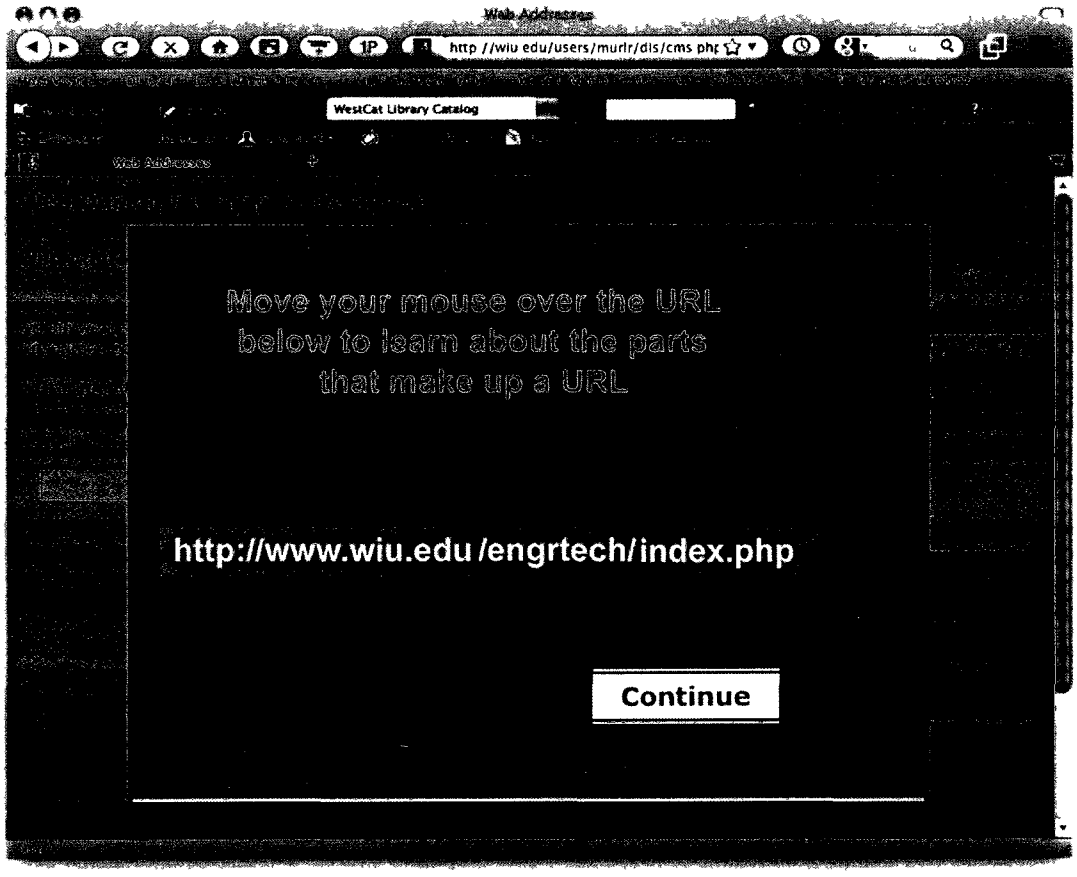

Figure 13. Interactive Lightbox example.

Module Evaluation

For simplicity and anonymity, the user is prompted to enter their assigned user number, which serves as a method of tracking the user through the system. The module being reviewed is hidden from the user but the data is collected when the evaluation form is submitted.

The evaluation is constructed on a 5-point Likert scale from "Not at all useful" to "Very useful". In addition to rating the usefulness of the module, the respondents are asked to estimate how long it took them to complete a given

module. They are also asked open-ended questions to help provide useful feedback and are prompted to respond to what they believe are the modules strengths as well as what they believe could be done to improve the module. As they complete the training, they continue providing feedback at the conclusion of each module.

Why Learn HTML?

The second module is designed to provide an overview of HTML and tags. The first page of content for this module explains the importance of learning HTML and, through the use of a tool tip, briefly introduces the user to the basic building blocks of HTML known as "tags". As shown in figure 14, this page features a tool tip and persistent navigation and titling.

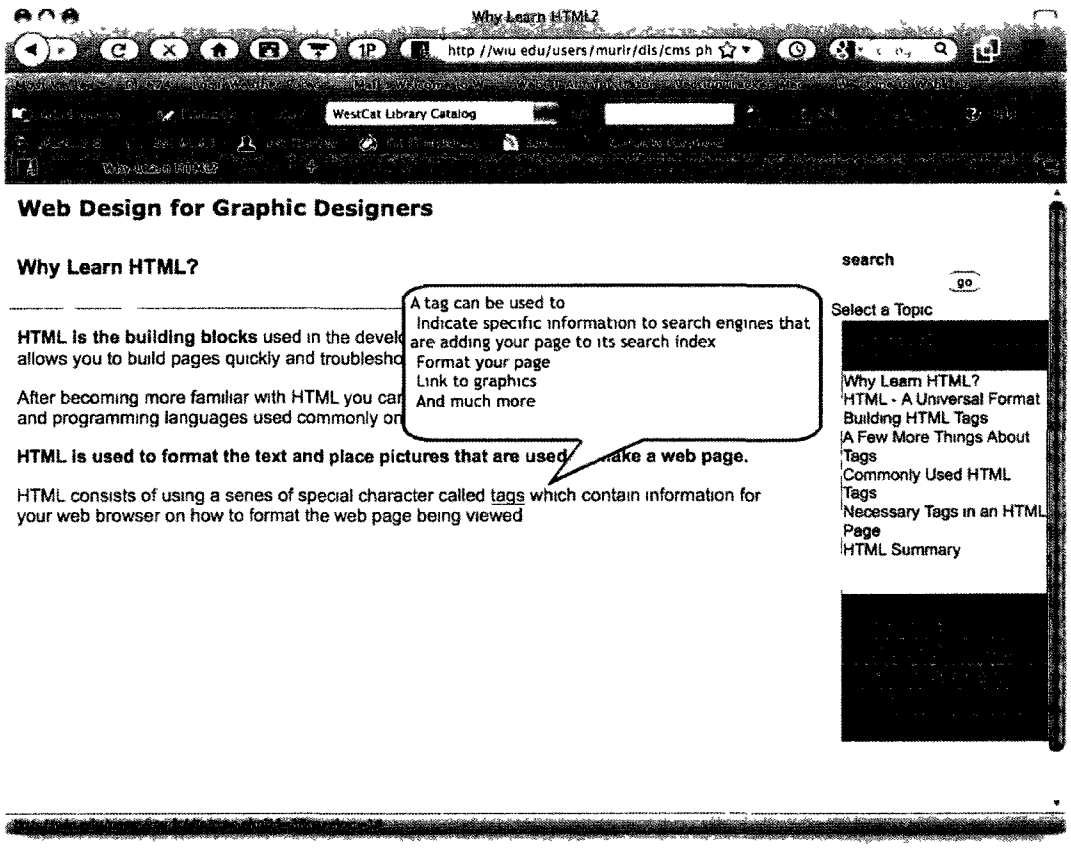

Figure 14. Why learn HTML with tooltip.

HTML – A Universal Format

The HTML – A Universal Format page contains only a small amount of content (figure 15). The intention of this page is to illustrate that is not necessary to have a high-end web editing software in order to save or create HTML pages. Beyond the persistent features, this page of content contains no additional features.

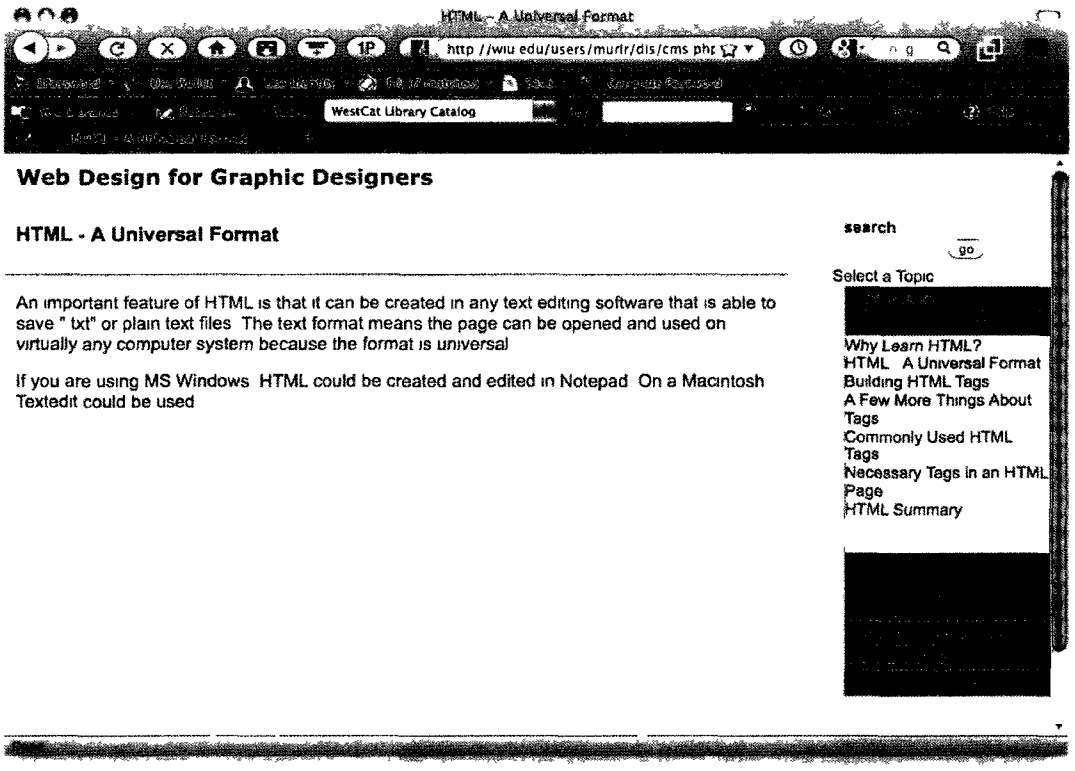

Figure 15. HTML – A universal format content page.

Building HTML Tags

Introduction to the basic building of HTML tags is covered in Building HTML Tags through clarification of the use of brackets ("<" and ">"), the creation of tags and how to turn some tags on and off. It should be noted that the HTML tags used in the discussion are green and utilize a Roman typeface to help the user differentiate between content and examples (see figure 16).

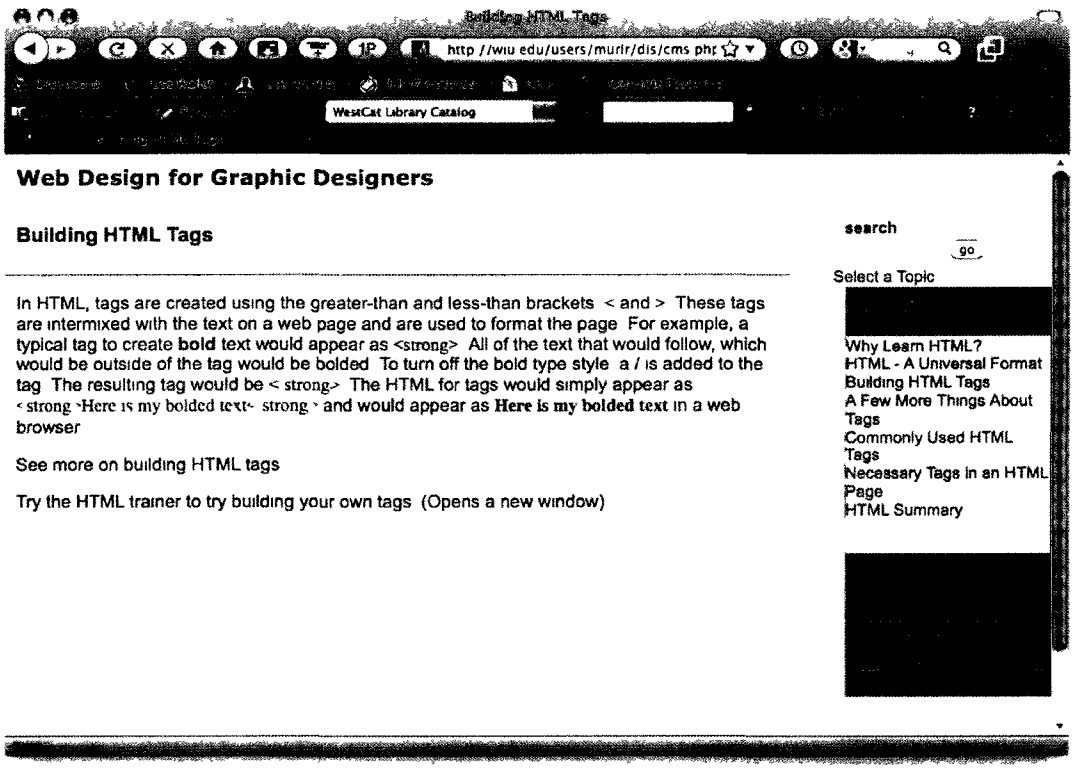

Figure 16. Building HTML tags content page.

The bottom of the page contains a link "Try the HTML trainer to try building your own tags". Following the link opens an HTML trainer page in a new browser window or tab. The purpose of the trainer page is to provide the learner the opportunity to try to create their own tags and see how they would look when they are viewed with a web browser (see figure 17).

The trainer was developed using PHP and web forms. After brief instructions, the user is instructed to enter HTML codes in a web form and click "Try it". The results of their code are then shown in a box labeled "The Results". Any valid or invalid HTML code can be entered and the results shown to the

user. The user always sees how the browser will handle the tags they have entered.

The HTML trainer also has examples of tags that can be used and a brief description of what is happening in each example. The examples are located at the bottom of the trainer and the user can navigate an accordion to view the given examples. These examples cover formatting text (creating large, blue text), creating a link, and adding hard (paragraph) returns in an HTML page.

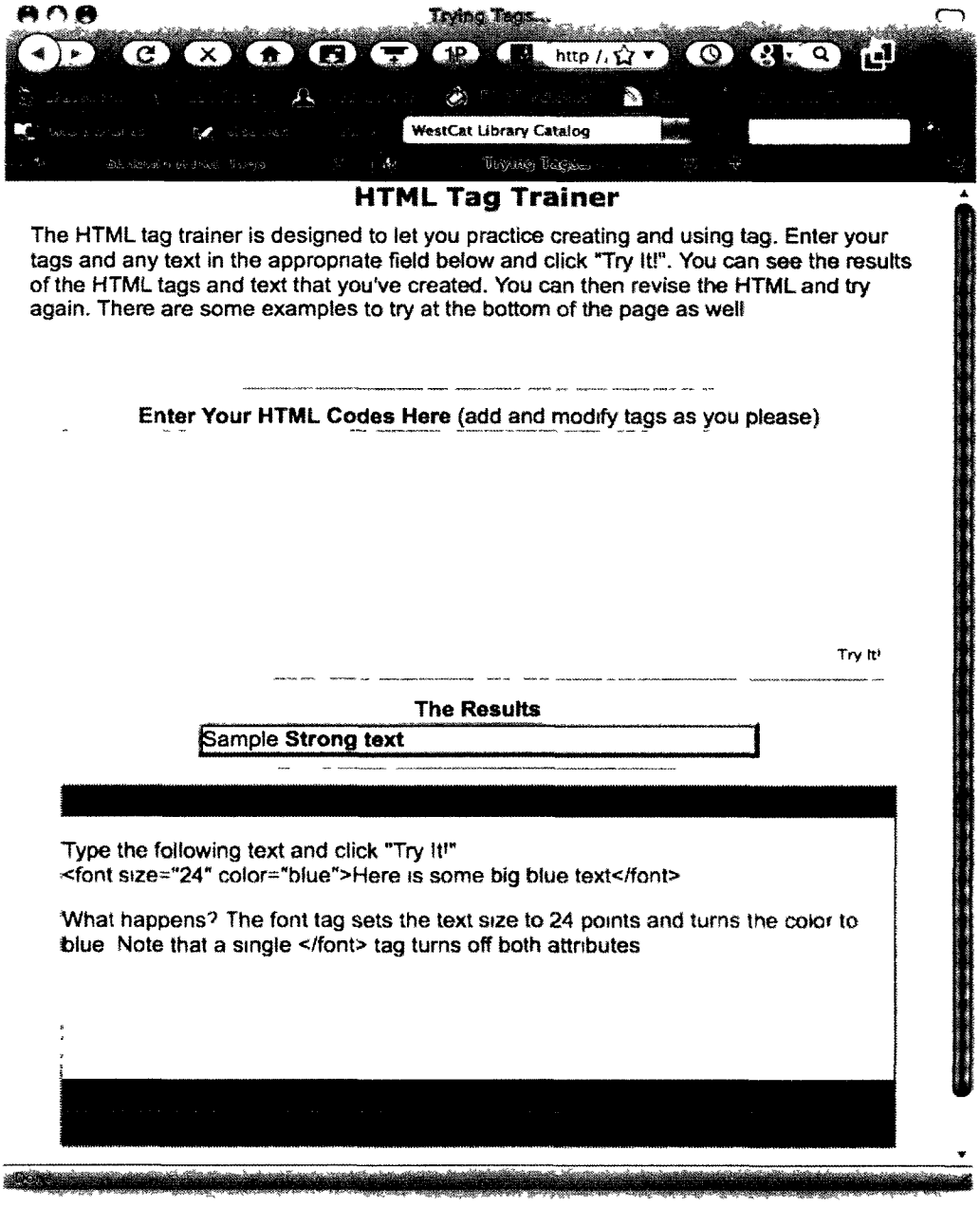

Figure 17. The HTML trainer with accordion panel used for examples.

While the HTML training system page contains persistent features (navigation and titling), it also utilizes a Lightbox. The Lightbox plays an

animation designed to help the user become slightly more familiar with the HTML tag creation process and assists in correctly identifying the brackets used in the tag creation process (figure 18).

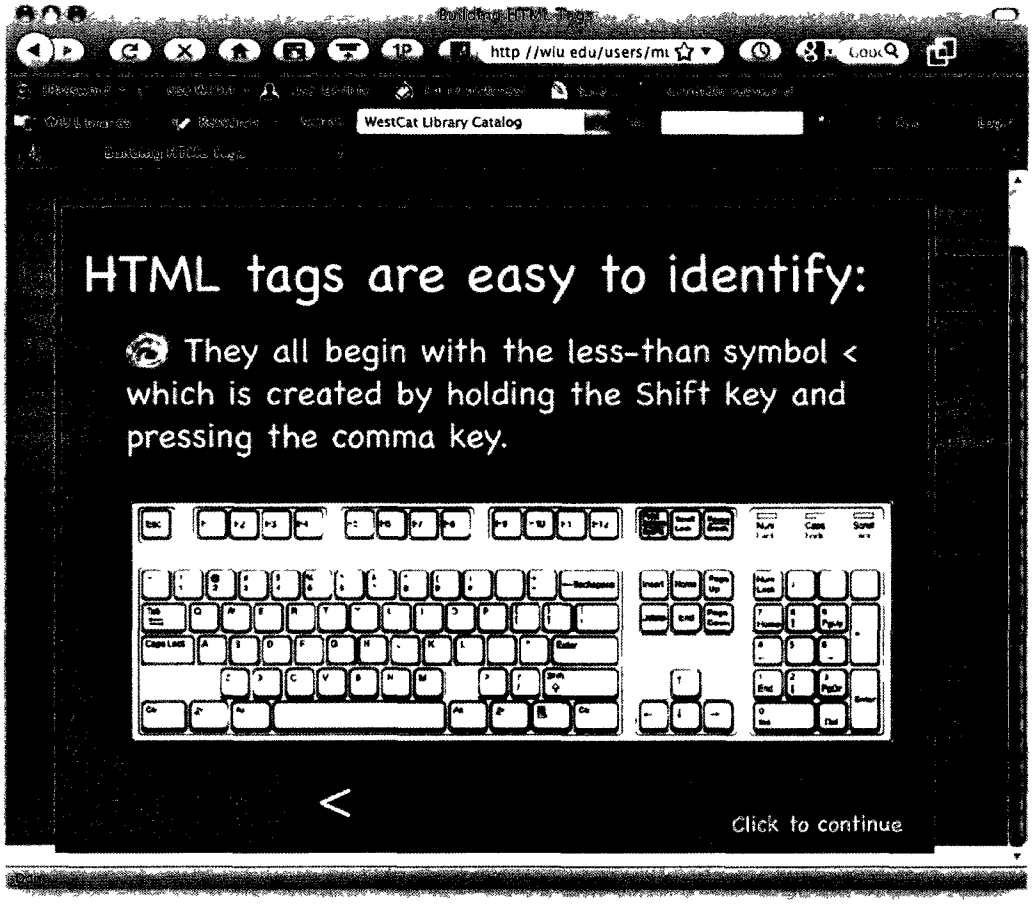

Figure 18. Building HTML tag Lightbox movie demonstrating how to create tags.

A Few More Things About Tags

Some additional tag conventions are discussed in the A Few More Things About Tags section. The conventions covered include (see figure 19):

- Tags are not case-sensitive

- Some tags can have options with them, such as font and color
- Some tags don't need to be turned off, such as the horizontal rule
- Web browsers ignore extra spaces in text so using the space bar for align in ineffective
- Web browsers will ignore tabs set with the keyboard
- Web browsers will ignore returns created by pressing the keyboard

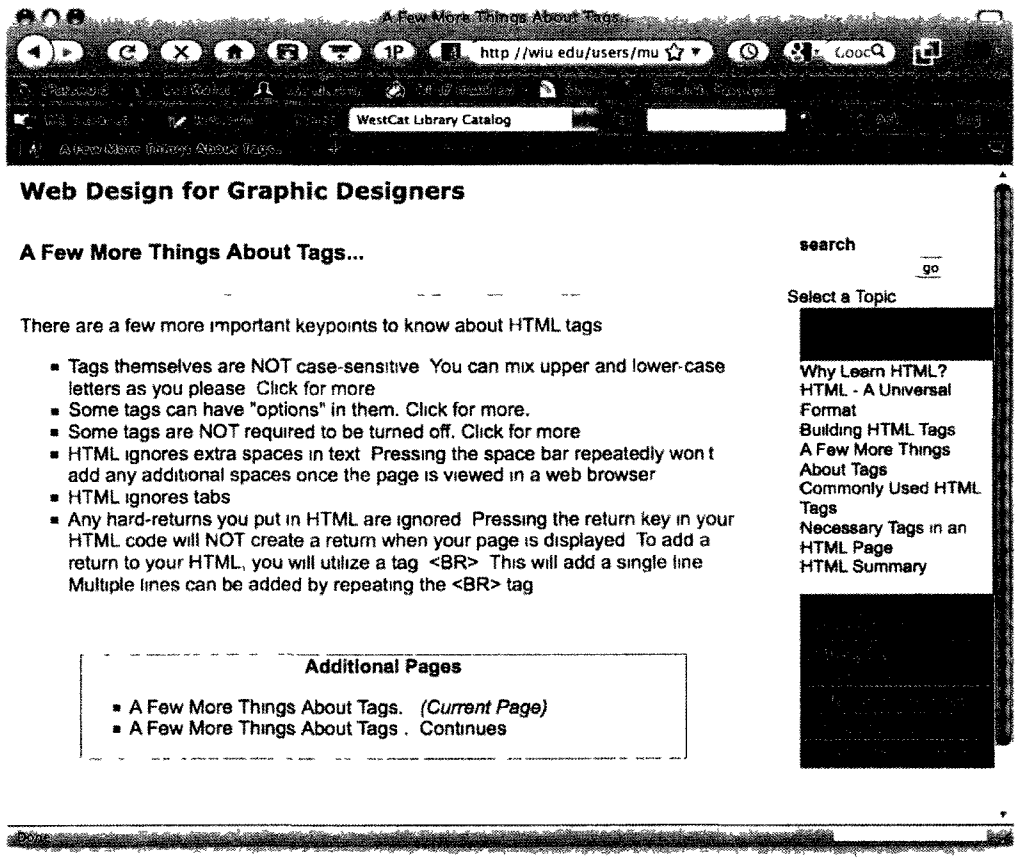

Figure 19. More information about tags with additional pages / sub-page navigation.

Features on the page include Lightboxes which offer clarification on some of the conventions mentioned above as well as the persistent navigation and page title elements. In order to keep the pages easily readable and uncluttered, additional information about tags is placed on another page linked at the bottom of the screen. This navigational element allows the content that belongs together to stay together while allowing other content to be covered.

The Additional Pages element shows the user any additional pages with the page and allows them to quickly access the content. It should be noted the training system recognizes the users current page and identifies this for the user, making it easier for them to navigate the additional pages of content.

The second page of content is shown in the following screen image. This page also contains the persistent navigation and titling used throughout the training system.

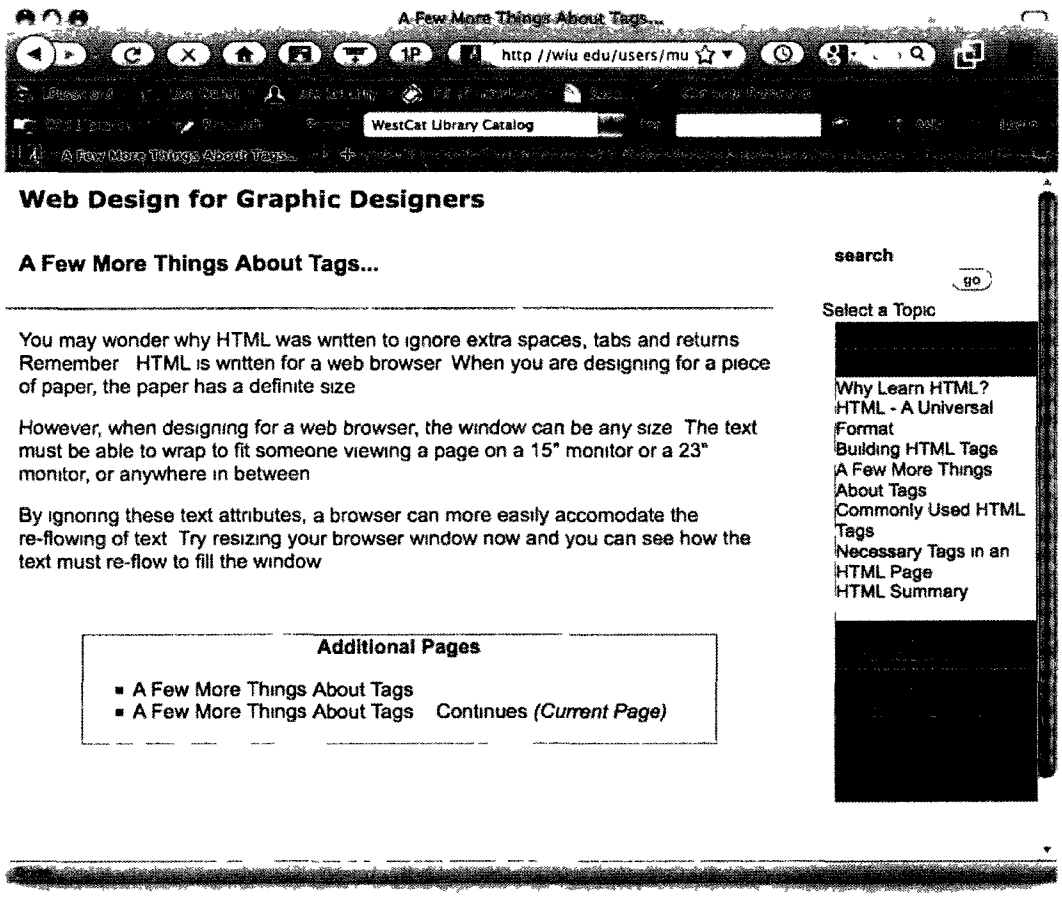

Figure 20. Second sub-page concerning additional information about tags.

Commonly Used HTML Tags

This page of content is designed to provide the user with a comprehensive list of HTML tags that can be used in the creation of their own pages. While not exhaustive, it does provide a listing of the more commonly used HTML tags. As stated at the top of this content page, it is recommended that the user not attempt to memorize the list but instead to print the page and uses it as a reference. (See figure 21).

The page features include persistent navigation and titling. While most of the pages of the training are designed to be compact, this particular page is denser with content with the intention of it being used as printed material.

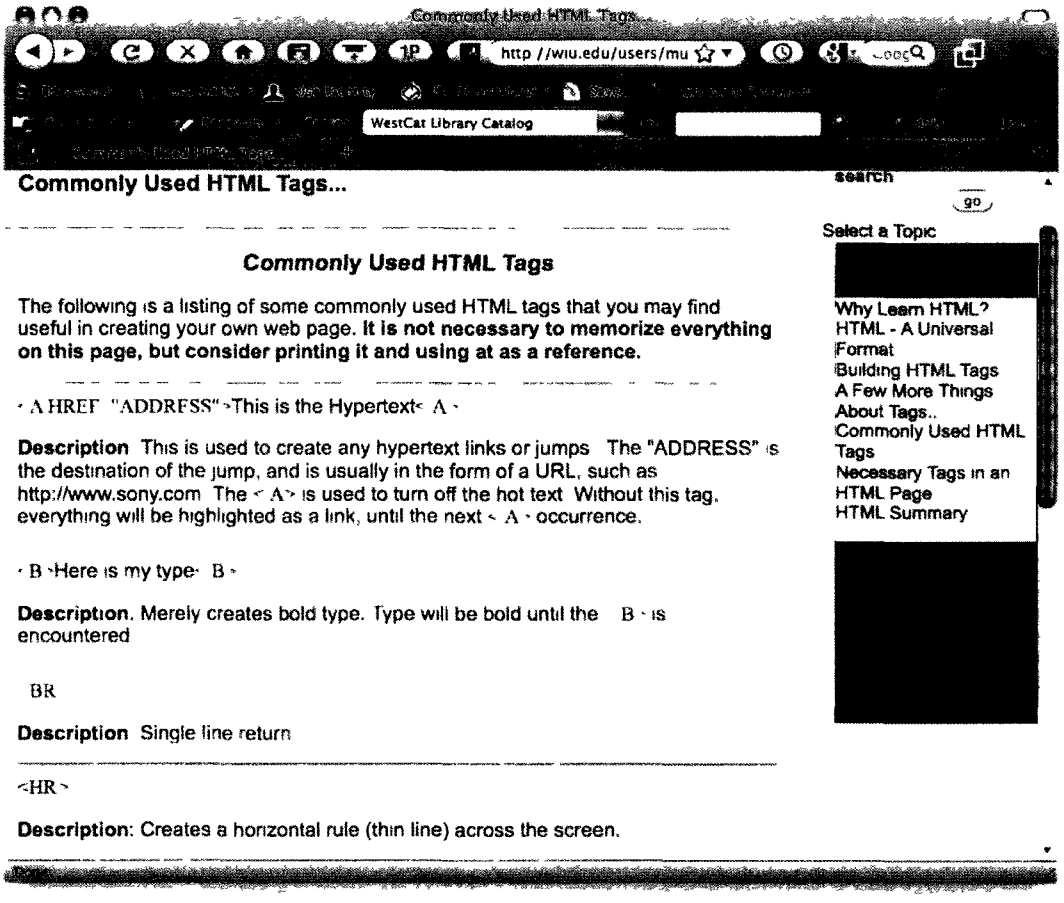

Figure 21. Listing of commonly used HTML tags.

Necessary Tags in an HTML Page

One of the most important tasks of HTML is to provide structure to web pages. The figure below (figure 22) shows the structural tags for creating a

standard HTML page. Hovering over any element shows the user the function of the specific tag.

There is heavy use of persistent navigation and titling and the tooltips feature in this section.

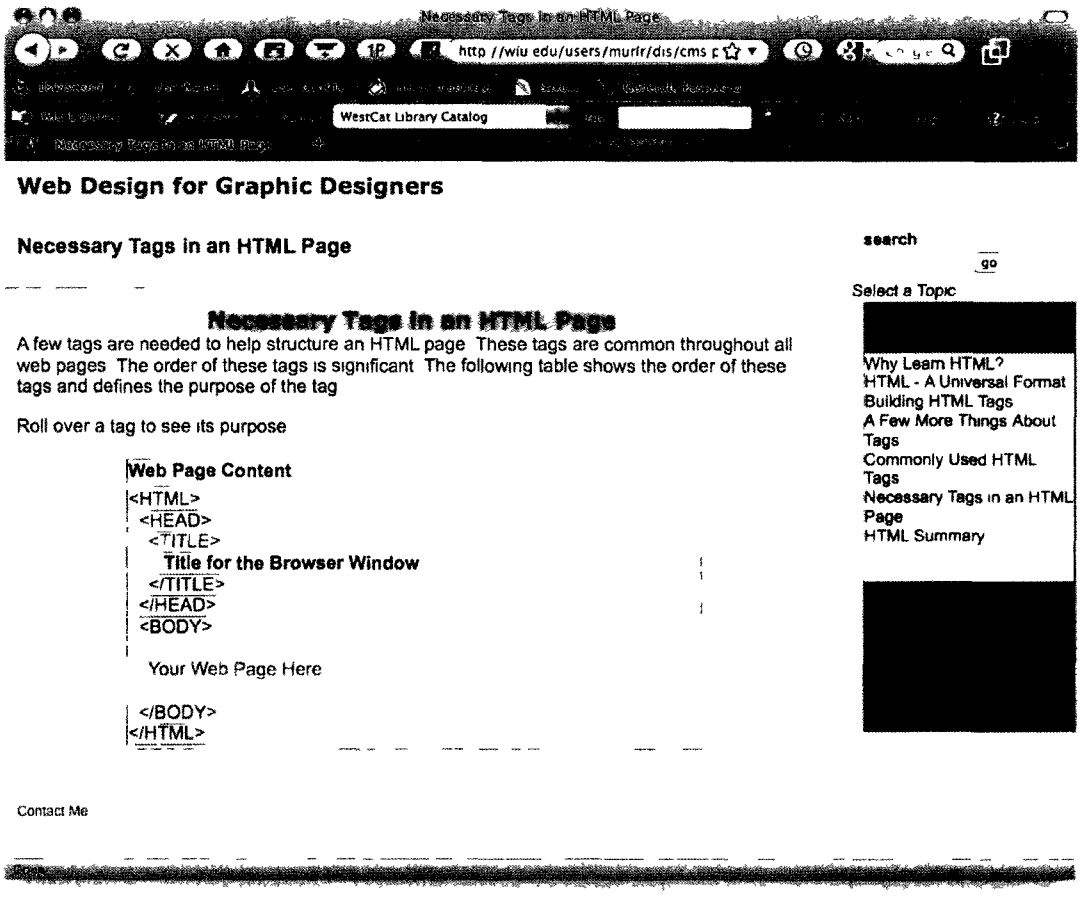

Figure 22. Required HTML tags.

HTML Summary

The final page of this module is a brief summary of some of the concepts discussed earlier in the module. The figure below (figure 23) is a screen shot of

the HTML summary page. As the last page of the module, the user also has the option to complete the brief evaluation following the instruction.

The features of this page include persistent navigation and titling.

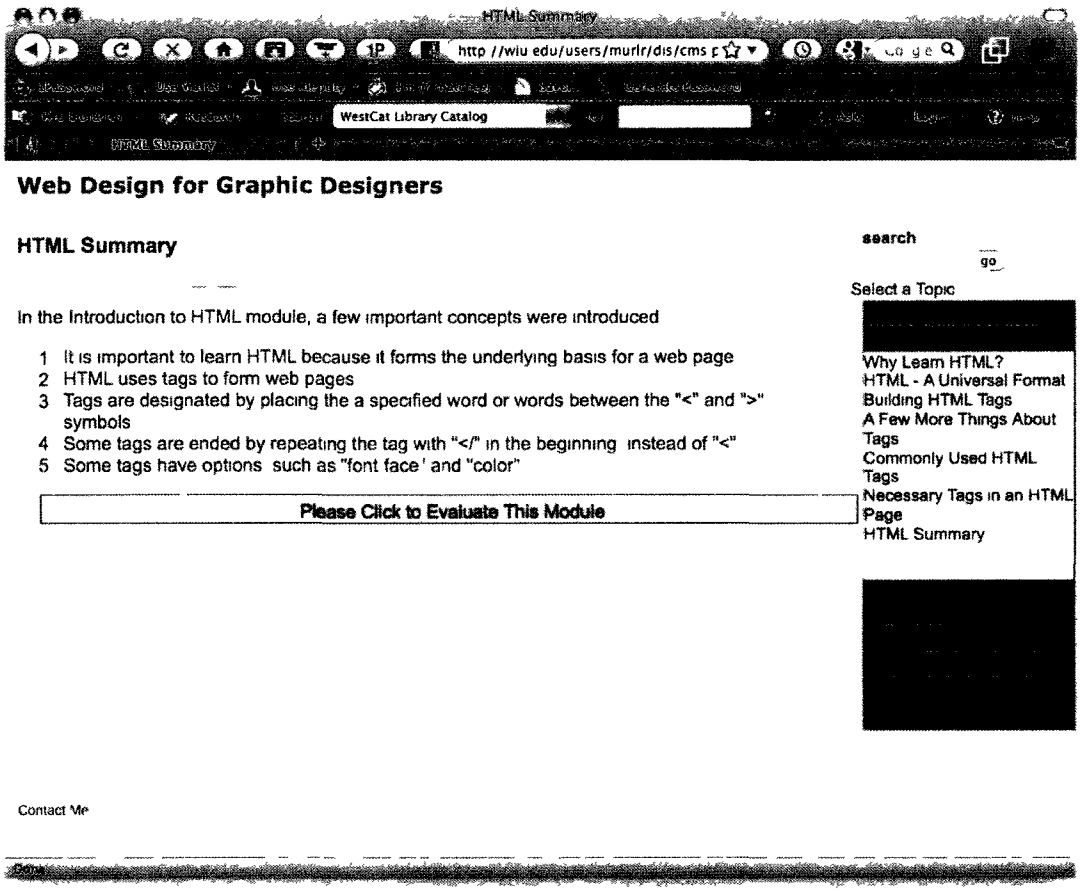

Figure 23. Module summary and link to the module evaluation.

Dreamweaver® Module Overview

The module titled "Getting Started with Dreamweaver®" is an overview of the Dreamweaver® program. The module explores the advantages of using

Dreamweaver® over hand-coding HTML, methods in setting up local files and folders of a website, and introduces the user to some of the basic functionality of Dreamweaver®.

This page includes persistent navigation and titling as shown in figure 24.

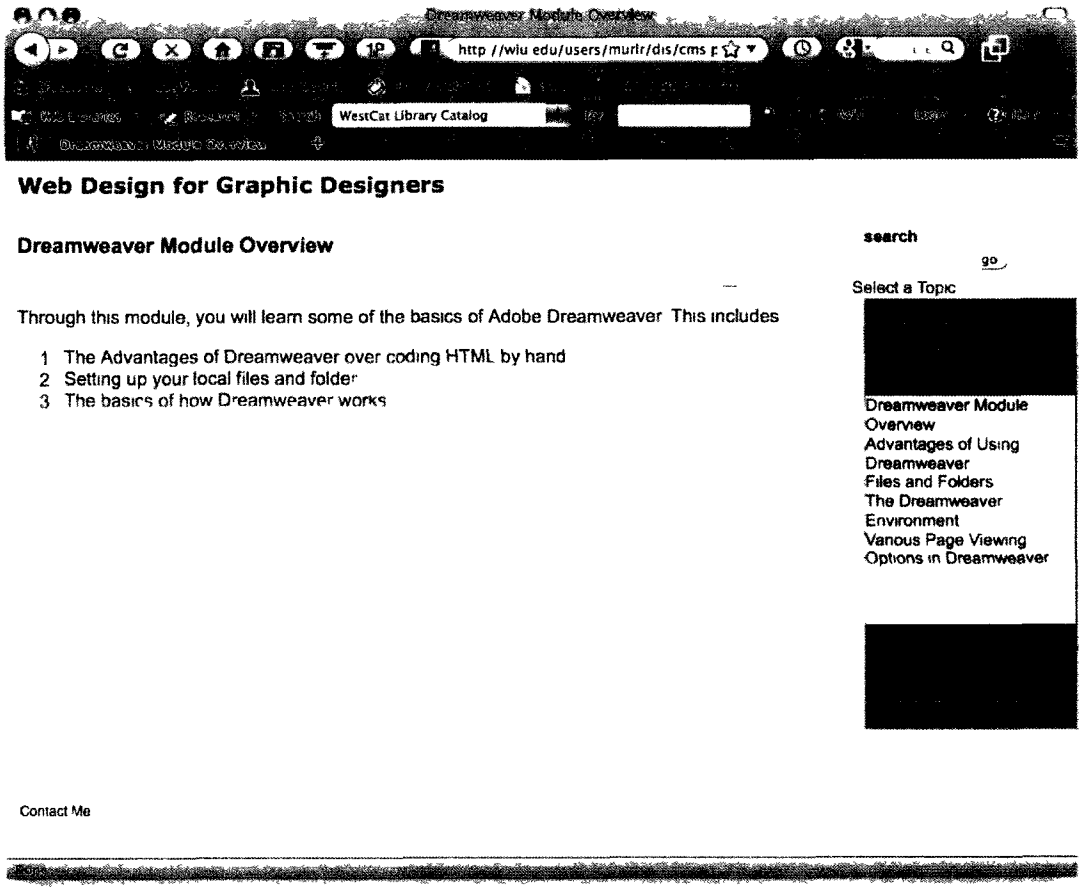

Figure 24. Overview of the getting started with Dreamweaver® module.

Advantages of Using Dreamweaver®

The intent of "Advantages of Using Dreamweaver®" is to present the argument that Dreamweaver® is a better development environment than a basic HTML text editor. Dreamweaver® allows the user to work directly in the HTML code if they choose, but also allows them the advantage of using a program that is more user friendly (figure 25).

This page includes persistent navigation and titling features.

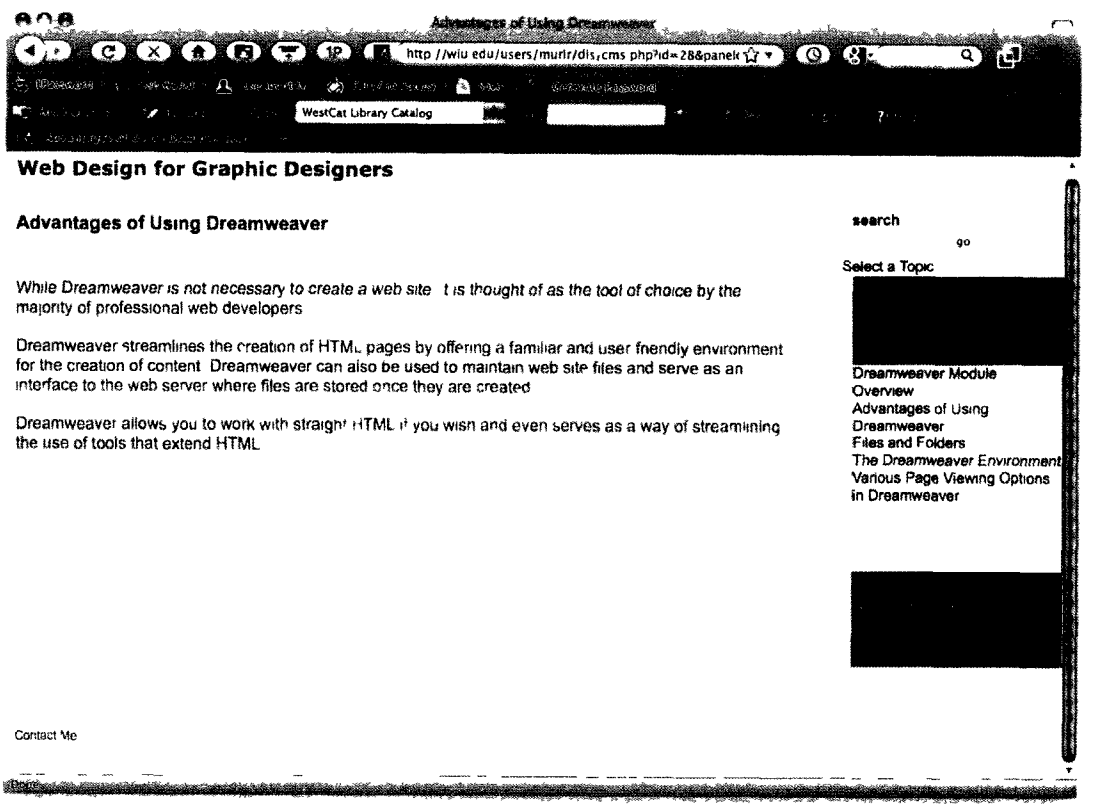

Figure 25. Advantages to using Dreamweaver® content page.

Files and Folders

To successfully publish web pages, the user needs to understand the concept of and files and folders and manage them successfully. This section makes clear to the user some methods of organizing folders to help keep their website files organized and the user is able to decide on a file system that works best for them. Additional pages were required to relay the content to the user. The "Additional Pages" navigational feature is presented at the bottom of each of the sub-pages as shown in the figures 26 through 28.

Persistent navigation and titling are used throughout the pages.

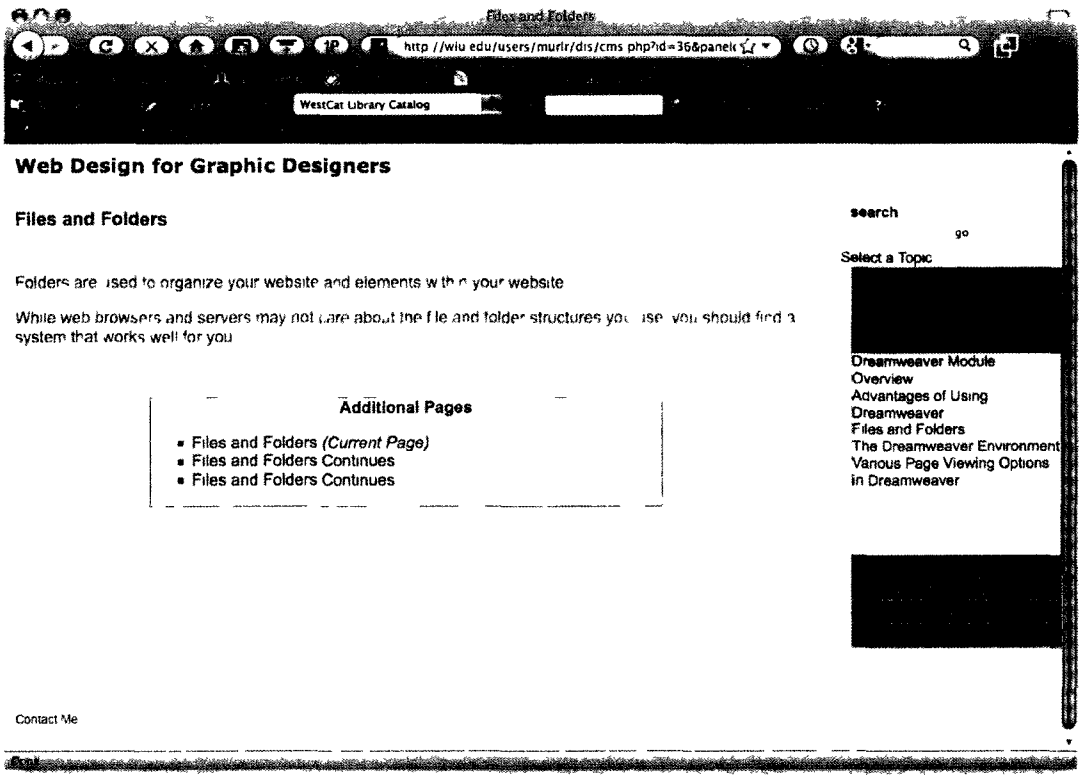

Figure 26. Files and folders content page.

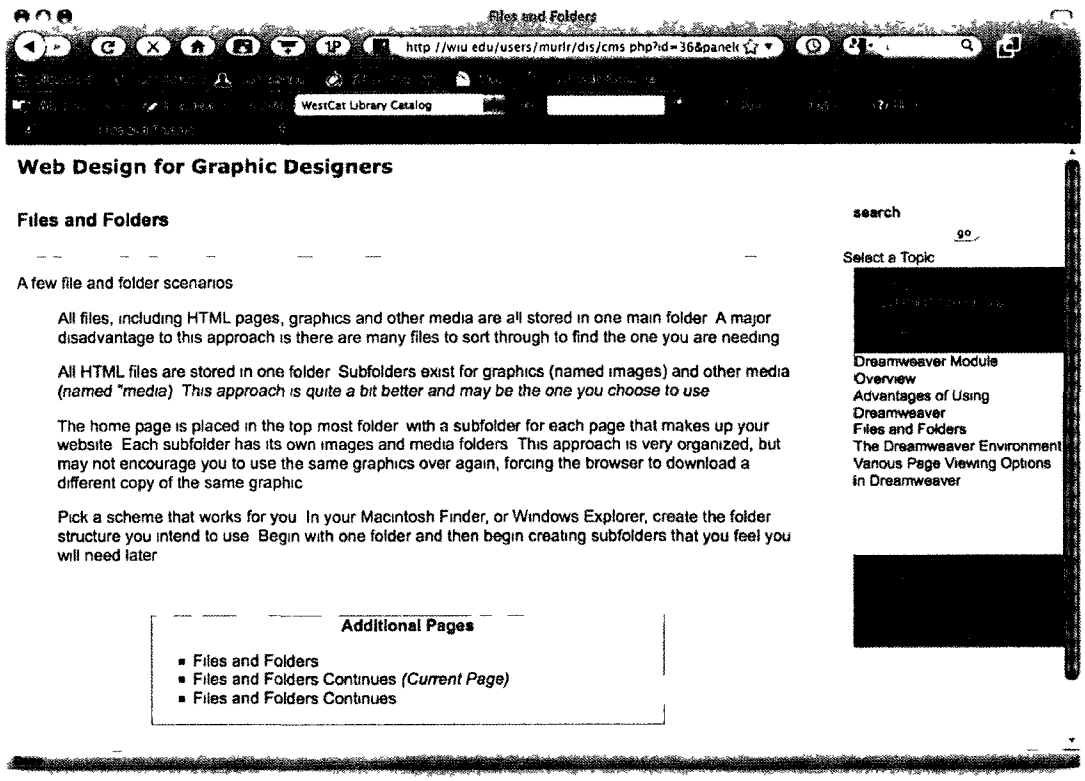

Figure 27. Files and folders second sub-page.

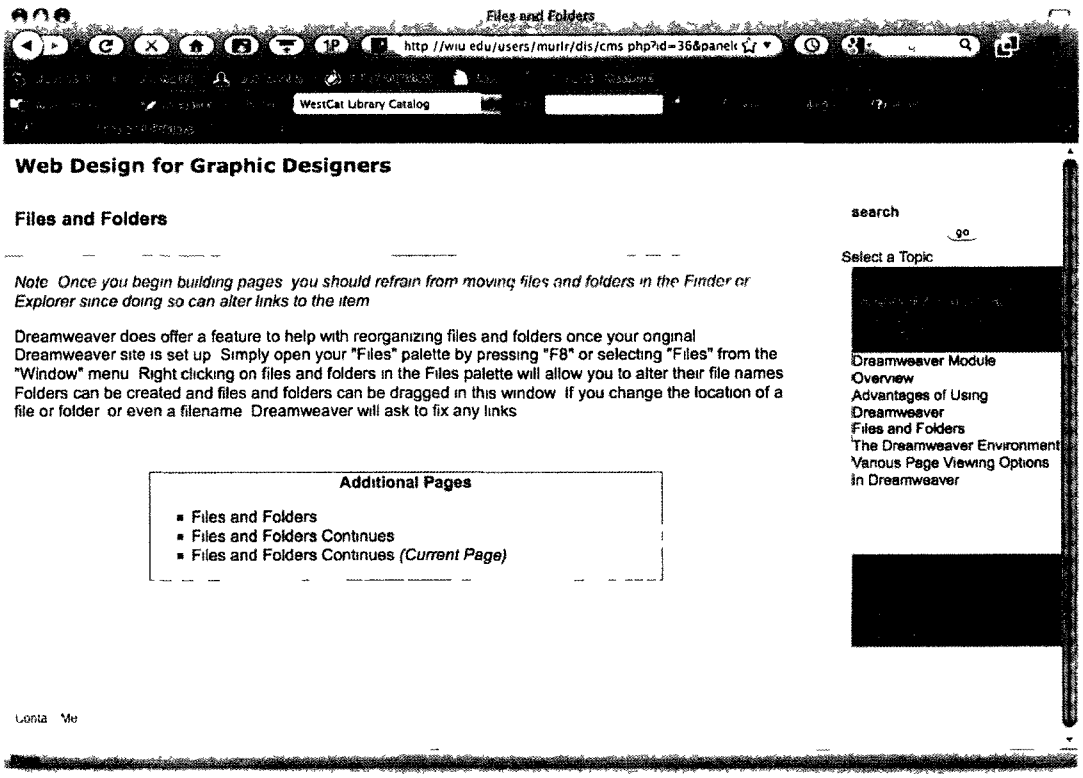

Figure 28. Files and folders third sub-page.

The Dreamweaver® Environment

The intended audience of these modules (graphic communication students) should already be somewhat familiar with the user interface of Dreamweaver® since it is similar to other Adobe® software used in graphic communication classes. The more basic operation is assumed to be understood and the focus is, Instead, dedicated to more commonly used features of the program.

The user is prompted to see a Lightbox demonstration to help them identify the features of the program more quickly and Flash® video highlights the regions being explained and provides a brief summary of their purposes.

The following figure (figure 29) shows the page with the Lightbox opened. In addition to the Lightbox, the content page features consistent navigation and page titling.

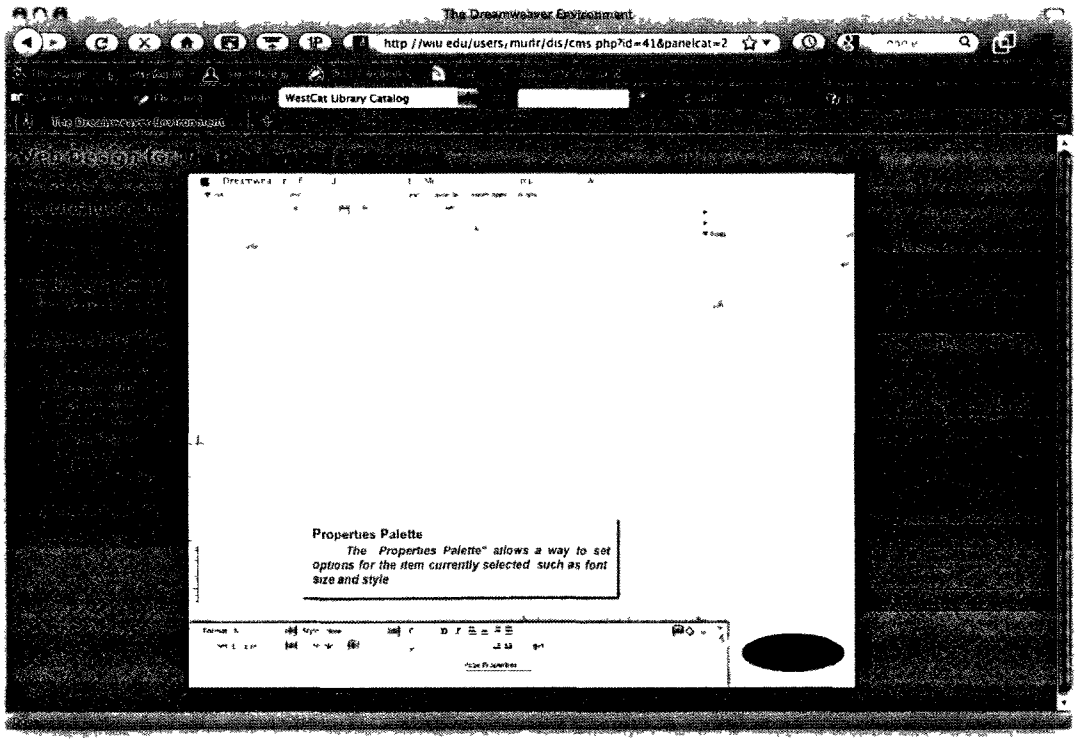

Figure 29. Lightbox demonstrating the Dreamweaver® environment.

Various Page Viewing Options in Dreamweaver®

One of the strengths of Dreamweaver® is its ability to display HTML and the page design simultaneously or the code or the page design separately. Further, the user can move quickly between any of the three views to do any necessary editing. This section focuses on explaining these three views to the user and helping them to locate the options in Dreamweaver® as shown in figure 30.

The user is offered a link to help them find where the various page-viewing options are selected. Clicking the link opens a Lightbox and plays a Flash® animation showing a typical web page being editing in Dreamweaver®. The animation then pans to the location of the page viewing options located on the web page window.

An accordion feature is also used, utilizing three tabs of information and each highlighting a different page viewing option with both text and a graphic.

The page features include a Lightbox, the persistent titling and page navigation.

Once this module is complete, the user is prompted to complete the questionnaire shown previously.

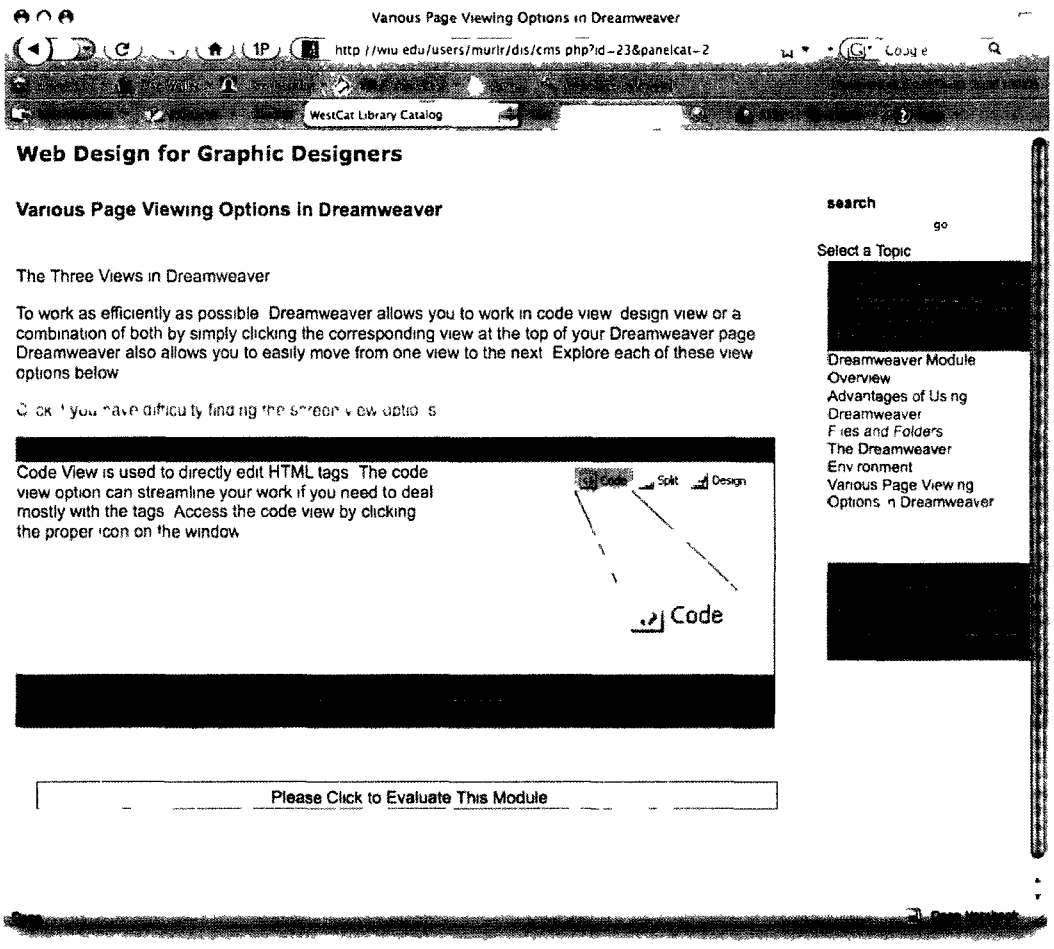

Figure 30. Various page viewing options in Dreamweaver® content page. Adobe product screen shot(s) reprinted with permission from Adobe Systems Incorporated.

Setting Up Dreamweaver® Overview

The "Setting Up Dreamweaver®" module is designed to familiarize the user with how to correctly set up Dreamweaver® for use, how to navigate the save dialogue boxes, and correctly save pages that have been created.

As seen in the figure 31, the features found on this page include persistent titling and navigation.

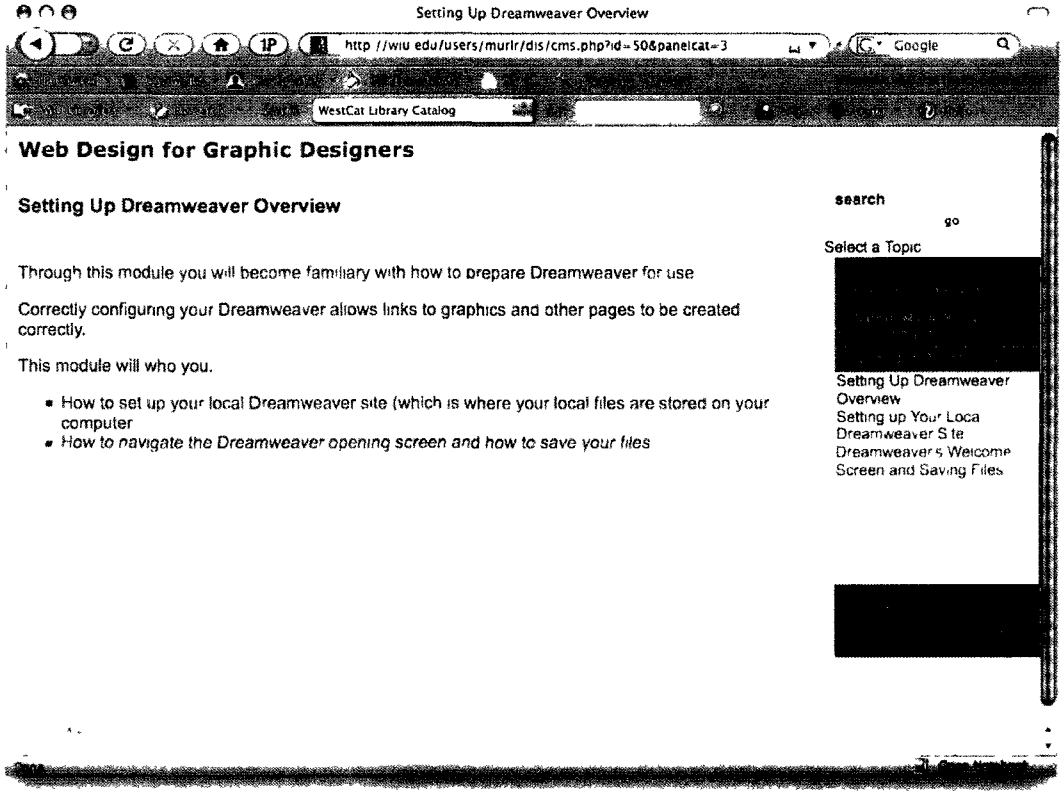

Figure 31. Overview to setting up Dreamweaver® module content page.

Setting Up Your Local Dreamweaver® Site

The content of this page addresses the set-up and use of the Dreamweaver® local site operations. The information is presented in a step-by-step format. The page contains various links that show relevant graphics in a Lightbox.

The page features for this content page includes persistent navigation and titling and various light boxes as illustrated in figure 32. Red italics text is used to stress an important element on the page.

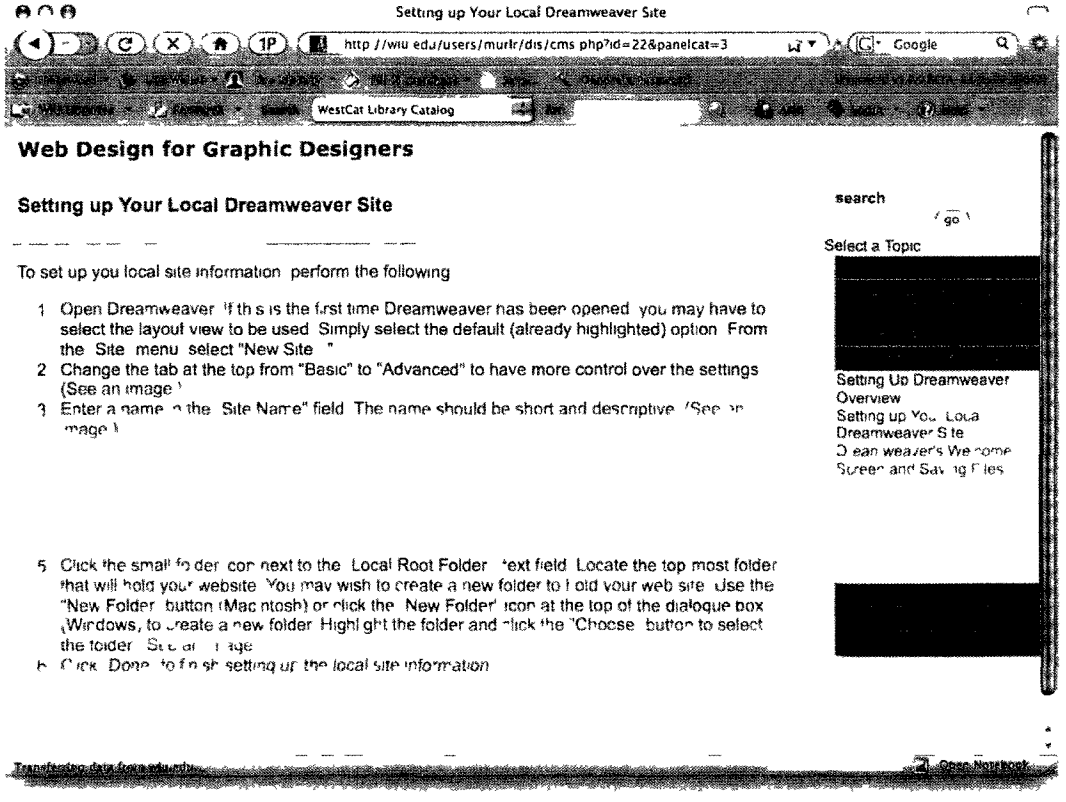

Figure 32. The process of setting up local information in a Dreamweaver® site.

Building a Basic Site Overview

The "Building a Basic Site" module is designed to provide the user with the knowledge to create a basic website using Adobe® Dreamweaver®. The overview informs the user how to create a basic HTML page based on a Dreamweaver® template and how to perform basic editing on the created page

with a reminder to configure Dreamweaver® as instructed above. Clicking the provided hyperlink provides the user with the information necessary to configure the program. Figure 33 provides an example of what the user is presented in this section.

Features found on this page include consistent navigation and titling.

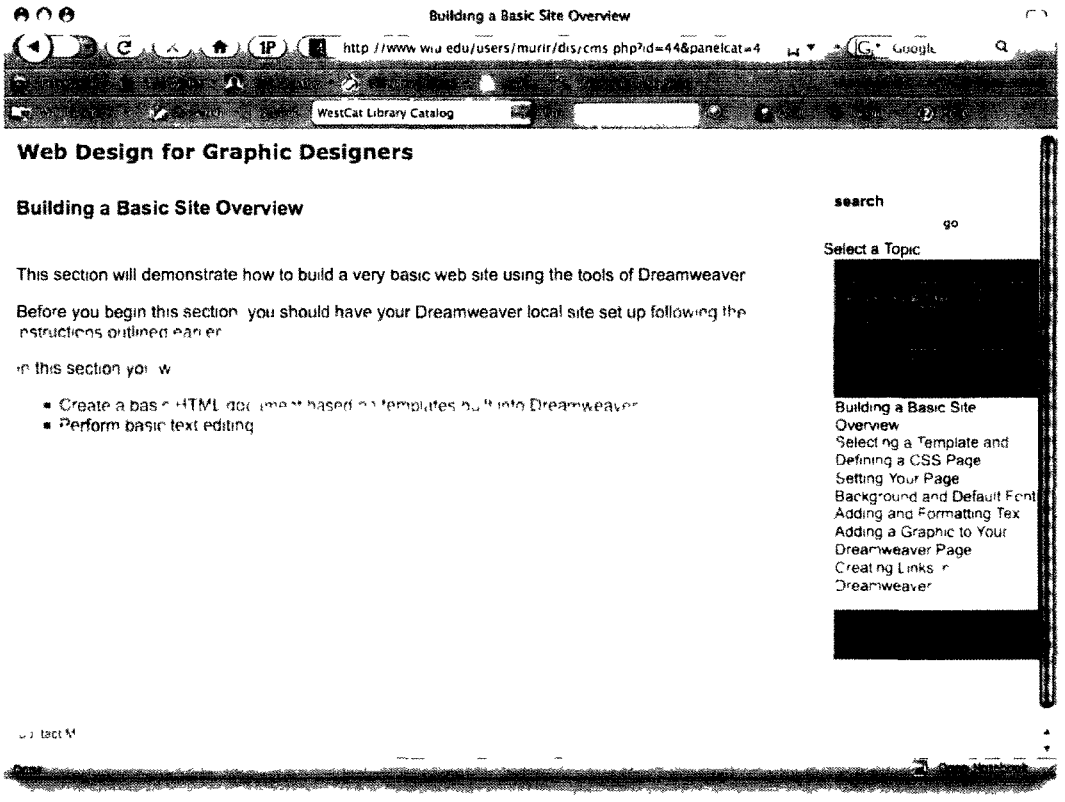

Figure 33. Overview to the building a basic site module.

Selecting a Template and Defining a CSS Page

Dreamweaver® provides a variety of templates to aid in the creation of web pages. The main purpose of the templates is to provide an easily modifiable

page structure to begin web page building. The templates also provide a readily compliant page structure based on accessibility standards.

In order to utilize the templates, the user needs to select where to store the Cascading Style Sheets (CSS). CSS is an advanced web page tool that can be used to control the layout of pages and font choices.

This segment lists the steps the user needs to follow to create a web page from a template and informs of the process for saving the CSS information. The user can see the steps involved in selecting a template and defining a CSS page via a Lighbox movie tutorial. The tutorial uses both audio and video to demonstrate the process and to explain key information about the options contained in Dreamweaver® and the existing templates. Key elements of the movie are also highlighted with text throughout the movie. (See figure 34).

Features on this page include the persistent navigation and titling found consistently throughout the content modules as well as a video presented through a Lightbox.

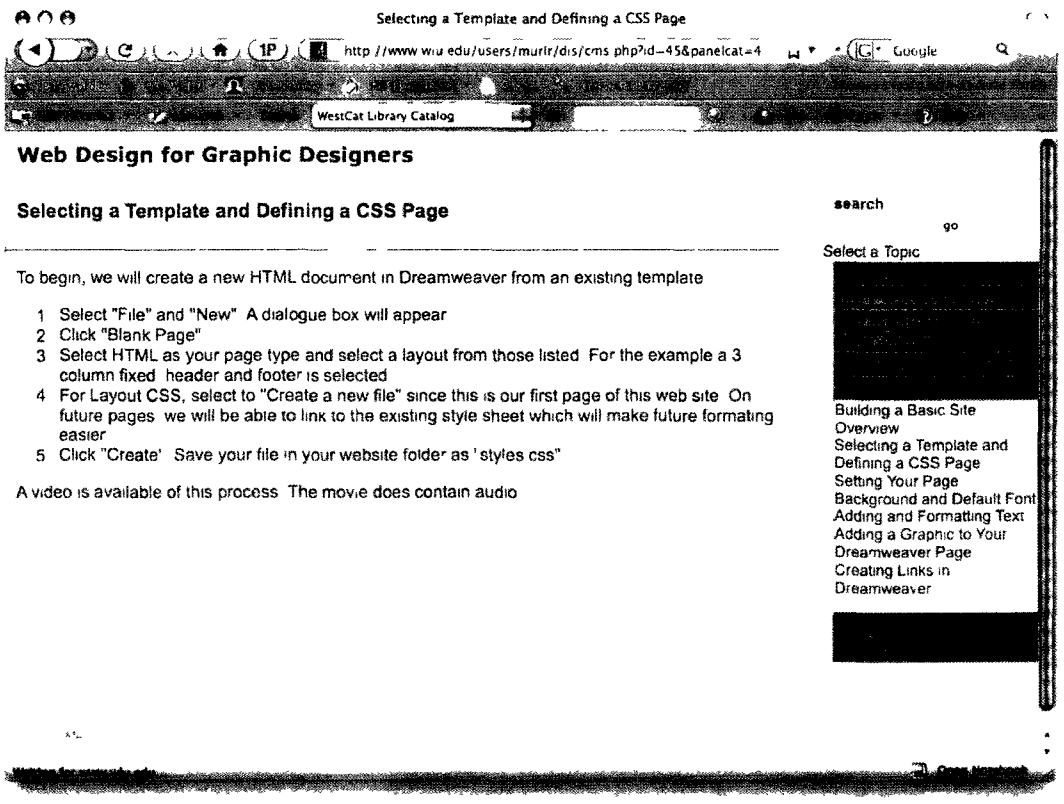

Figure 34. Overview of the process to select and define a CSS page.

Setting Your Page Background and Default Font

Selecting a webpage background color and default font in the next step once a template has been selected and the style sheet information has been saved. This section focuses on setting this information in Dreamweaver® through the "Page Properties" menu option and the proper method of navigating to the "Page Properties" dialogue box as well as setting pertinent options.

The user has the ability to access, via a Lightbox, a graphic of what the Page Properties dialogue box looks like as well as access a brief video

illustrating the change in page background color and default font (e.g. Figure 35).

Features of this content page include the Lightbox feature and the persistent page navigation and titling features.

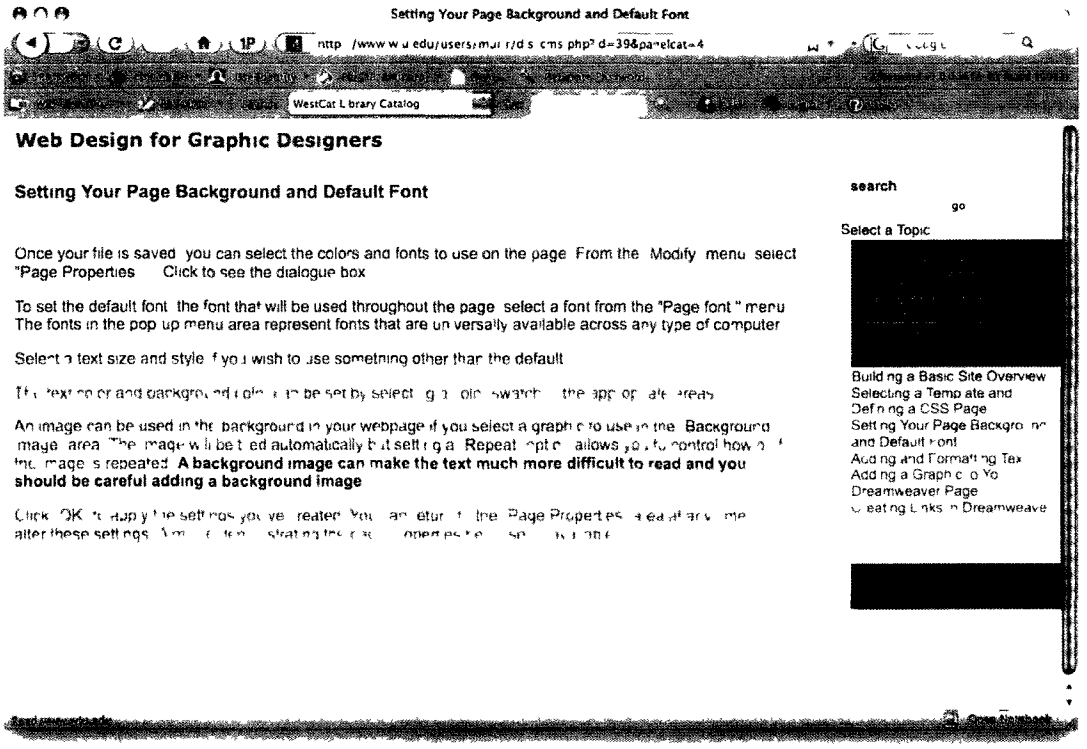

Figure 35. Setting the default font and page background.

Adding and Formatting Text

Creating and formatting text in Dreamweaver® is similar other Adobe® software of which the Graphic Communication student Is familiar. The content of the “Adding and Formatting Text” page instructs the user to utilize the “Design” view in Dreamweaver® to facilitate the creation and formatting of text.

The content of this page is broken into two pages with additional content accessed through the "Addition Pages" area seen in figure 36. Two pages are utilized for the content to keep the page sizes small and to help the user focus on key elements on each page of content.

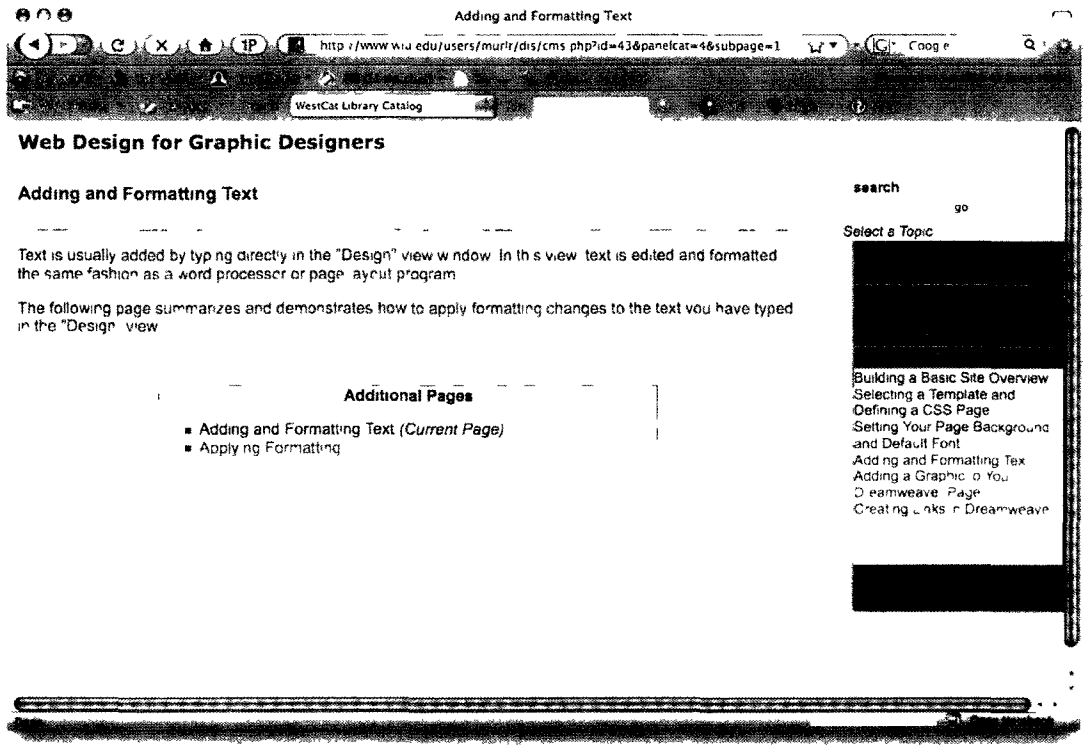

Figure 36. Adding and formatting text in Dreamweaver®.

The second page of content, illustrated in figure 37, allows the user to see text being created and formatted in Dreamweaver® through a movie accessed through a Lightbox.

Persistent titling and navigation features are utilized in the "Adding and Formatting Text" content page as well as a Lightbox for the movie.

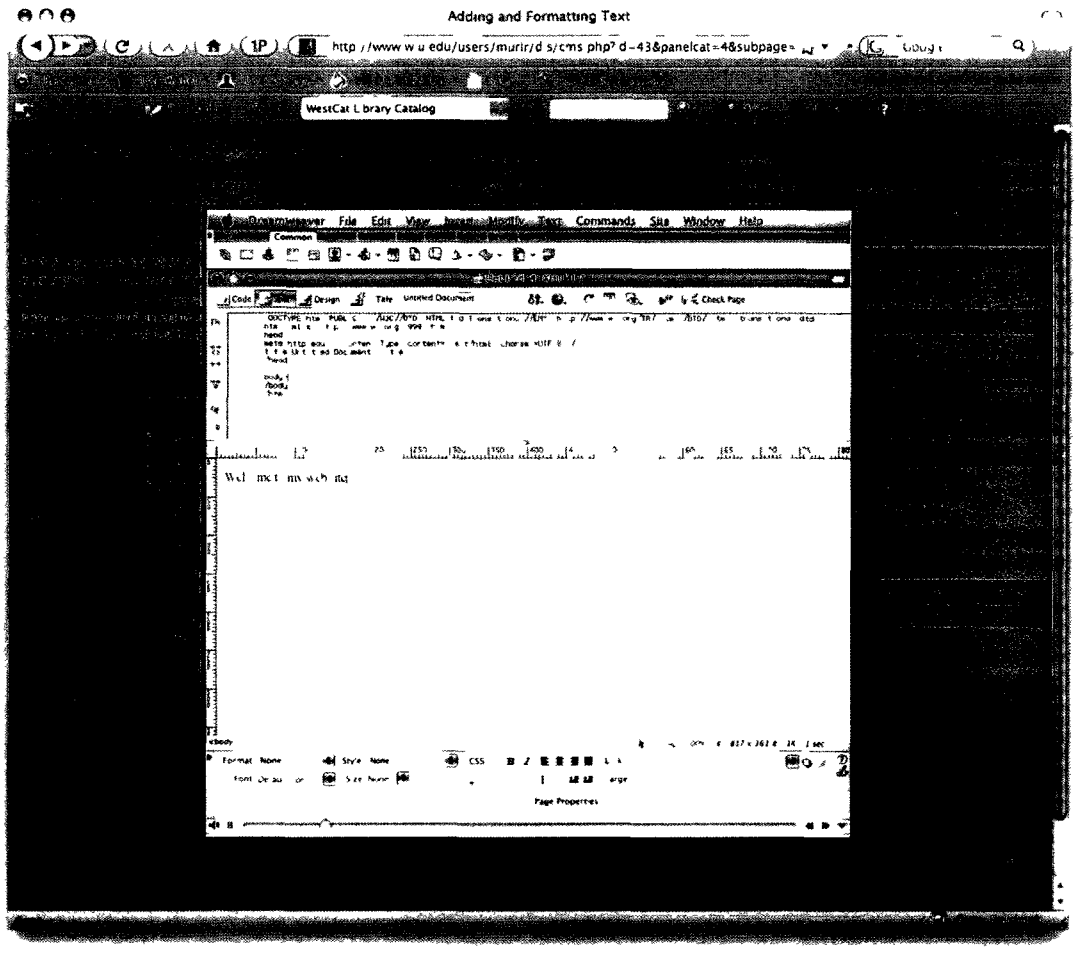

Figure 37. Adding and formatting text Lightbox example. Adobe product screen shot(s) reprinted with permission from Adobe Systems Incorporated.

Adding a Graphic to Your Dreamweaver® Page

Dreamweaver® can be used to quickly and efficiently add graphics to an HTML document. This portion conveys how the user can accomplish adding a graphic to their own web page.

It is in this section that two the main types of graphics found on the web (JPEG and GIF) are covered. They are also informed of additional information

available to them in the "Web Graphics" that they can access through the navigation accordion on the right side of the screen.

The process of adding a graphic is discussed and the user is instructed as to where to find the necessary menu options to perform the necessary tasks. Upon selecting and image, the user is requested to add additional accessibility information about the graphic. The options for accessibility are included.

The "Adding a Graphic to Your Dreamweaver® Page" information is shown in the figure 38. Features for this section include persistent titling and navigation and a Lightbox is available that shows the user the accessibility dialogue they will encounter while adding an image to their Dreamweaver® page.

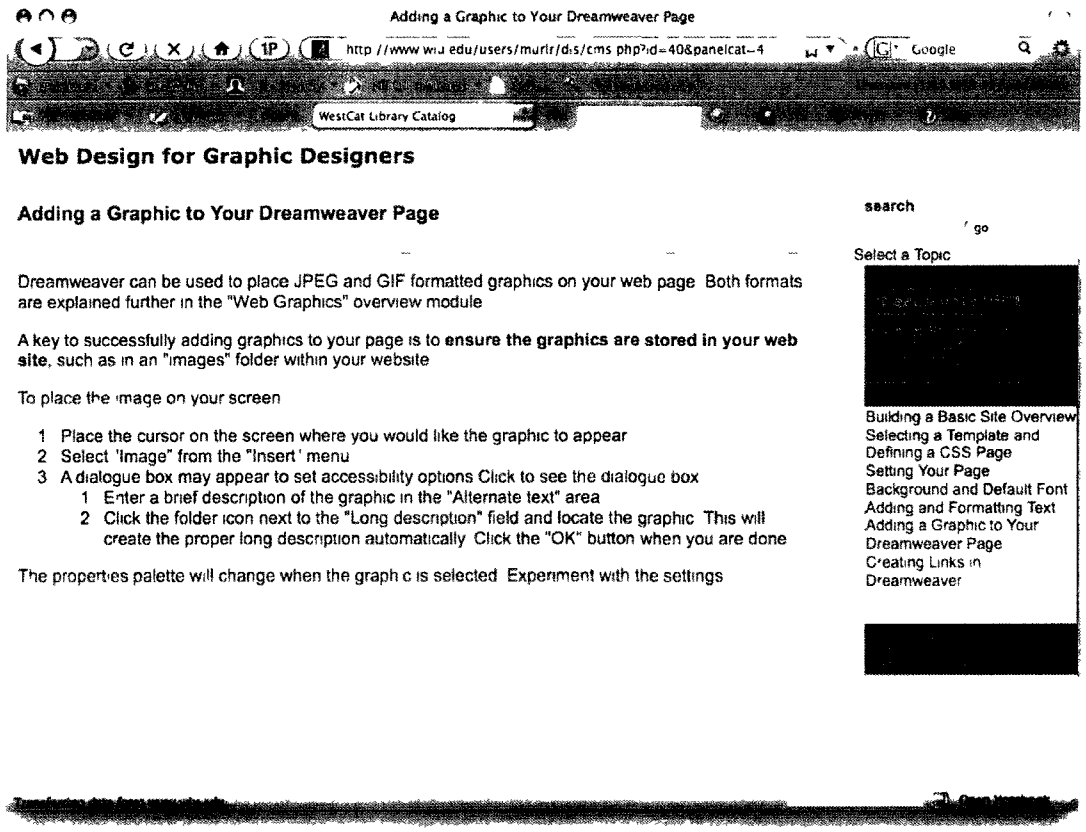

Figure 38. Process steps for adding a graphic to a Dreamweaver® page.

Creating Links in Dreamweaver®

The final segment of the "Building a Basic Site" informs the user on adding hyperlinks in Dreamweaver®. Content for the page is broken into three parts: creating a link to content contained in the user's own website, how to link to content on a website located elsewhere, and how to create E-mail links. The "Additional Pages" section shown in figure 39 allows the user to move quickly to any of these three content sub-pages.

Linking to content within a user's site can be done in a variety of ways. The different methods discussed in the training system involves using Dreamweaver®'s properties palette to locate the file in which to link by browsing files, utilizing a crosshair feature, typing the name of the file directly into the palette, or using a menu option to add a hyperlink. Explanation of the crosshair feature is available by video, via a Lightbox.

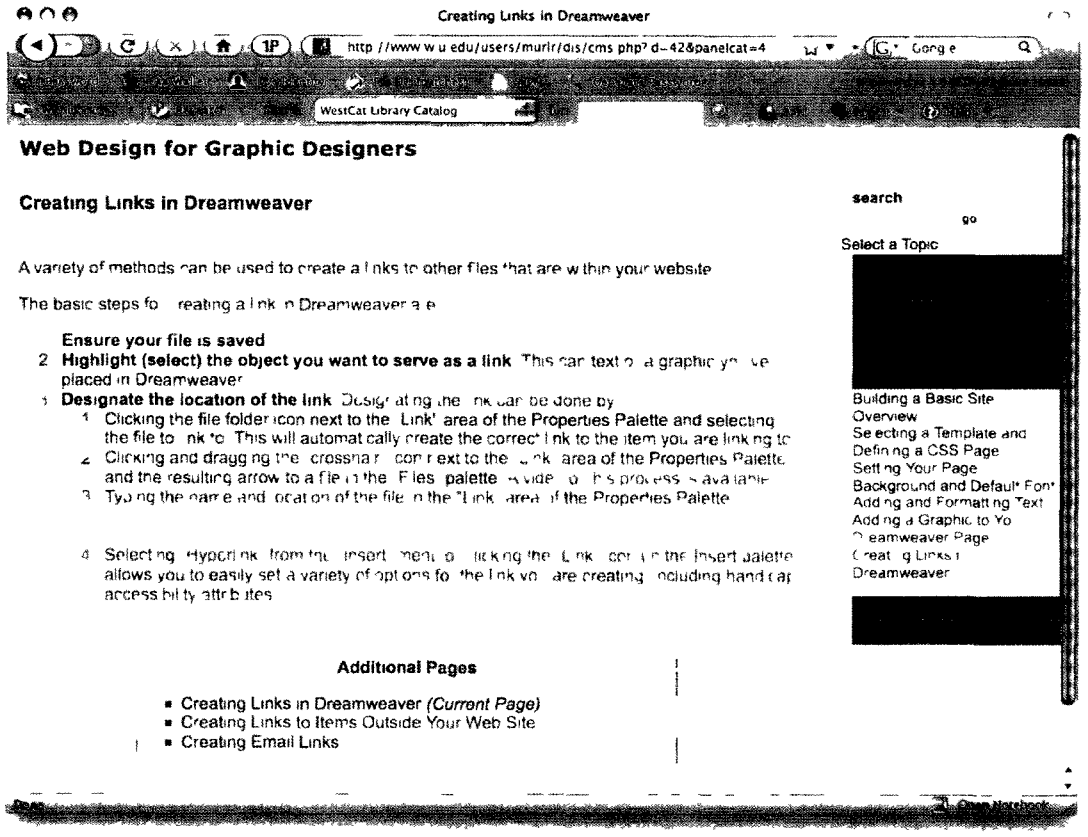

Figure 39. Process steps for adding links in Dreamweaver®.

The second sub-page discusses the process of adding a hyperlink to content not contained in the user's own web space as shown in figure 40. To

prevent a common oversight, red italics are used to stress the importance of prefacing the web address hyperlink with "http://".

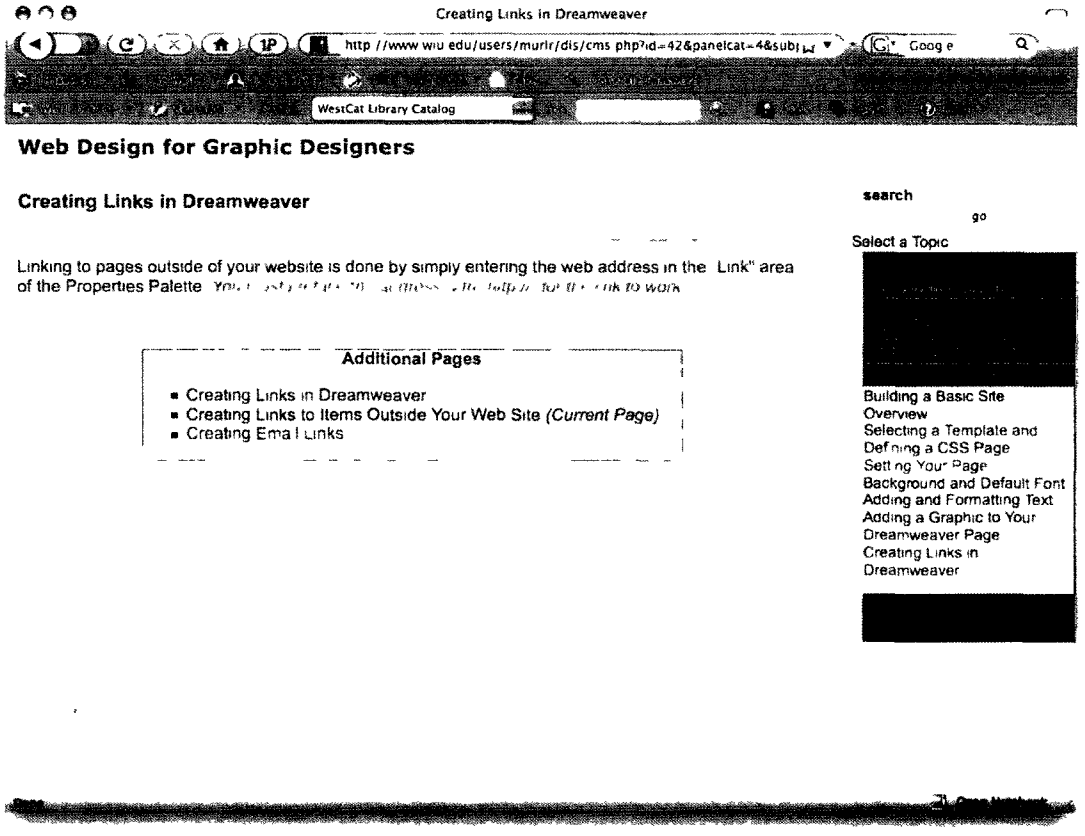

Figure 40. Adding links for external web pages using Dreamweaver®.

The final sub-page instructs the user in the creation of E-mail address links. Once properly created, a website visitor can click the E-mail address hyperlink to launch their E-mail client complete with webmaster's return address.

The page of instructions for creating E-mail hyperlinks are shown in figure 41. The user has the ability to test the hyperlink E-mail address by following a link provided in the content.

Key features found in the "Creating Links in Dreamweaver®" content sub-pages include persistent titling and navigation and a variety of Lightboxes used to show the user the miscellaneous dialogue boxes they will encounter. Also included is a movie clip teaching how to create hyperlinks using the crosshair feature in Dreamweaver®.

The sub-page referring to creating E-mail hyperlinks concludes the "Building a Basic Site" module. The user is asked to follow a link and evaluate the module using the evaluation form previously discussed.

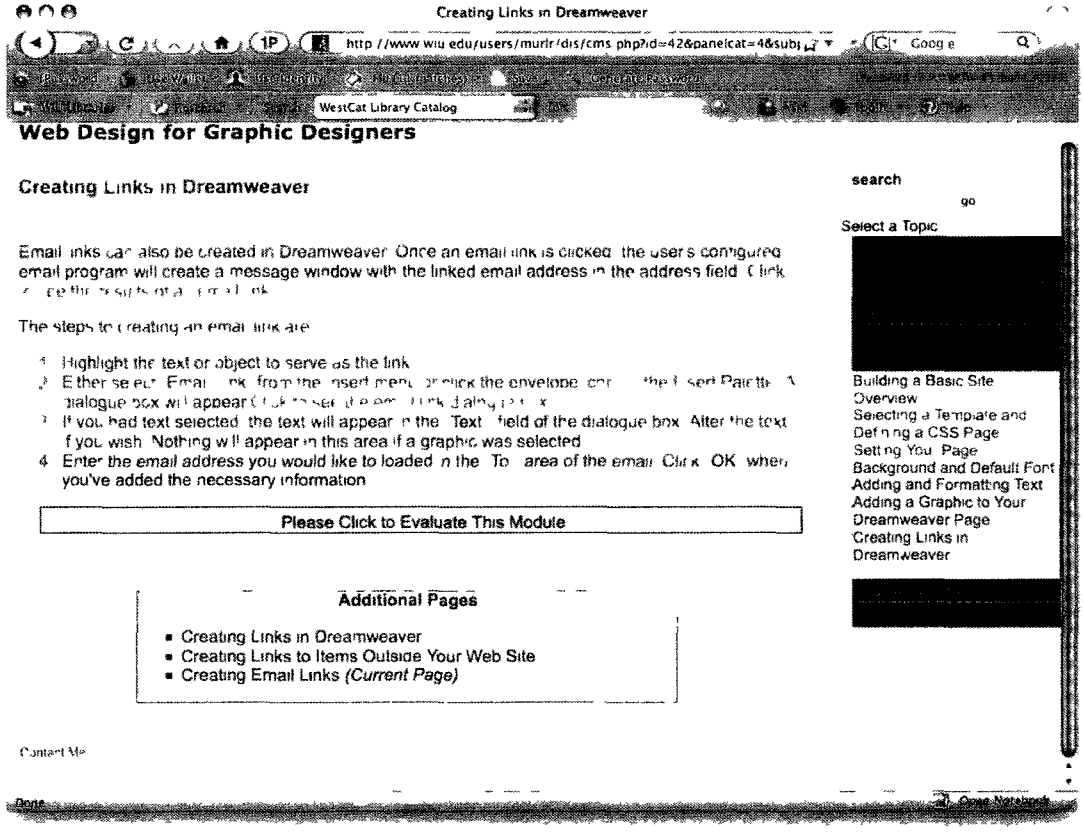

Figure 41. Creating E-mail links in Dreamweaver®.

Web Graphics Overview

The "Web Graphics" content module (figure 42) discusses how to effectively use graphics in the creation of web pages. The overview content module reviews the type of information contained within the module.

The training is designed for graphic communication students already familiar with creating graphics in programs such as Adobe® Photoshop® and Adobe® Illustrator®. The module concentrates on making graphics ready for the web, rather than how graphics are created. Although the user is familiar with adding graphics to print publications, the use of graphics in web development requires the additional consideration of download times.

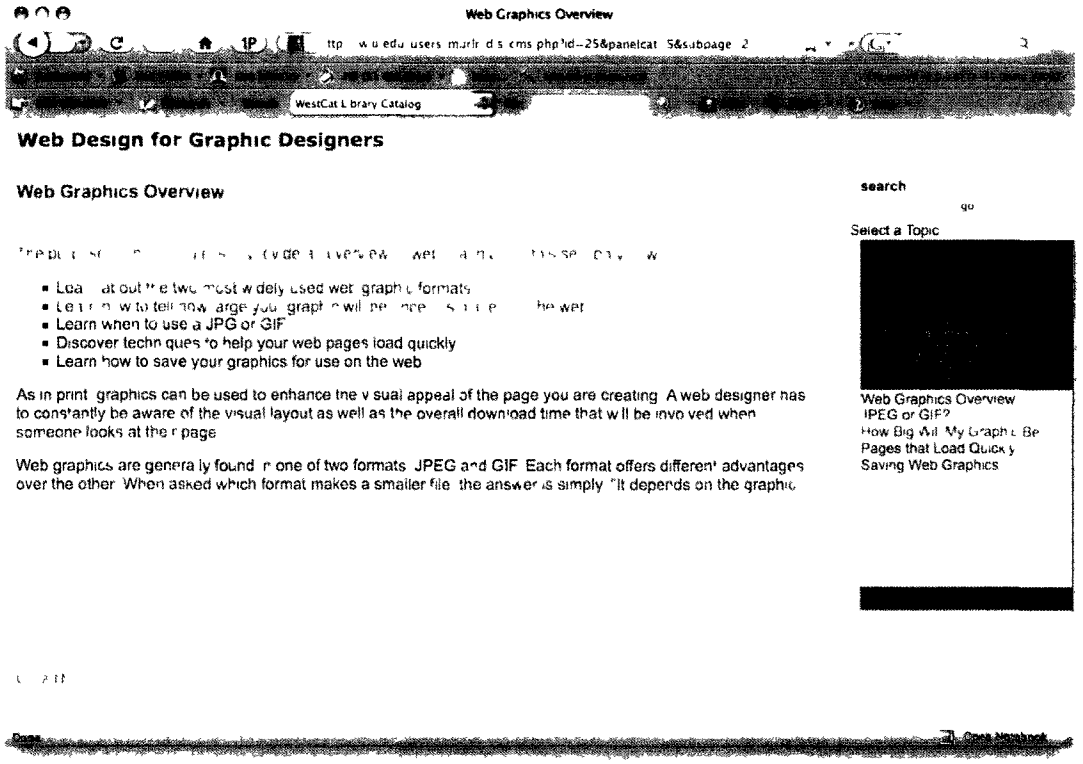

Figure 42. Content page for the web graphics overview content module.

JPEG or GIF?

The "JPEG or GIF?" page is broken into two sub-pages and is designed to help the user understand the differences between the JPEG and GIF file formats. The second sub-page summarizes the advantages and disadvantages of both file formats.

To help the user focus on the content of each file format, an accordion is used with a separate tab. Each format includes the proper file extension associated with that format, when best to use the graphic (i.e., for a logo, for a photo), and possible shortfalls selecting the particular file format. Figure 43 shows the second sub-page with the accordion.

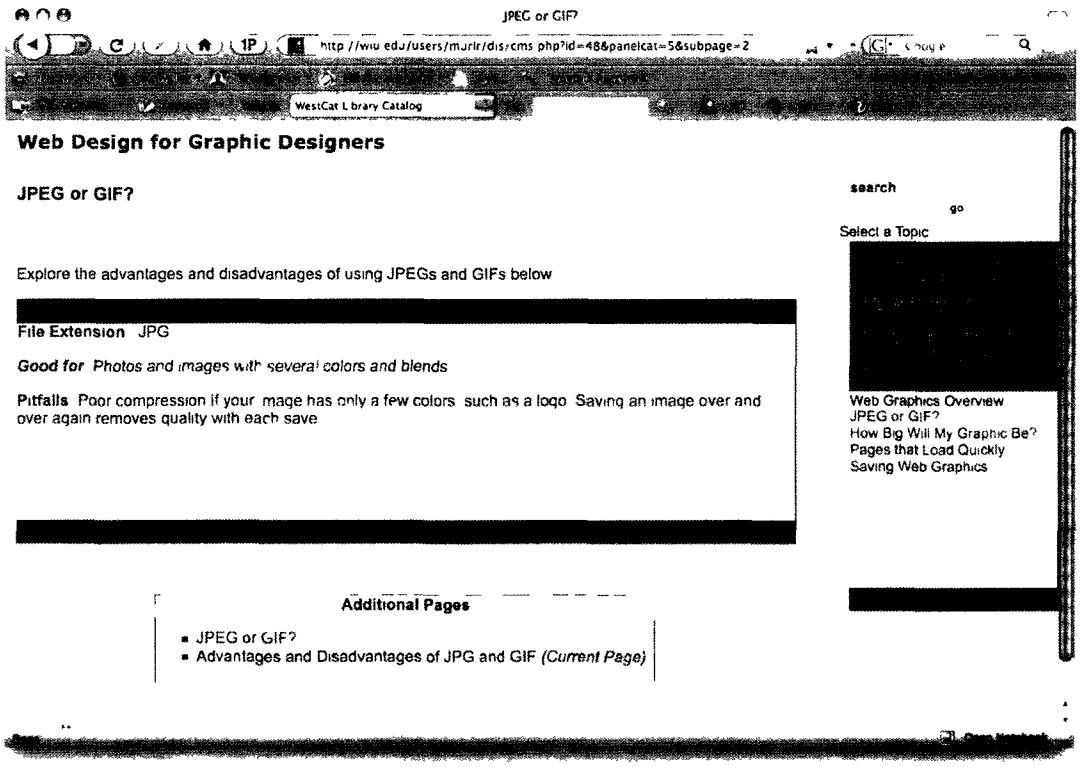

Figure 43. JPEG or GIF file format content page with accordion panels.

How Big Will My Graphic Be?

As a novice web author, importing graphics can offer a variety of challenges including consideration of horizontal and vertical pixels and issues of resolution. When preparing to save graphics for importing to a website, web author may find the image much larger than they need, thus requiring them to return to their image-editing program and make the necessary adjustments.

This section of the module offers useful information for preparing graphics for the web. First, web authors are instructed to use their image editor to alter the size of the image to optimize download time as opposed to merely scaling the image in their web-editing program.

Next, the user is instructed to use an optimum resolution of 72 dots-per-inch (DPI). This DPI is optimized for displaying images on the screen, whereas print images are often a minimum of 150 DPI.

To help the web author visualize how large their graphic will be once placed in a web page, they are instructed to convert the image to a 72 DPI image and view the image at a ratio of 100% as determined in Adobe® Photoshop® and Illustrator® title bars. A Lightbox is used to help the user identify where to find the zoom percentage on the user's window. Figure 44 shows the Lightbox open to indicate the percentage of zoom.

Features of this page includes a Lightbox and persistent navigation and titling.

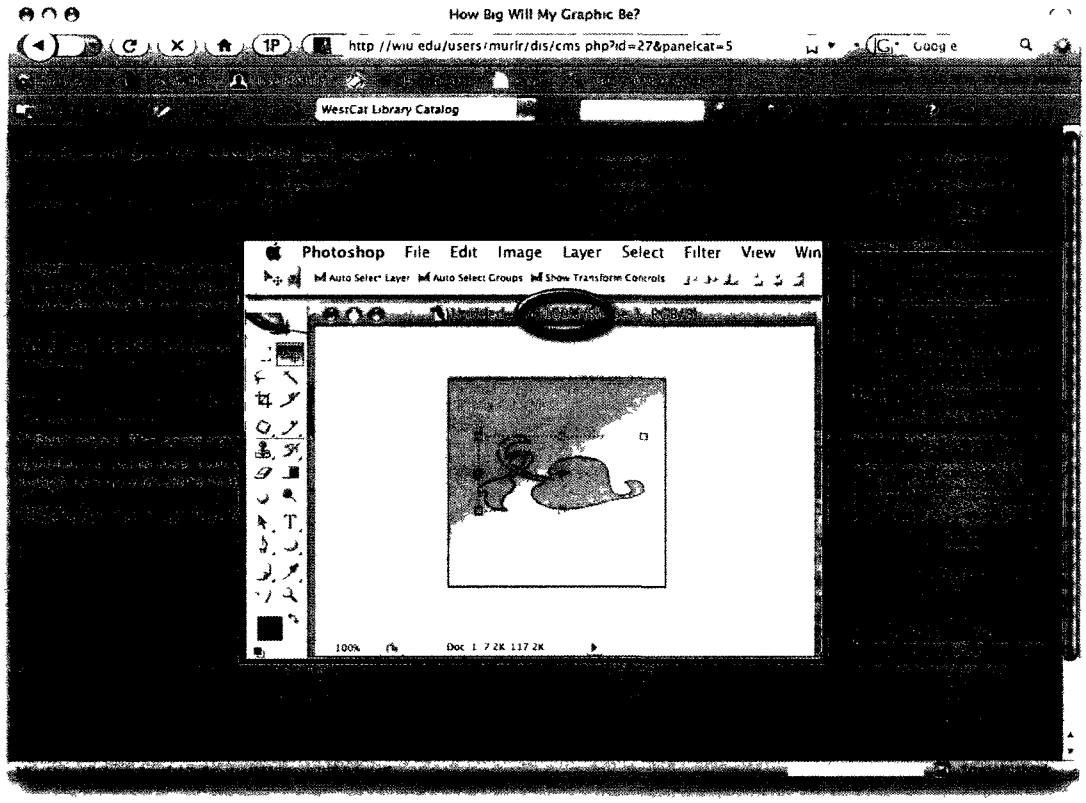

Figure 44. Determining the scale of graphics before they are imported into Dreamweaver®. Adobe product screen shot(s) reprinted with permission from Adobe Systems Incorporated.

Pages That Load Quickly

Consideration of the download size of a website during the design phase has been mentioned in previous sections. The purpose of the "Pages That Load Quickly" content page is to offer more detail about the page size limits and what should be observed when creating web pages. This would include limiting the page download size to approximately 200 kilobytes, (external media as well as the HTML page that forms the web page). It is also suggested the user provide

hyperlinks to large media files so the user can self-select downloading large, internet-based files.

The page contains a minimal number of features. These features are limited to persistent page navigation and titling. Figure 45 shows the content page as it appears in the HTML training system.

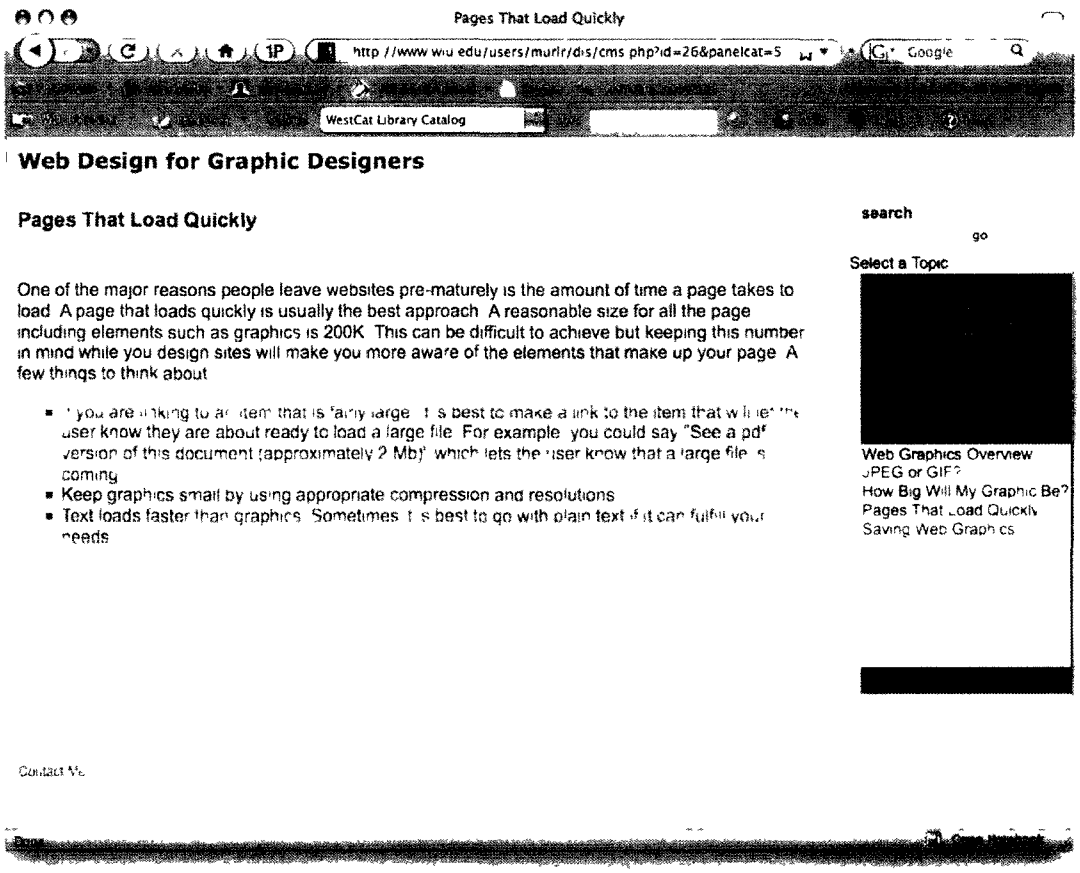

Figure 45. Content page concerned with minimizing graphic download time.

Saving Web Graphics

The final content page of the "Web Graphics" module explains how to utilize Adobe® software to create web-ready images. The process is broken down into five steps and is demonstrated through a Lightbox movie.

This five-step process begins with the suggestion to first saving the file in the program's native file format to retain all pertinent image and type layers. Saving the file in the native format is necessary if additional changes are needed in the future.

The second step of the process requires selecting the appropriate menu option for the graphic editing software. The menu option functions identically in Adobe® Photoshop® and Adobe® Illustrator®, two industry-leading image-editing programs introduced and utilized throughout the Graphic Communication program.

The third and fourth steps in the process offer the web author options of a variety of settings to create an image with appropriate quality and file size.

Finally, the web author is instructed to save the graphic inside of their local website folder.

A variety of features were utilized in the creation of this content page. Persistent navigation and titling are utilized as well as a Lightbox used to demonstrate the file saving process. A tool tip is utilized to explain to the user why they should save their file in the native format. The "Saving Web Graphics" content page in figure 46 is shown with the tool tip being displayed. At the conclusion of this module, the user is asked to complete the module evaluation.

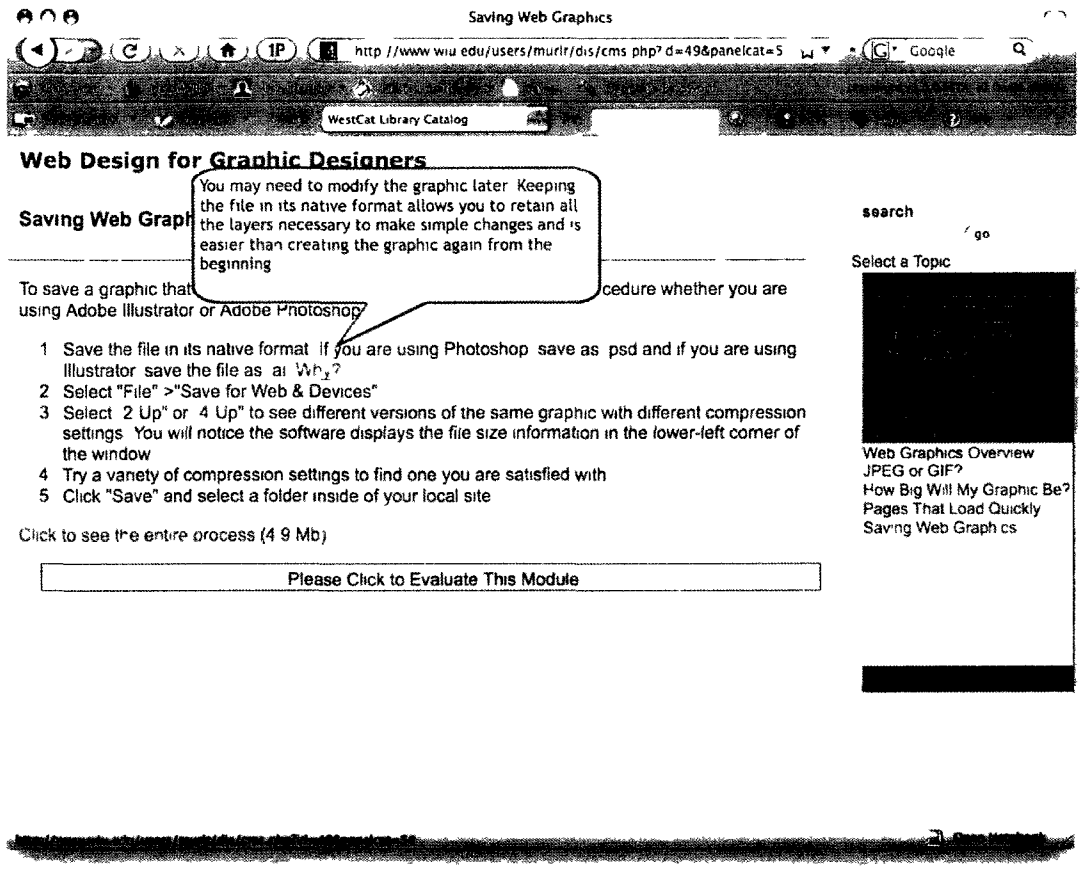

Figure 46. Process steps for saving web graphics.

Uploading Overview

The final module, "Uploading Your Site", describes the last steps of creating a website. The "Uploading Overview" provides the user with an outline of the steps to be followed. The steps involve activating account space on a web server provided by Western Illinois University, how to configure Dreamweaver® to upload files, how to use Dreamweaver® to check for broken links and spelling errors, the process of uploading an entire website in Dreamweaver®, how to locate/test the uploaded website, and how to make changes to an existing

website. The module concludes with a "What's Next" section which tells the user where and how to proceed with developing their web skills. (see figure 47)

Features of the content page include persistent titling and navigation.

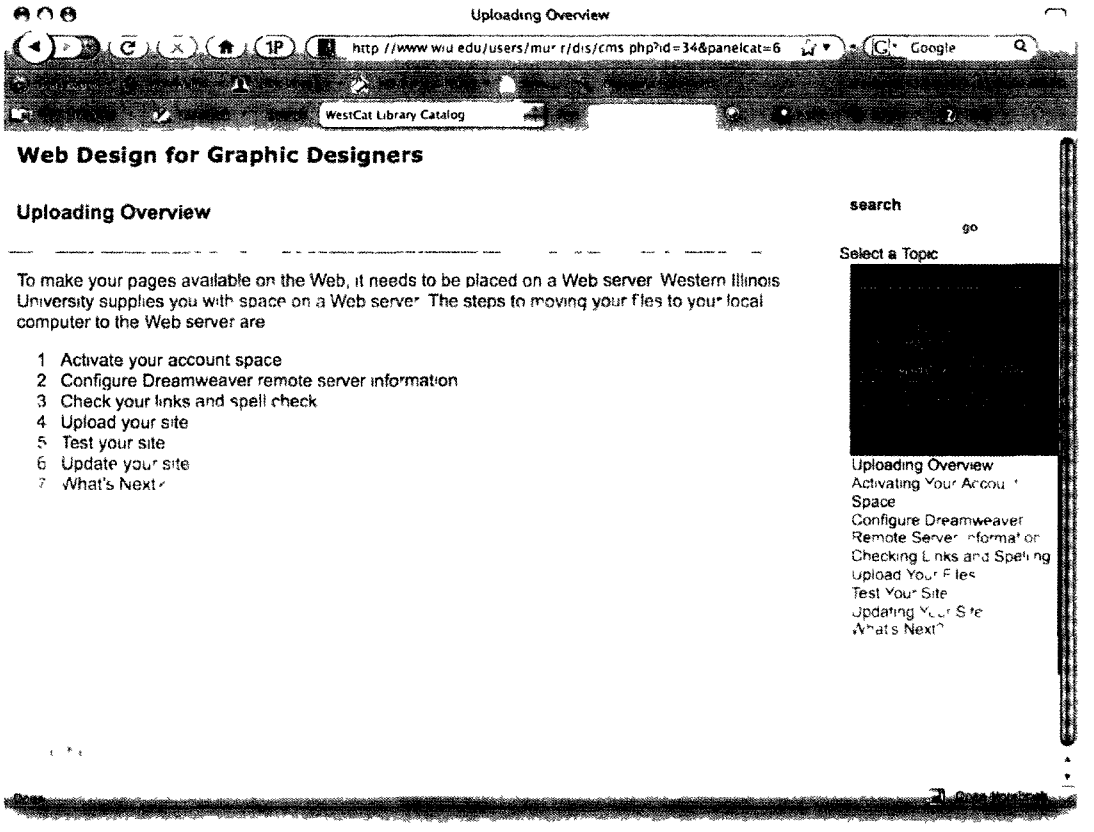

Figure 47. Overview of uploading module.

Activating Your Account

Western Illinois University provides all of its students with web server space for hosting web pages for personal promotion and learning endeavors.

Prior to use, the server account space must be created which involves selecting a variety of options from a secure website provided by the University.

During the activation process, a folder is created in the users network storage space. The folder is named “http” and is configured with permissions making it viewable through a web browser. The web author need only to place their website files in this folder.

Figure 48 shows the content page. The steps described on the page merely state the process the user should follow to make their server account space active. Features of the page are limited to persistent navigation and titling. However, a hyperlink is provided that allows the user to quickly access the interface required to activate the server space.

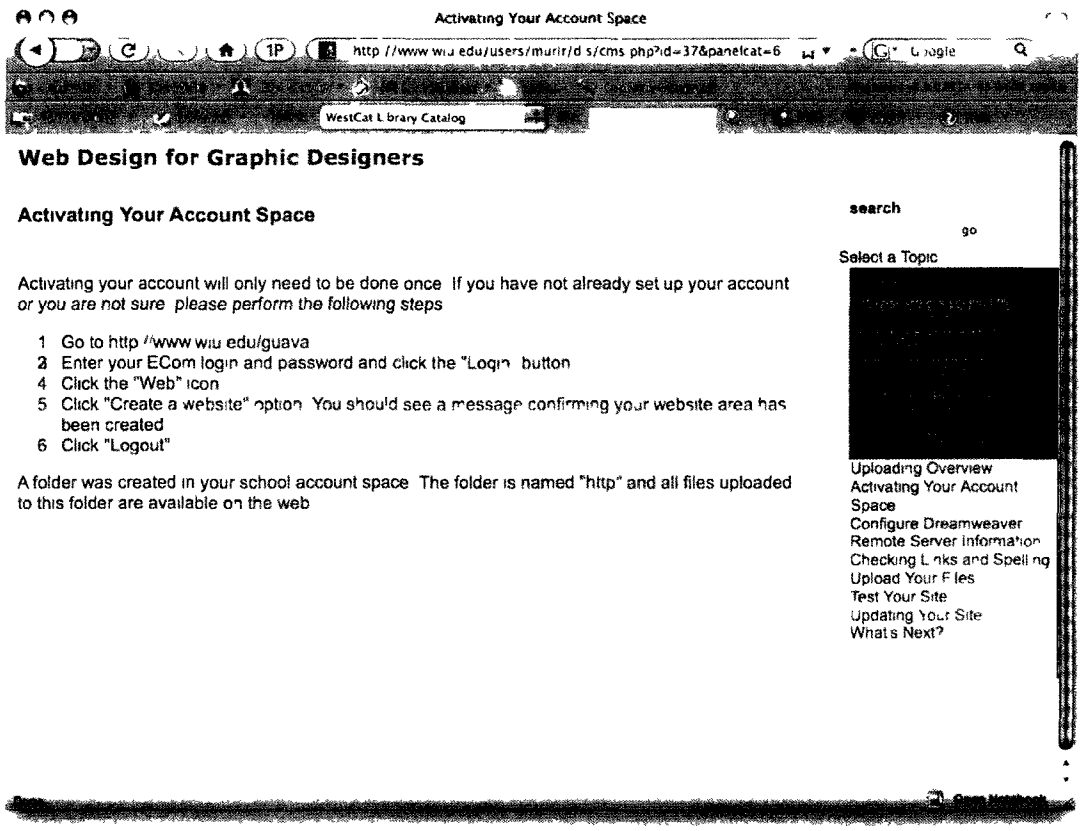

Figure 48. Process for activating web server account space at Western Illinois University.

Configure Dreamweaver® Remote Server Information

Dreamweaver® must be properly configured for uploading files to a remote web server, such as the one used at Western Illinois University. Configuring Dreamweaver® requires the user to alter additional settings in Dreamweaver®, which is covered in two sub-pages of the module. The first sub-page, "Configure Dreamweaver® Remote Server Information" content page describes why the configuration must be done.

A second sub-page (shown in figure 49) is used to describe the process of configuring Dreamweaver®'s settings. To help illustrate the process, a variety of images are available to the user through Lightboxes and the entire process can be seen through a Lightbox video as well. The user is also informed that if Dreamweaver® is unable to connect to the web server, they will be required to verify the settings.

The pages offer persistent navigation and titling. Three Lightboxes are used in the second page to illustrate the Dreamweaver® dialogue boxes the user will encounter while changing the Dreamweaver® configuration and an additional Lightbox is used to show a multimedia video of the process.

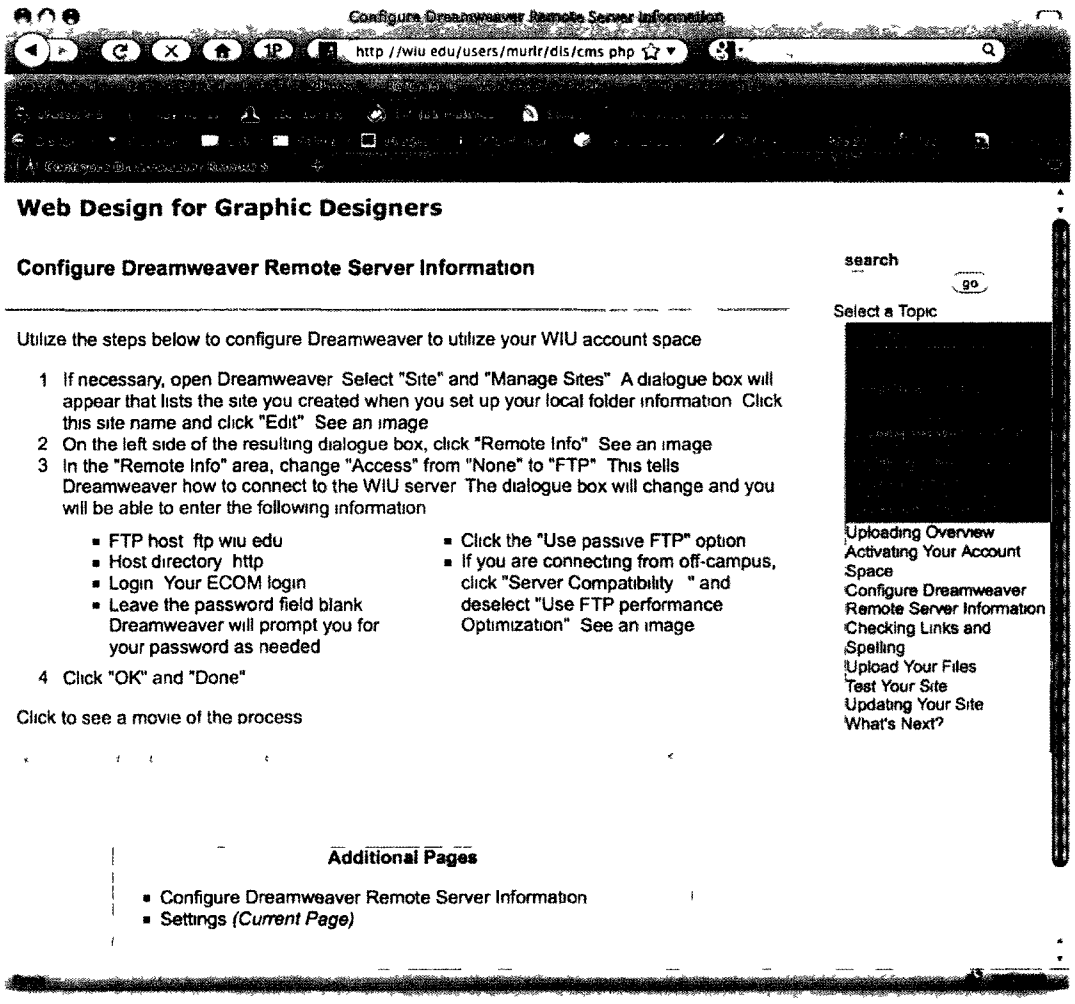

Figure 49. Configuring Dreamweaver® to connect to the remote web server.

Checking Links and Spelling

In order to create a professional looking web presence, the web author must present a website that is free of spelling errors and broken links. The "Checking Links and Spelling" section is designed to assist with checking and correcting any spelling errors of broken links. This is covered in two sub-pages.

Dreamweaver® allows the web author to automatically verify all of the internal web links that exist in their website as described on the first sub-page (figure 50). Spell check, which can only be conducted on an already open document, is covered in the second sub-page. Persistent titling and navigation are feature of both subpages. A Lightbox is also used to show the user the results of performing a link check using the link checking tool provided in Adobe® Dreamweaver®.

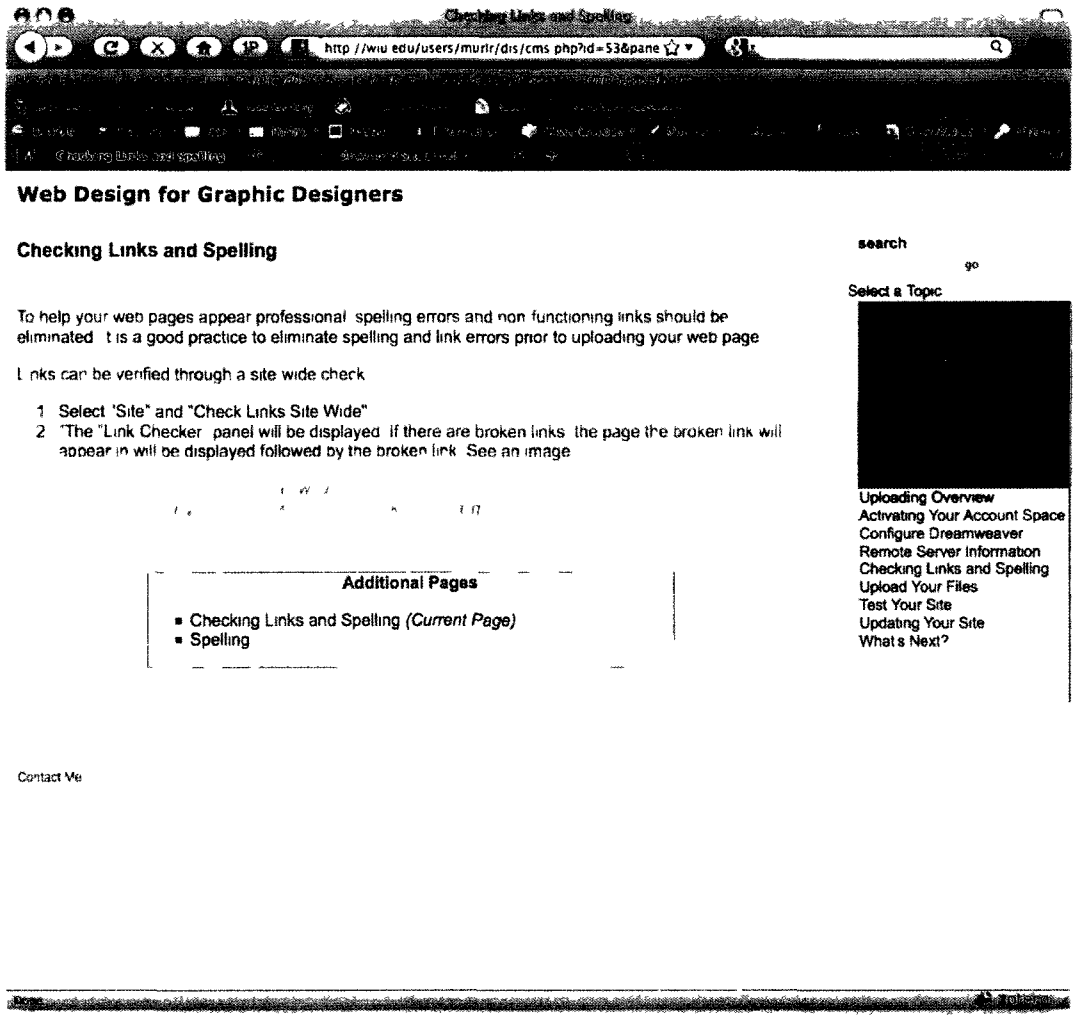

Figure 50. The spell checking and link checking processes.

Upload Your Files

Once Dreamweaver® is configured, spell checking has been completed, and the links have been checked, the web author is now ready to place the files on the file server. The "Upload Your Files" section (figure 51) describes the process of using Dreamweaver® to upload all of the site files.

The process involves opening Dreamweaver®'s "Files" panel and then selecting the top-most file icon. The user selects an icon to upload all of the files that are used to create the website. After connecting to the server, the user is prompted by Dreamweaver® to confirm the user wants to upload all of the files. Once confirmed, Dreamweaver® completes the file transfer. A movie is available to demonstrate the steps involved in uploading files.

The content page is shown in the following figure. Features of the content page consistent of persistent navigation and titling. The movie demonstrating the steps plays as a Lightbox.

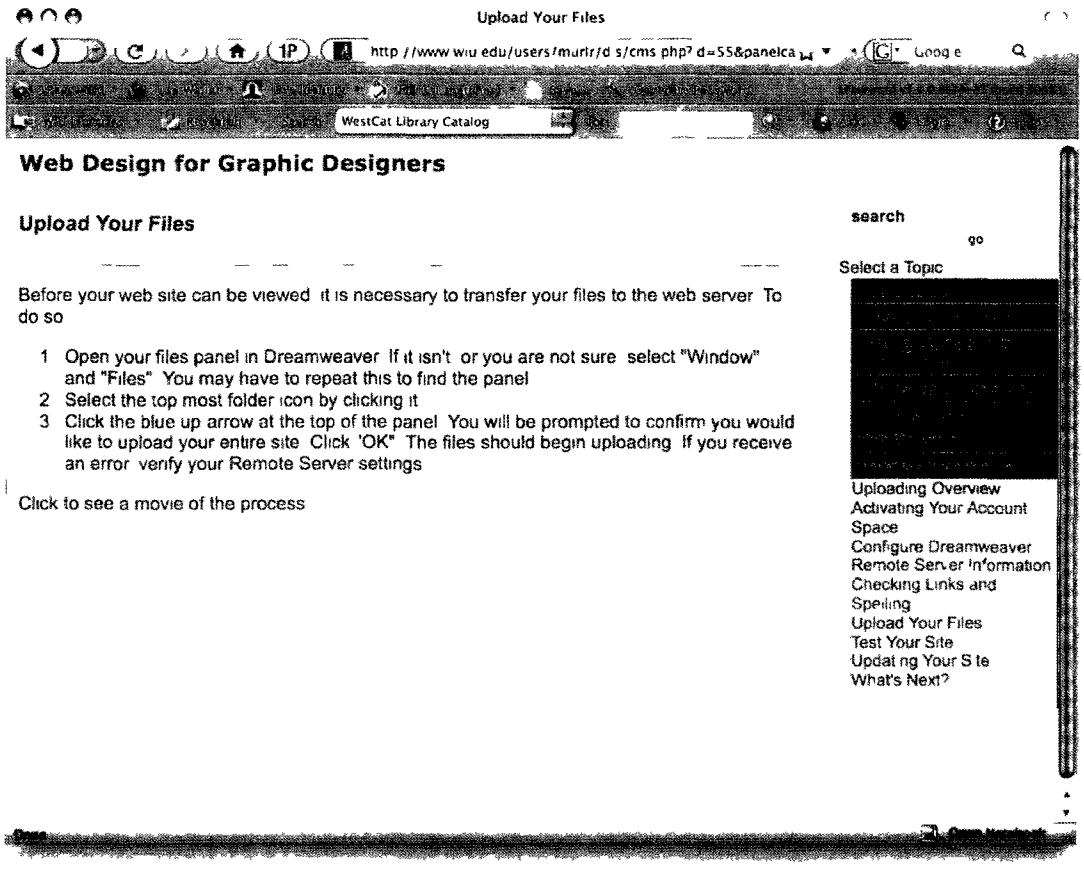

Figure 51. Process for uploading files to the remote web server.

Test Your Site

Once the web author has placed their web page files on the server, they can now navigate and view their files. The "Test Your Site" page (figure 52) describes how the web author can locate their files on Western Illinois University's web server.

The Test Your Site page includes persistent navigation and titling.

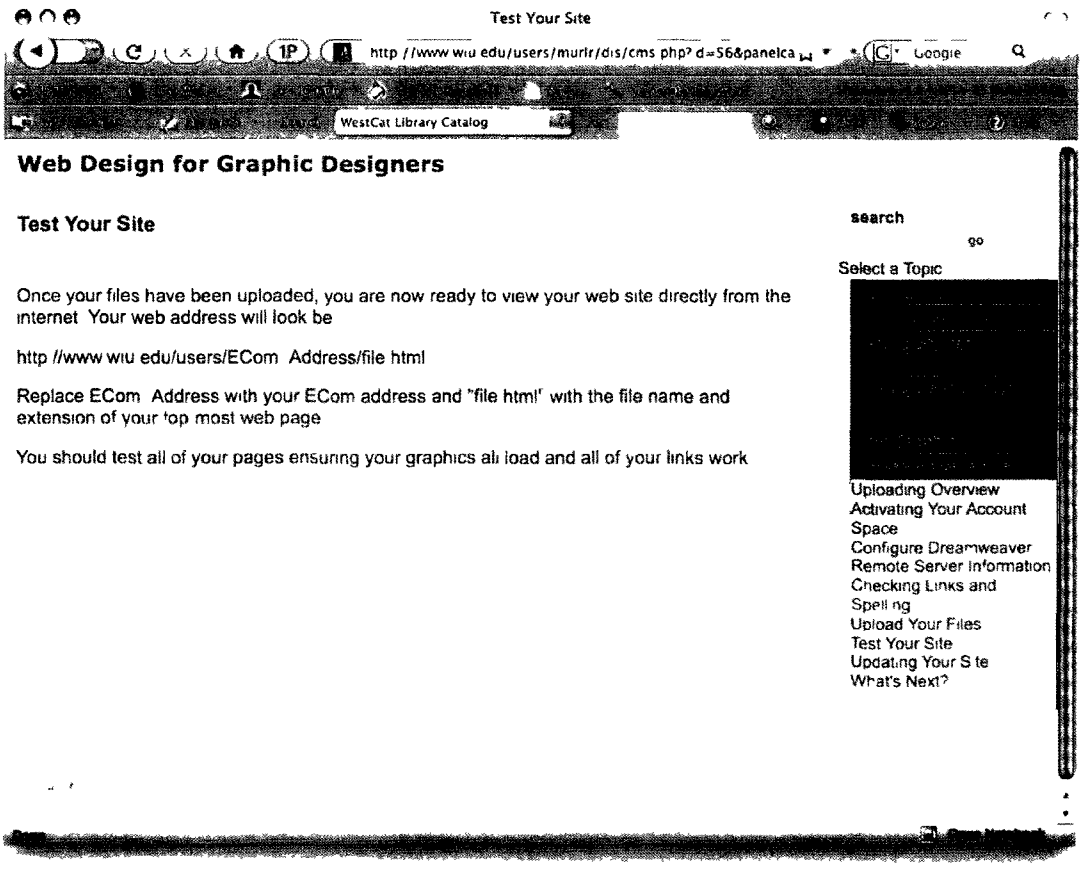

Figure 52. Testing the website hosted on Western Illinois University's web server.

Updating Your Site

At some point, the web author may decide to edit or add content to the website. It is not necessary to repeatedly upload all of the site files when a change is made. The "Updating Your Site" page (figure 53) describes the process of updating only the website pages that have undergone modifications.

The process of modification involves opening the file to be changed, making the appropriate changes, saving the file, and using Dreamweaver®

features to upload the individual page. A Lightbox displays a graphic of the icon needed to use to upload files.

Page features include persistent navigation and page titling. A Lightbox is used to show a graphic of the icon need to upload a single file after editing.

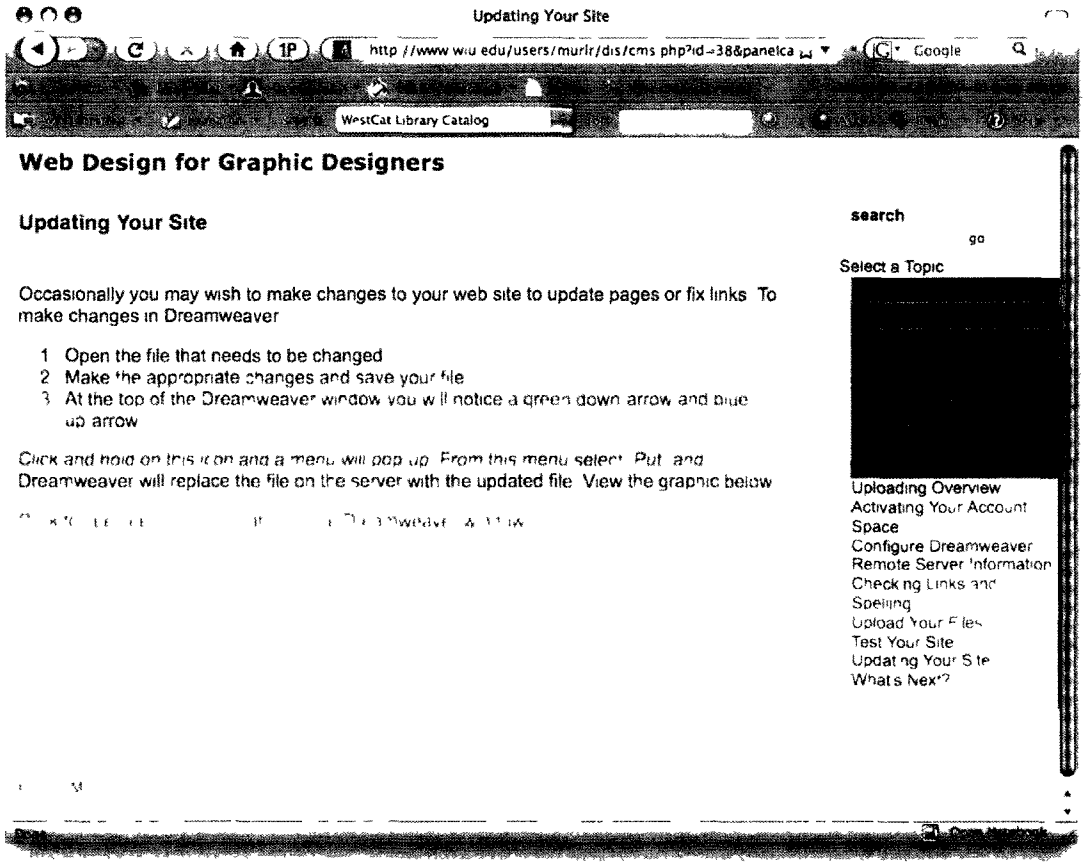

Figure 53. Process for updating website pages.

What's Next?

The final section (figure 54) offers suggestions for future steps in web page development. As stated in Chapter II, web pages can be static or dynamic.

The HTML training system focuses on developing static web pages. Here, the suggestion is that that the user become proficient in developing Cascading Style Sheets and Dreamweaver® templates and look to incorporate dynamic content through the use of PHP, ASP and/or JSP.

The page contains persistent navigation and titling and offers a link for evaluating the module.

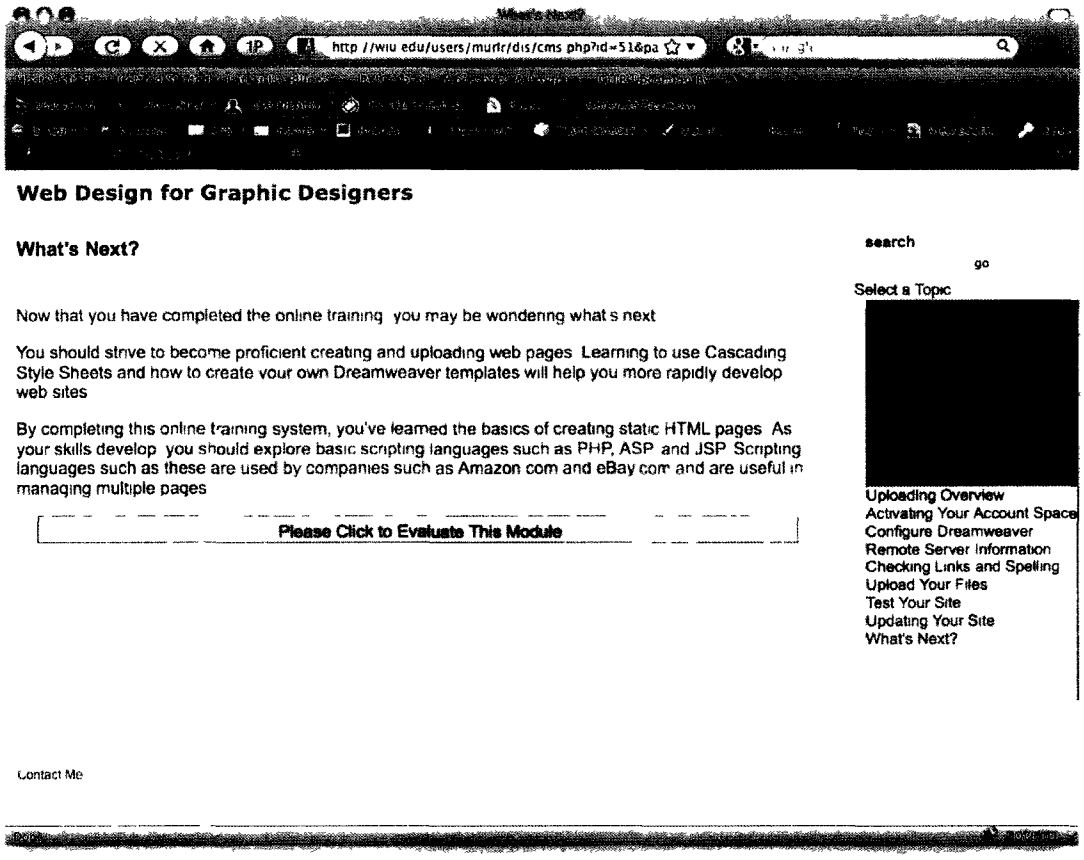

Figure 54. Content suggesting the next steps to follow for the user of the prototype system.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This design research demonstrates a prototype content management system capable of training graphic communication students in the creation of basic HTML web pages. The prototype serve as a method of introducing basic HTML structure and commands early in the student's academic careers.

Exposure to concepts of web page creation earlier in their academic career provides a foundation from which to hone their newly acquired skills prior to entering into the job market. Students with web page development experience will be better prepared for positions that involve any level of web page development, especially if such a skill is a core element of the student's career aspiration.

The following chapter offers a brief summary of the design research, conclusions to the research questions, and recommendations for future research and development.

Summary

An extensive review of the literature was performed to investigate performance problems involving graduates of graphic communication programs

in higher education. Due to a lack of available literature on the topic, an online survey was administered to a small group of graphic communication majors and minors at Western Illinois University. The survey gathered data regarding types of desired skills training and receptivity to additional training that offered no school credit.

Although the responses varied regarding the skills the students showed interest in achieving, one in particular stood out; the desire to learn more about creating and publishing web pages. There was also a positive response to taking advantage of additional training modules dedicated to the topic of web page development regardless of whether course credit was included.

The instructional problem faced by students who have graduated from Western Illinois University's graphic communication program is a problem of opportunity. While the curriculum is currently aligned with accrediting standards set forward by the Accrediting Council for Collegiate Graphic Communications, the program does not have sufficient teaching staff to take on additional courses that cover HTML content. As a result, the students are forced into a situation whereby their first exposure to web publishing does not occur until they reach senior-level coursework. To address this limitation, a self-guided HTML training prototype is proposed to address the following issues:

- Current curriculum cannot support the additional courses required.
- Students enrolled in the Graphic Communications program experience skills-based learning in all courses in the major and

therefore expect to be able to experience skills-based learning in all facets of their graphic communications education.

- The need for graduates to acquire the necessary skills to be successful in the workplace.

The objective of this design research was to develop a comprehensive HTML training system for students enrolled in the Graphic Communications program at Western Illinois University. Specifically, the three-fold objectives addressed in the study were:

1. Identify the optimal self-guided HTML training system that can be made available to students currently enrolled in graphic communications courses at Western Illinois University.
2. Design a self-guided HTML training system to help graphic communications students begin to learn how to create websites.
3. Develop an operational prototype of the self-guided HTML training system.

In order to address these objectives, it was necessary to answer the following research questions:

1. What components are necessary to create and publish a basic web site, (including hardware, software, and using the methods available to students at Western Illinois University)?
2. How can appropriate design methodologies be used to design a self-guided HTML training system for graphic communication students at Western Illinois University?

3. What are the principal features of an HTML training system for graphic communications students at Western Illinois University?

A review of the existing literature was performed to determine the optimal software and hardware to use to create and publish a website as well as identify the most adaptable and flexible system for creating web pages for students enrolled in graphic communication courses at Western Illinois University. As a result of this review, the Adobe® Dreamweaver® product was determined to be the best solution. The product is available to students at Western Illinois University as well as being commercially popular. Websites can be created on Macintosh or Windows-based computers and offers the same functionality on either platform. The hardware requirements of Dreamweaver® varies by operating system. Dreamweaver® utilizes a web server to host web sites of which WIU students already have access making it a cost effective solution.

The second research question asked how appropriate design methodologies can be used to design a self-guided HTML training system for students of graphic communications. While a variety of design methodologies exist, the Palmer and Rhodes (1997) design methodology was determined to be the most appropriate. Palmer and Rhodes (1997) provided a comprehensive framework and theoretical base for the training system developed.

The final research question looked at what the primary features of a self-guided HTML training system would look like. Since the training system was being developed for students at Western Illinois University, it seemed relevant to implement the system using hardware and software available at the university.

Initial development of the training system was done in Blackboard Vista, a commercially available course management system.

Implementing a training system utilizing Blackboard Vista presented a large number of problems that had to be addressed (e.g. students would have to be granted access by a system administrator, the system proved to be very inflexible when adding content, complex pages need to be created externally to the course management system and then imported, and the use of advanced features such as JavaScript was limited since the course management system was designed to disable the use of these types of features).

Keeping in mind the limitations of the course management system and the goal of keeping the system on hardware and software supported by the university, an alternative content management system was developed. The training system consists of a unique method of developing and delivering content and was developed using an open source database program (MySQL) and scripting language (PHP).

Aside from the delivery system, the content of the system consists of a variety of modules of instruction, each module consisting of an array of topics/pages. Various multimedia, (including images, interactive movies, and digital video) is used to help illustrate important concepts throughout the modules.

To test the usefulness of the prototype system, graphic communication students were recruited to test the system. Students were asked to complete a brief survey at the end of each learning module and at the close of the study.

Additionally, page access information was saved and analyzed. Student response to the system and content was positive. Page access counts indicated that some students participating in the study repeatedly reference various pages of content.

The Western Illinois University webmaster completed the training and provided comments on the prototype system and content and suggested adding additional content to address concerns with web accessibility for impaired persons. The webmaster also echoed suggestions made by student participants to offer a "Next Page" and "Previous Page" feature.

Conclusions

The conclusions to the research questions follow:

Research question 1: What are the components necessary to create and publish a basic website? This will require the investigation of three items:

a. What is the optimal software needed to create and publish a website?
b. What is the optimal hardware needed to create and publish a website?
c. For students enrolled in the graphic communication courses at Western Illinois University, what is the most available, adaptable and flexible method of creating a website?

A variety of hardware and software can be used to create and publish websites. Spanbauer (1996) found some web developers prefer to create HTML code by hand, directly in a text editing program. Dowling (2003) suggests that web page editing software can be helpful in assisting the developer by creating properly formatted HTML code automatically. Further, a developer sees the changes being made to formatting automatically. In a text editor, the changes to the file being edited are viewed separately in a browser rather than in one window. Some web editing programs combine the ability to edit HTML code directly and are able to take advantage of a graphic view of their web pages, providing greater flexibility than a standalone text editor.

Dowling (2003) believes it is impossible to determine the one best editing program because of the different preferences of the users, but considers availability as one of the primary factors in determining a web editing software.

Two web editing programs are readily available to students at Western Illinois University: Adobe® Dreamweaver® and Microsoft® Frontpage®. Both software programs allow the user to edit code directly and utilize a graphical editor.

While Frontpage® is not well supported on campus and runs only in a Microsoft® Windows® environment, Dreamweaver®, runs identically on a Macintosh and Windows® operating system. Graphic Communication students utilize Macintosh computers during classroom instruction and can use the same computers during open lab times to complete homework or training such as that developed for this study. Therefore, it was determined that Adobe®

Dreamweaver® provided the best software option for the prototype training system.

Hardware was also taken into consideration. The university already provides students with web server space that would be adequate for such a program. Adobe® Dreamweaver® can be easily integrated into the existing web server structure, thus providing an, other necessary hardware includes a web inexpensive and consistent interface solution for uploading files for the web.

Research question 2: How can appropriate design methodologies and technologies be used to design a self-guided HTML training system for graphic communication students at Western Illinois University?

A wide variety of design methodologies exist. Kierns (1999) suggests any design methodology based on four principles: active responding (providing the user with a variety of choices and interactions as opposed to simply requiring them to read), provide immediate feedback, the user should be allowed to take small steps, and provide a self-paced system.

The ADDIE training system is the accepted methodology for development of online training at Western Illinois University. The steps of ADDIE (analysis, design, develop, implement, and evaluate) provide a very broad approach for developing instruction. For the purpose of this prototype, a more specific framework was desired for the development of the training system (i.e. Palmer and Rhodes (1997)).

Palmer and Rhodes (1997) is derived from both theory and practice and utilizes ten categories: supportive environment, meaningful application, opportunities for choice, manageable tasks, performance examples, performance opportunities, knowledge of progress, opportunities for success, multi-sensory techniques, and intuitive appeal. The application of each of these areas is addressed in Chapter III.

Research question 3: What are the principal features of an instructional prototype for a self-guided HTML training system for graphic communications students at Western Illinois University?

In order to find the principal features of an instructional prototype system for Graphic Communication students at Western Illinois University, it was necessary to consider the available options for creating a training system.

Western Illinois University utilizes a learning/course management system that is a commercially available product known as Blackboard Vista. The use of this program created drawbacks including issues with dealing with student enrollments and limitations on the types of interactions allowed by the system.

To overcome the limitations of Blackboard Vista, a custom training system utilizing MySQL and PHP, (a database and scripting language already available at WIU) was preferred. Through the use of these tools, a flexible training system was developed.

The newly developed training system utilizes a variety of primary features. The new features are illustrated in Chapter IV. These features include:

- A method of offering content in smaller and more manageable blocks of content (i.e. modules). These modules allow the user to quickly navigate to a given topic and see how the topic relates to other similar topics and breaks the training into smaller, more manageable tasks.
- A flexible system to create and organize content. The prototype system allows the content creator to focus on the development of the content without requiring them to develop individual web pages. Selecting a category and ranking for the page within the category organizes the content. Alternative systems require manipulation of the navigation that appears on all pages.
- An unobtrusive solution for presenting multimedia. The Lightbox program presents movies and multimedia content in a subtle manner by dimming the main browser window except for the multimedia content being presented.
- A simple method of expanding the amount of information available to the user.
    - The tooltip feature presents additional information by simply hovering or moving the mouse over a highlighted word or group of words to display additional information relevant to that which is being selected.
    - Persistent accordion navigation feature provides a navigational structure that uses stacked panels or tabs of

information. Panels hold a variety of related information and clicking on a panel displays that panel's information.

- Persistent page titles feature to assist the user in keeping track of where they are in a particular learning module. The title of the document being viewed is located in the same location regardless of the content page being viewed.

Recommendations/Future Research

Recommendations for additional research and development include:

1. Development of additional features to the user and administrative interfaces to increase the flexibility of the content management system and delivery platform for online training. When entering content, for example, it would be useful to create an interface to allow the creation and maintenance of learning module categories. Additionally, it would be useful to have an automated method of creating Lightboxes and tooltips in the content pages rather than the current manual method of entering HTML text to activate the Lightbox or tooltip. Adding such features would allow the system to be used for the development of other online instruction in virtually any discipline.
2. Simple modifications to the system would allow any Graphic Communication student the ability to access the content. Currently, the system developer grants access to the training system upon request. Making this alteration would allow more students the opportunity to

explore the system. Additional data mining could also be performed to find frequency rates of the information being requested.

3. Additional content could be developed to include modules describing how to create graphics for buttons, offer more in-depth information on the use of cascading style sheets (CSS), and how to build and modify Dreamweaver® templates to better facilitate the creation of web sites. Development of additional advanced content would allow users to explore the methods of creating advanced web pages, (including dynamic web pages). A series of additional modules could examine topics such as creating MySQL databases, adding Javascript to a webpage, or including embed online movies.
4. The addition of related links would provide an opportunity for the user to explore related websites offering more in-depth information. For example, the section that addresses the creation of links in Dreamweaver® could also be linked to other Internet resources addressing the same topic providing the user access to a variety of alternative resources on the same topic.
5. The addition of a question and answer mechanism on each content page could provide the opportunity for meaningful feedback to both users and administrators of the system. Students would be able to post questions or comments concerning the content discussed in the module as well as reply to other posts.

6. Determination of how a larger audience can use the HTML training system would be helpful. While the training system was designed for students in the Graphic Communication program at Western Illinois University, it is feasible that the training system can be adapted to suit the needs of other programs such as Instructional Design and Technology, Art, and Marketing.
7. Modifying content in the HTML training system to meet the needs of other graphic communication programs. The program could be made available via website (e.g. http://www.graphiccommcentral.org), making the educational materials available for other graphic communication programs outside of Western Illinois University. Simple modifications to better customize the training system for other uses would be all that is required.

In summary, the prototype system is a viable method of delivering effective training to students motivated to learn more. New technologies should continue to be explored to both add features and enhance content to the training.

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APPENDIX A

FORMER STUDENT SURVEY INSTRUMENT

Graphic Communications Graduate Survey
Demographic Information

Name

Graduation Date

College Major

Area of Emphasis

Approximate Credit Hours in Graphic Communications

Gender

Male
Female

Are you currently employed in an industry that relates closely to Graphic Communications?

Yes
No

Current Job Title

Length of time employed at this organization

What type of industry are you currently employed?

Corporate :

Graphic [illegible]

If you are employed in the graphic communications industry, what area(s) are you most involved with in your current position?

Web Multimedia Development
Image Manipulation
Printing (image transfer)
Design and Prepress
Finishing Binding
Management

What skills do you believe could be enhanced in graduates of the graphic communications program at WIT?

Do you believe that if content was offered as learning modules to enhance skills, but wouldn't be for credit, do you think you would've completed the modules?

What skills in the Graphic Communications area that you learned from WIT do you believe have most contributed to your success in the industry?

Submit Survey

APPENDIX B

SURVEY FEEDBACK

Total Surveys: 22

Student Name	Josh B.
Enhance Program	Web page development and design, Multimedia development (Flash®, Director) Of course I just minored in GCOM so didn't take every class available.
Would You Complete	Most definitely, especially now, with my job I know I could have used more drill and practice and learning skills.
Skills for Success	Creation of my portfolio in Flash®. I completed it in my minor but as I got this job I went back to refurbish my skills and teach myself more about Flash®. I also have used my photo editing and Illustrator® skills to design some logos and flyers for my job.
Student Name	Brian J.
Enhance Program	More Web Design built into program.
Would You Complete	Yes, any additional course material would be useful.
Skills for Success	Web design and Page Layout.
Student Name	Brooke Havenga
Enhance Program	Everyone is looking for web designers! Maybe a web design class could be offered in the earlier level classes so the concept could be learned more in-depth.
Would You Complete	Yes

Skills for Success	The concepts and tools of Photoshop® and Illustrator®. The printing and pre-press processes.
Student Name	Diane H.
Enhance Program	Honestly - I do not think you can enhance much else. Time limits were given, the terminology was given to us - you just have to want to learn it. In my everyday world we have to recreate some things that have been faxed repeatedly (which isnt pretty. So maybe recreating more projects could benefit the current students. Being able to look at something and break it down into how it can be printed onto a tshirt is not as simple as it was in 414. Luckily it is a skill that can easily be aquired with practice.
Would You Complete	Yes I do - if my schedule would have allowed it. I love the printing industry and am pretty fascinated by it.
Skills for Success	GCOM 211 - this was a great class teaching the basics of design and layout and different ways to lay things out. I get to create some "original" designs for some of the sales reps I work with and they are always impressed with the end result. I also think 414 is a great class because you get to explore the different aspects of printing. AB Dick, screen printing, RISO, and color separations. This class

	really helps you decide what area you want to further your career in. Learning all of the programs was a plus also. The employers loved seeing that on the resume.
Student Name	Nicholas C.
Enhance Program	The area covered is too broad. Trying to fit the Adobe® suite along with the print aspect is too much. For me personally, i wish there would have been two illustrator® classes, possibly 3 Photoshop®'s, and i learned enough in the page layout aspect. The Printing was too much, and i know personally i will never use it.
Would You Complete	No, because you don't as a student believe that enhancing your skills in say Photoshop® are necessary. As I look at it today, I wish I knew everything about the program. I have used it for about 9 months on a daily basis and still only know about 80-85%. Honestley the G-comm classes, are by far the most time consuming classes that i have taken to date. Asking a student to take more time out of a project filled schedule would take too much time for a student with a full school schedule.
Skills for Success	Photoshop® classes and Illustrator® classes unfortunetely the Page layout classes as well.
Student Name	Shaune P.

Enhance Program	The graduates will definately need a better sense of deadlines. In the industry there is no extentions. If the project is not completed by the designated time, you run the risk of losing your customer. Also a better understanding of printer and copier maintenance is suggested. More demonstrations in bindery work would also be beneficial. All beginners in the industry will end up doing this kind of work at one point.
Would You Complete	As a student that entered into the department with little computer and graphics knowledge, no. However, it is necessary information that is needed.
Skills for Success	Software skills: Image Ready®, QuarkXPress®, Illustrator®, Photoshop®, Dreamweaver® (some Flash®). Internship experience gave me a very good sense of what the industry is like. GCom 415 provided me with most information that benefited me in my first job.
Student Name	Brandon L.
Enhance Program	Understanding you can't learn everything in 2 semesters, I still have a lot to learn with Photoshop®. I would emphasize the importance of not doing the minimum to get a class project done. Rather, urge students to dig within

	the program and try to learn it as deep as possible.
Would You Complete	Looking back, I wish we would have done something similar as I wish I could have learned so much more. It's different with graphics people as you have to love what you're doing and the programs you use. In my case, I loved the design side of the curriculum and would have jumped on any chance to dive deeper with Illustrator®, InDesign®, and Photoshop®.
Skills for Success	Doing a lot of hands-on training was key to where I am now. The lectures were good but getting into the programs and using them, not simply surface tools, but in-depth training was vital to learning the programs. I find myself faced with situations at work that we dealt with in the classroom and am able to work through most with relative ease.
Student Name	Dawn S.
Enhance Program	More time spent on animation and three dimensional graphics applications.
Would You Complete	Yes.
Skills for Success	The ability to use page layout applications like Quark® Express, and Photoshop®. Also, through watching my professor's organization of classroom time I gained insight into effective

	training practices even though that was not a focus of the program. I also learned many things about scanning, resolution, and file types.
Student Name	Adam B.
Enhance Program	Prepress work. They need to teach more about preparation of the files before they are sent to press. YOUR GOING TO WORK LONG HOURS!! Teach more about how bleeds work, what they do.
Would You Complete	Truthfully...no. The "want" to learn can only push a college student so far. The credits helped drive the "want". *DOes that make since?*
Skills for Success	Learning about the print industry. I think that since it wasn't a straight "graphic design" major, really broadend the amount learned about the whole industry. I have realized that much of what you taught I have come across in my job as far as how the print industry works.
Student Name	Christy H.
Enhance Program	-Portfolio building -Drawing skills -Advertising layouts -Teaching the right tools -Emphasis on portfolio presentation when in an interview -Logo Layout and Design -In Photoshop® there is so much more to learn besides color changing

Would You Complete	Yes, when I was in school with graphic design I loved new challenges. There is just a huge amount of different skills learned at other schools that I found that I didn't possess b/c I never learned them. I would definately complete learning modules.
Skills for Success	I am not in the graphic communications field anymore because I would have to go back to school to get more formal training. Down the line I probably will but looking for a job in the field I found that many schools were beating me out b/c of my skill level.
Student Name	Nannette L.
Enhance Program	
Would You Complete	Yes
Skills for Success	I feel the courses I completed in graphic communications enhanced my skills when working with digital images. This has been very helpful when designing instructional materials, digital or print-based.
Student Name	Steven B.
Enhance Program	A more in-depth use of Photoshop® and illustator. The classes available when I attended WIU were great for exposure to the program, but focusing on more specific uses of the program features would have been nice. I've had to teach

	myself the finer techniques for important features like clipping paths, the pen tool, etc.
Would You Complete	It would depend on the content of the module, but I would certainly look at them. If it was an area I didn't know, or felt I could improve on, I would have completeed them.
Skills for Success	The clone stamp, patch and healing tools; as well as using the measure tool to auto-rotate an image are features I have regularly taught to others with more industry experience than I have. Plus, they make photo-retouching and cob'ing (along with pen tool proficiency) go much faster.
Student Name	Patrick C.
Enhance Program	More work with Flash® and Dreamweaver®
Would You Complete	Depends on the content and subject matter, if interesting YES!
Skills for Success	Photoshop® and Illustrator®. thanks Roger
Student Name	Don S.
Enhance Program	Classes dealing with the printing aspect like the one taught by Bloemker, but without the attitude & ego, so students arent scared to ask him a question & get humiliated. Like what happens after we make these designs (magazine

	covers, CD labels, Calendars, etc.) what is the next step & what should we know about terminology used in the outside world. Anything dealing with trapping, ripping, etc. in my opinion would help a ton. PREPRESS. The class only seniors took with that new professor (I forget his name) was a great class because you learned about all the different aspects of the graphic & printing community with CSRs, QC, Mockup, etc. In the web aspect, I would have a CSS class because it seems that is getting more and more popular in the web environment. I don't know if we had a class like that or not, I cant remember, I was taking 19 hours with 2 web classes at that time that I got D's in. So, I didnt know my ass from my elbow that semester. Also HTML codes must be known. At least basic codes, because not every company uses Dreamweaver®. Tables, style sheets and basic html are good things to know.
Would You Complete	Without a doubt.
Skills for Success	The Graphics classes I took with the art department helped build my creativity more than I could imagine. The graphics classes I took with ENGRTECH, helped me in a different

	way. I learned the main uses for the tools in all the graphics programs. Tracing in Illustrator® helped & the Quark® class with Roger was also a very insightful class with the pagination & such.
Student Name	Jennifer W.
Enhance Program	I'm not really sure. All of the GCom courses seem to be introductory to the workforce. I think that it is important to learn as many programs as possible because different companies use different software. Also, it is important to know the function of the various tools and filters (if present) in all programs. Knowing basic skills is the best advice I can give.
Would You Complete	I think so. I was very interested in my major and doing anything extra to enhance my design ability. I belonged to AIGA for one semester, and I wished that the club was more active. The more practice for "real life" situations, the better. The internship was very beneficial.
Skills for Success	My basic knowledge of the tools and several programs has helped me the most. The company I'm working for is trying to make the switch from to Quark® to InDesign®. My basic knowledge of the program was an asset because I

	was able to look back at my school notes and prepare a short presentation to the rest of the staff. My presentation impressed my boss because he felt that I had given a basic overview, so now, the staff will only spend one day at an advanced InDesign® class, verses three since we feel comfortable skipping the beginner and intermediate sessions.
Student Name	Mohammed S.
Enhance Program	Web Design, Actionscript
Would You Complete	Yes
Skills for Success	n/a
Student Name	Jeff M.
Enhance Program	Every attempt should be made to teach identical printing processes to those the graduate will be exposed to once employed.
Would You Complete	I would have personally. I have created several modules as a teacher. There are benefits and disadvantages. Benefits include: the ability to explore in more depth than regular classroom instruction can allow; a big disadvantage can be the motivation level of the individual as you can only get out of it what you put into it. A tendency with the modular approach is to simply computerize

	the experience. Every attempt should be made to use hands-on experiences as much as possible. This is why I came away from WIU with such a rich experience that lecture, books, etc, alone can not match.
Skills for Success	Without question, color-separation techniques, halftone work, offset printing, camera work, Photoshop® experience. Screen printing was not offered at the time I was there but would have been relevant as printing is not just reserved paper alone.
Student Name	Gary B.
Enhance Program	Interviewing skills.
Would You Complete	I think so.
Skills for Success	I am not in the Graphics industry, even though I would like to be. I think there should be more help in the job search for Graphic Design students.
Student Name	Andrew A.
Enhance Program	more information about how projects are reproduced in traditional lithographic processes or other means.
Would You Complete	If I thought that these modules would help enhance my career after graduation. Also, if the modules were offered at times that didn't interfere with my other GCOM classes.
Skills for Success	All of the design

	knowledge, even the web design. Also, knowing how to solve problems with files, or computers that I wasn't aware of how to fix before I majored in GCOM
Student Name	
Enhance Program	Incorporate more of the IT/Computer Science part of it. When I was first looking for a job it seemed that I had Graphic Communications skills, but lacked some IT skills. Even though I am pursuing a different career (nursing), the skills that marketing and design skills that I learned will help me especially if I decided to pursue nursing administration.
Would You Complete	Probably not
Skills for Success	My main reason for minoring in GCOM was to get an overview of graphic design to better my marketing skills. Learning the different programs was very benefical.
Student Name	Brian Havelka
Enhance Program	the students hate it, but more focus on the effect the designers have on a companies bottom line. more portfolio development, more creative projects. Showing more of the difference between production design and creative design. **NO EXTENSIONS PERIOD** grading was much to

	easy. i have yet to have a deadline that we were not allowed to meet and that includes our design departments. IF you can't get your work done in the "real world" you will get fired, prepare for that
Would You Complete	i would have. Though i did grades fine, my designing was weak ,y professional development in the field would be better
Skills for Success	Even though i am in a business field now, the computer skills i learned, focused on shortcuts, has let me fly past the rest of my department in productivity and accuracy.
Student Name	Jennifer K.
Enhance Program	Advanced ASP/PHP programming, advanced Javascript programming. These skills come in handy for any web development-based occupation, and at this time, with no time on my own to learn these languages with any sort of proficiency; I wish part of my college curriculum had focused more on programming language.
Would You Complete	Oh, yes. If I could fit them into my curriculum, I certainly would have.
Skills for Success	Desktop publishing, Photoshop® skills, and Adobe® Illustrator® skills learned at WIU have helped me excel.

APPENDIX C

PHP CODE FOR DISPLAYING

MODULE CONTENT

```
<?php
if (!isset($_SESSION)) {
      session_start();
}
$MM_authorizedUsers  = "";
$MM_donotCheckaccess = "true";

// *** Restrict Access To Page: Grant or deny access to this page
function isAuthorized($strUsers, $strGroups, $UserName, $UserGroup) {
      // For security, start by assuming the visitor is NOT authorized.
      $isValid = False;

      // When a visitor has logged into this site, the Session variable
MM_Username set equal to their username.
      // Therefore, we know that a user is NOT logged in if that Session
variable is blank.
      if (!empty($UserName)) {
      // Besides being logged in, you may restrict access to only certain
users based on an ID established when they login.
      // Parse the strings into arrays.
      $arrUsers  = Explode(",", $strUsers);
      $arrGroups = Explode(",", $strGroups);
      if (in_array($UserName, $arrUsers)) {
```

```
$isValid = true;
        }
        // Or, you may restrict access to only certain users based on their
username.
        if (in_array($UserGroup, $arrGroups)) {
                $isValid = true;
        }
        if (($strUsers == "") && true) {
                $isValid = true;
        }
        }
        return $isValid;
}

$MM_restrictGoTo = "login.php";
if (!((isset($_SESSION['MM_Username'])) &&
(isAuthorized("",$MM_authorizedUsers, $_SESSION['MM_Username'],
$_SESSION['MM_UserGroup'])))) {
        $MM_qsChar   = "?";
        $MM_referrer = $_SERVER['PHP_SELF'];
        if (strpos($MM_restrictGoTo, "?"))
                $MM_qsChar = "&";
        if (isset($QUERY_STRING) && strlen($QUERY_STRING) > 0)
                $MM_referrer .= "?" . $QUERY_STRING;
        $MM_restrictGoTo = $MM_restrictGoTo. $MM_qsChar .
"accesscheck=" . urlencode($MM_referrer);
        header("Location: ". $MM_restrictGoTo);
        exit;
}
?>
```

```
<?php
require_once('Connections/OtherDisadmin.php');
require_once('Connections/Disadmin.php');
?>

<?php
function NavBuilder ($pagenumber, $itemtitle, $Old_Title)
{       //convert to link begin
        echo '<li>';
        if ($_GET['subpage']==NULL) {
                $_GET['subpage']='1';
        }
        if ($_GET['subpage']!=$pagenumber) {
                echo '<a href=cms.php?id=' . $_GET['id'] . '&panelcat=' .
$_GET['panelcat'] . '&subpage=' . $pagenumber . '>';
        }
        // echo 'Page ' . $pagenumber . ' - ';
        //determine what the link will be == NULL
        if ($itemtitle == NULL) {
                //   echo 'Previous Page Content Continues';
                echo $Old_Title . ' Continues';
        }
        else {
                echo ' ' . $itemtitle;
        }
        echo '</a>';
        if ($_GET['subpage']==$pagenumber) {
                echo ' <em>(Current Page)</em>';
        }
        echo '</li>' ;
```

```
        //convert to link end
}

if (!function_exists("GetSQLValueString")) {
        function GetSQLValueString($theValue, $theType, $theDefinedValue
= "", $theNotDefinedValue = "")
        {
                $theValue = get_magic_quotes_gpc() ? stripslashes($theValue) :
$theValue;
                $theValue = function_exists("mysql_real_escape_string") ?
mysql_real_escape_string($theValue) : mysql_escape_string($theValue);

                switch ($theType) {
                        case "text":
                          $theValue = ($theValue != "") ? "'" . $theValue . "'" :
"NULL";
                          break;
                        case "long":
                        case "int":
                          $theValue = ($theValue != "") ? intval($theValue) : "NULL";
                          break;
                        case "double":
                          $theValue = ($theValue != "") ? "'" . doubleval($theValue) .
"'" : "NULL";
                          break;
                        case "date":
                          $theValue = ($theValue != "") ? "'" . $theValue . "'" :
"NULL";
                          break;
                        case "defined":
```

```
                    $theValue = ($theValue != "") ? $theDefinedValue :
$theNotDefinedValue;
                    break;          }
            return $theValue;
      }
}

$colname_Recordset1 = "-1";
if (isset($_GET['id'])) {
  $colname_Recordset1 = $_GET['id'];
}
mysql_select_db($database_Disadmin, $Disadmin);
$query_Recordset1    = sprintf("SELECT * FROM CM_MainTable WHERE
id = %s", GetSQLValueString($colname_Recordset1, "int"));
$Recordset1          = mysql_query($query_Recordset1, $Disadmin) or
die(mysql_error());
$row_Recordset1      = mysql_fetch_assoc($Recordset1);
$totalRows_Recordset1 = mysql_num_rows($Recordset1);

mysql_select_db($database_Disadmin, $Disadmin);
$query_GetWebBasics    = "SELECT * FROM CM_MainTable where
CATEGORY = 7 ORDER BY `Order` ASC";
$GetWebBasics                = mysql_query($query_GetWebBasics,
$Disadmin) or die(mysql_error());
$row_GetWebBasics            = mysql_fetch_assoc($GetWebBasics);
$totalRows_GetWebBasics = mysql_num_rows($GetWebBasics);

mysql_select_db($database_Disadmin, $Disadmin);
$query_Get_Intro_to_HTML     = "SELECT id, PageTitle, `Order` FROM
CM_MainTable WHERE Category = 1 ORDER BY `Order` ASC";
```

```
$Get_Intro_to_HTML                    =
mysql_query($query_Get_Intro_to_HTML, $Disadmin) or
die(mysql_error());
$row_Get_Intro_to_HTML                =
mysql_fetch_assoc($Get_Intro_to_HTML);
$totalRows_Get_Intro_to_HTML = mysql_num_rows($Get_Intro_to_HTML);

mysql_select_db($database_Disadmin, $Disadmin);
$query_Get_DW_Overview        = "SELECT * FROM CM_MainTable
WHERE Category = 2 ORDER BY `Order` ASC";
$Get_DW_Overview              =
mysql_query($query_Get_DW_Overview, $Disadmin) or die(mysql_error());
$row_Get_DW_Overview    = mysql_fetch_assoc($Get_DW_Overview);
$totalRows_Get_DW_Overview = mysql_num_rows($Get_DW_Overview);

mysql_select_db($database_Disadmin, $Disadmin);
$query_GetSettingUpDW   = "SELECT * FROM CM_MainTable WHERE
Category = 3 ORDER BY `Order` ASC";
$GetSettingUpDW         = mysql_query($query_GetSettingUpDW,
$Disadmin) or die(mysql_error());
$row_GetSettingUpDW     = mysql_fetch_assoc($GetSettingUpDW);
$totalRows_GetSettingUpDW = mysql_num_rows($GetSettingUpDW);

mysql_select_db($database_Disadmin, $Disadmin);
$query_GetUsingDW = "SELECT * FROM CM_MainTable WHERE
Category = 4 ORDER BY `Order` ASC";
$GetUsingDW = mysql_query($query_GetUsingDW, $Disadmin) or
die(mysql_error());
$row_GetUsingDW = mysql_fetch_assoc($GetUsingDW);
$totalRows_GetUsingDW = mysql_num_rows($GetUsingDW);
```

```
mysql_select_db($database_Disadmin, $Disadmin);
$query_GetWebGraphics   = "SELECT * FROM CM_MainTable WHERE
Category = 5 ORDER BY `Order` ASC";
$GetWebGraphics         = mysql_query($query_GetWebGraphics,
$Disadmin) or die(mysql_error());
$row_GetWebGraphics     = mysql_fetch_assoc($GetWebGraphics);
$totalRows_GetWebGraphics = mysql_num_rows($GetWebGraphics);

mysql_select_db($database_Disadmin, $Disadmin);
$query_GetUploadingYourSite  = "SELECT * FROM CM_MainTable
WHERE Category = 6 ORDER BY `Order` ASC";
$GetUploadingYourSite                =
mysql_query($query_GetUploadingYourSite, $Disadmin) or
die(mysql_error());
$row_GetUploadingYourSite            =
mysql_fetch_assoc($GetUploadingYourSite);
$totalRows_GetUploadingYourSite =
mysql_num_rows($GetUploadingYourSite);

mysql_select_db($database_Disadmin, $Disadmin);
$query_GetGraphicsOverview     = "SELECT * FROM CM_MainTable
WHERE Category = 8 ORDER BY `Order` ASC";
$GetGraphicsOverview            =
mysql_query($query_GetGraphicsOverview, $Disadmin) or
die(mysql_error());
$row_GetGraphicsOverview        =
mysql_fetch_assoc($GetGraphicsOverview);
$totalRows_GetGraphicsOverview =
mysql_num_rows($GetGraphicsOverview);
```

```
?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<!-- DW6 -->

<?php
//adding code to track the pages being accessed.
require_once('Connections/OtherDisadmin.php');
$PageAccessed      = $_GET['id'];
$ModuleAccessed = $_GET['panelcat'];
$AccessedBy        = $_SESSION['MM_Username'];

if (($PageAccessed!=NULL) and ($ModuleAccessed!=NULL)) {
//$editFormAction = $_SERVER['PHP_SELF'];
//if (isset($_SERVER['QUERY_STRING'])) {
      // $editFormAction .= "?" .
htmlentities($_SERVER['QUERY_STRING']);
//}
//if ((isset($_POST["MM_insert"])) && ($_POST["MM_insert"] == "form1")) {
      $insertSQL = sprintf("INSERT INTO PageTracking (PageAccessed,
ModuleAccessed, AccessedBy) VALUES (%s, %s, %s)",
                  GetSQLValueString($PageAccessed, "int"),
                  GetSQLValueString($ModuleAccessed, "int"),
                  GetSQLValueString($AccessedBy, "text"));

      mysql_select_db($database_Disadmin, $Disadmin);
      $Result1 = mysql_query($insertSQL, $Disadmin) or
die(mysql_error());
}
```

```
//}
?>



<head>
<!-- Copyright 2005 Macromedia, Inc. All rights reserved. -->
<meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1"
/>
<title><?php echo $row_Recordset1['PageTitle']; ?></title>

<link rel="stylesheet" href="css/1.css" type="text/css" />
<link href="ajax_mouseover/css/bubble-tooltip.css" rel="stylesheet"
type="text/css" />
<link href="SpryAssets/SpryAccordion.css" rel="stylesheet" type="text/css"
/>
<link href="SpryAssets/SpryAccordion2.css" rel="stylesheet" type="text/css"
/>
<link rel="stylesheet" href="lightwindow/css/lightwindow.css" type="text/css"
media="screen" />
<script type="text/javascript" src="SpryAssets/SpryAccordion.js"></script>
<script type="text/javascript" src="ajax_mouseover/js/bubble-
tooltip.js"></script>
<script type="text/javascript"
src="lightwindow/javascript/prototype.js"></script>
<script type="text/javascript"
src="lightwindow/javascript/scriptaculous.js?load=effects"></script>
<script type="text/javascript"
src="lightwindow/javascript/lightwindow.js"></script>
```

```
</head>
<!-- The structure of this file is exactly the same as 2col_leftNav.html;  the only difference between the two is the stylesheet they use -->
<body>

<div id="masthead">
  <h1 id="siteName">Web Design for Graphic Designers </h1>
  <div id="globalNav"></div>
</div>
<!-- end masthead -->
<div id="content">
  <div id="breadCrumb"></div>
  <h2 id="pageName"><?php echo $row_Recordset1['PageTitle']; ?></h2>
  <p><hr />
  <div class="feature">
    <p>
<?php
    if (($row_Recordset1['Content'] != NULL) ) { //Check to make sure I have 1 page of content first
        if ((strlen($row_Recordset1['Content2']) <2) ) { //ok, we have one item and no subpages. Display the page and be done.
            echo $row_Recordset1['Content'];
        } else {
            if (($_GET['subpage']=='') or ($_GET['subpage']==1)) { echo $row_Recordset1['Content']; }
            if ($_GET['subpage']==2){ echo $row_Recordset1['Content2']; }
            if ($_GET['subpage']==3){ echo $row_Recordset1['Content3']; }
            if ($_GET['subpage']==4){ echo
```

```
$row_Recordset1['Content4']; }
                if ($_GET['subpage']==5){ echo
$row_Recordset1['Content5']; }
                if ($_GET['subpage']==6){ echo
$row_Recordset1['Content6']; }

                //Looks like we build the subpage navigation here.
                echo '<P> </p><center><div
class="SubpageNavigation"><center><strong>Additional
Pages</strong></center><ul>';
                //now, lets look at what the page title is and or was. The
Logic is:
                //Let's check this for second page.
                $PreviousTitle = $row_Recordset1['PageTitle'];
                if ( $row_Recordset1['Content2'] != NULL) {
                    NavBuilder (1, $row_Recordset1['PageTitle'],
$PreviousTitle);
                    if ($row_Recordset1['Content2_Title']!= NULL) {

    $PreviousTitle=$row_Recordset1['Content2_Title'];
                    }
                }
                if ( $row_Recordset1['Content2'] != NULL) {
                    NavBuilder (2, $row_Recordset1['Content2_Title'],
$PreviousTitle);
                    //if ($row_Recordset1['Content2_Title']==NULL)
                }
                if ($row_Recordset1['Content3_Title']!= NULL) {
                    $PreviousTitle=$row_Recordset1['Content3_Title'];
                }
```

```
                if ( $row_Recordset1['Content3'] != NULL) {
                    NavBuilder (3, $row_Recordset1['Content3_Title'],
$PreviousTitle);
                }
                if ($row_Recordset1['Content4_Title']!= NULL) {
                    $PreviousTitle=$row_Recordset1['Content4_Title'];
                }
                if ( $row_Recordset1['Content4'] != NULL) {
                    NavBuilder (4, $row_Recordset1['Content4_Title'],
$PreviousTitle);
                }
                if ($row_Recordset1['Content5_Title']!= NULL) {
                    $PreviousTitle=$row_Recordset1['Content5_Title'];
                }
                if ( $row_Recordset1['Content5'] != NULL) {
                    NavBuilder (5, $row_Recordset1['Content5_Title'],
$PreviousTitle);
                }
                if ($row_Recordset1['Content6_Title']!= NULL) {
                    $PreviousTitle=$row_Recordset1['Content6_Title'];
                }
                if ( $row_Recordset1['Content6'] != NULL) {
                    NavBuilder (6, $row_Recordset1['Content6_Title'],
$PreviousTitle);
                }
                echo "</ul>";

                //convert to link begin
                /*echo '<li>';
                if ($_GET['subpage']!=2) { echo '<a href=cms.php?id=' .
```

```
$_GET['id'] . '&panelcat=' . $_GET['panelcat'] . '&subpage=2>'; }
                    echo 'Page 2';
                    if ($_GET['subpage']==2) { echo ' <em>(Current
Page)</em>'; }
                    determine what the link will be == NULL
                    if ($row_Recordset1['Content2_Title'] == NULL) {
                        echo 'Previous Page Content Continues';
                    } else {
                        echo ' ' . $row_Recordset1['Content2_Title'];
                    }
                    echo '</a></li></ul>' ;*/
                    //convert to link end
                    //}
                    echo '</div></center>';
                }
        } else {
                echo "
                <p><center><h2>How do I navigate the training?</h2></center>
                <p>  The training material is presented in
<strong>modules</strong> with
                    various <strong>topics</strong> within each module. You
may choose to
                    use the structure on the right side of the screen to
<strong>jump to
                    any topic</strong> within any module. </p>
                <p> <a href=\"popup.php?id=5\" class=\"lightwindow\"
params=\"lightwindow_width=500,lightwindow_height=400\" title=\"Modules
Overview\">
                    An overview of the modules is available.</a>
                    <blockquote><p style=\"color: red\"><em >Though you can
```

```
choose to view any
                topic in any module whenever you please, topics and
modules are developed to
                build off of one another. It is recommended you complete
the training from
                the top and work down.</em></p></blockquote>
            <strong>Clicking \"Understanding How the Web
Works\"</strong>
                in the \"Select a Topic\" area on the right is recommended.
";
      }?></p>
      </div>

   <div class="story">
            <?php if ($row_Recordset1['RL1'] != NULL) { // Show if recordset
empty ?>
      <h3>Related Links </h3>
      <p><?php echo $row_Recordset1['RL1']."<br>".
                        $row_Recordset1['RL2']."<br>".
                        $row_Recordset1['RL3']."<br>".
                        $row_Recordset1['RL4']."<br>"; ?></p>
            <?php } // Show if recordset empty ?>
      </div>
   <div class="story">
            <?php if ($row_Recordset11['EL1'] != NULL) { // Show if
recordset empty ?>
       <h3>External Media </h3>
       <p><?php echo $row_Recordset1['EL1']."<br>".
                        $row_Recordset1['EL2']."<br>".
                        $row_Recordset1['EL3']."<br>".
```

```
                                    $row_Recordset1['EL4']."<br>"; ?></p>
        <?php } // Show if recordset empty ?>
    </div>
</div>
<!--end content -->
<div id="navBar">
    <div id="search">
        <form action="#">
        <label>search</label>
        <input name="searchFor" type="text" size="10" />
        <input name="goButton" type="submit" value="go" />
        </form>
    </div>
    <div id="sectionLinks">
        <ul><li>Select a Topic</li></ul>
    </div>
    <div class="relatedLinks">
        <div id="Accordion1000" class="Accordion2" tabindex="0">
        <div class="AccordionPanel2">
            <div class="AccordionPanelTab2"><span style="color:#000000;
font-weight:bold">Web Basics</span></div>
            <div class="AccordionPanelContent2"><ul>
            <?php do { ?>
                <li><a href="cms.php?id=<?php echo $row_GetWebBasics['id'];
?>&panelcat=0" class="navbarahref">
                <?php echo $row_GetWebBasics['PageTitle']; ?></a> </li>
            <?php } while ($row_GetWebBasics =
mysql_fetch_assoc($GetWebBasics)); ?>
            </ul></div>
        </div>
```

```
            <div class="AccordionPanel2">
          <div class="AccordionPanelTab2"><span style="color:#000000;
font-weight:bold">Introduction to HTML</span></div>
                    <div class="AccordionPanelContent2"><ul>
                    <?php do { ?>
            <li> <a href="cms.php?id=<?php echo
$row_Get_Intro_to_HTML['id']; ?>&panelcat=1" class="navbarahref">
            <?php echo $row_Get_Intro_to_HTML['PageTitle']; ?></a> </li>
                    <?php } while ($row_Get_Intro_to_HTML =
mysql_fetch_assoc($Get_Intro_to_HTML)); ?>
                    </ul></div>
            </div>

            <div class="AccordionPanel2">
                    <div class="AccordionPanelTab2"><span
style="color:#000000; font-weight:bold">Getting Started with
Dreamweaver</span></div>
                    <div class="AccordionPanelContent2">
                    <?php do { ?>
                        <a href="cms.php?id=<?php echo
$row_Get_DW_Overview['id']; ?>&panelcat=2"  class="navbarahref">
                        <?php echo $row_Get_DW_Overview['PageTitle'];
?></a> <br />
                    <?php } while ($row_Get_DW_Overview =
mysql_fetch_assoc($Get_DW_Overview)); ?>
                    </div>
            </div>

      <!--Start Another Tab -->
```

```
<div class="AccordionPanel2">
<div class="AccordionPanelTab2"><span style="color:#000000; font-
weight:bold">Setting Up Dreamweaver</span></div>
<div class="AccordionPanelContent2">
<?php do { ?>
<a href="cms.php?id=<?php echo $row_GetSettingUpDW['id'];
?>&panelcat=3"  class="navbarahref">
<?php echo $row_GetSettingUpDW['PageTitle']; ?></a> <br />
<?php } while ($row_GetSettingUpDW =
mysql_fetch_assoc($GetSettingUpDW)); ?>
</div>
</div>
<!--End another tab -->

<!--Start Another Tab -->
<div class="AccordionPanel2">
<div class="AccordionPanelTab2"><span style="color:#000000;
font-weight:bold">Building a Basic Site</span></div>
<div class="AccordionPanelContent2">
<?php do { ?>
<a href="cms.php?id=<?php echo $row_GetUsingDW['id'];
?>&panelcat=4"  class="navbarahref">
<?php echo $row_GetUsingDW['PageTitle']; ?></a> <br />
<?php } while ($row_GetUsingDW =
mysql_fetch_assoc($GetUsingDW)); ?>
</div>
</div>
<!--End another tab -->

<!--Start Another Tab -->
```

```
<div class="AccordionPanel2">
<div class="AccordionPanelTab2"><span style="color:#000000; font-weight:bold">Web Graphics </span></div>
<div class="AccordionPanelContent2">
<?php do { ?>
<a href="cms.php?id=<?php echo $row_GetGraphicsOverview['id']; ?>&panelcat=5"  class="navbarahref">
<?php echo $row_GetGraphicsOverview['PageTitle']; ?></a> <br />
<?php } while ($row_GetGraphicsOverview = mysql_fetch_assoc($GetGraphicsOverview)); ?>
</div>
</div>
<!--End another tab -->

<!--Start Another Tab -->
<div class="AccordionPanel2">
<div class="AccordionPanelTab2"><span style="color:#000000; font-weight:bold">Uploading Your Site</span></div>
<div class="AccordionPanelContent2">
<?php do { ?>
<a href="cms.php?id=<?php echo $row_GetUploadingYourSite['id']; ?>&panelcat=6"  class="navbarahref">
<?php echo $row_GetUploadingYourSite['PageTitle']; ?></a> <br />
<?php } while ($row_GetUploadingYourSite = mysql_fetch_assoc($GetUploadingYourSite)); ?>
</div>
</div>
<!--End another tab -->
```

```
            </div>
        </div>
<script>
function getQueryVariable(variable) {
        var query = window.location.search.substring(1);
        var vars = query.split("&");
        for (var i=0;i<vars.length;i++) {
                var pair = vars[i].split("=");
                if (pair[0] == variable) {
                        return pair[1];
                }
        }
        //alert('Query Variable ' + variable + ' not found');
}
</script>

<script type="text/javascript">
<!--
var Accordion1000 = new Spry.Widget.Accordion("Accordion1000",
{defaultPanel: getQueryVariable("panelcat")});
//-->
</script>
   <div id="advert"></div><div id="bubble_tooltip">
        <div class="bubble_top"><span></span></div>
        <div class="bubble_middle"><span
id="bubble_tooltip_content">Content is comming here as you probably can
see.Content is comming here as you probably can see.</span></div>
        <div class="bubble_bottom"></div>
   </div>
   <div id="headlines"></div>
```

```
</div>
<!--end navBar div -->
<div id="siteInfo"><a href="#">Contact Me</a> | &copy;2007 Roger L.
Runquist</div>
<br />
</body>
</html>
<?php
mysql_free_result($Recordset1);

mysql_free_result($GetWebBasics);

mysql_free_result($Get_Intro_to_HTML);

mysql_free_result($Get_DW_Overview);

mysql_free_result($GetSettingUpDW);

mysql_free_result($GetUsingDW);

mysql_free_result($GetWebGraphics);

mysql_free_result($GetUploadingYourSite);

mysql_free_result($GetGraphicsOverview);
?>
```

APPENDIX D

INSTITUTION REVIEW BOARD FORMS

WESTERN
ILLINOIS
UNIVERSITY

April 4 2009

Dr Roger Rundquist
Psychology

Dear Dr Runsquist

I am pleased to inform you that your WIU IRB protocol [illegible]09 has been approved for the period 4 [illegible]3 09 through 4 [illegible]3 10 I have enclosed a copy of the approval sheet along with a copy of the approved stamped informed consent Remember that if you encounter any adverse events while conducting this research that you should contact our office immediately Once you have completed the data collection and the study has ended please let our office know so that we can close the file If you find that you need more time than what was originally stated please complete a continuation form at least one week before the [illegible]

Please let me know if you have any questions about the process

Sincerely

[illegible]
IRB [illegible]

Office of Sponsored Projects
[illegible]

I. Date of Preparation: April 7, 2009
WIUIRB #: 312-09 (Include, if known)

WESTERN ILLINOIS UNIVERSITY
INSTITUTIONAL REVIEW BOARD
(FWA 00005865)
Sherman Hall, Room 320, Macomb, IL 61455-1390
Phone. 309/298-1191 FAX· 309/298-2091
Website: http //www wiu edu/users/misp/ E-mail: IRB-Administrator@wiu.edu

Human Subjects in Research
Expedited Review

Project Title:	Graphic Communication Student HTML Training System		
Principal Investigator/Faculty	Roger L. Runquist		
Address·	637 Malpass Library, WIU		
Telephone Number:	309/298-2243	*Fax Number:*	309/298-2435
E-Mail Address:	r-runquist@wiu.edu		
Co-PI or Student Investigator			
Address			
Telephone Number.		*Fax Number:*	
E-mail Address			
Primary Contact Person:	Roger L. Runquist		

II. Funding

☐ External Funding Agency (Name)

☐ Internal Grant Program ☐ None

Contract or Grant Title if applicable*:	N/A
Contract or Grant if applicable #:	N/A

PRINCIPAL INVESTIGATOR'S ASSURANCE AND SIGNATURES

Signature certifies that the Principal Investigator understands and accepts the following obligations to protect the rights and welfare of research subjects in this study

- I recognize that as the Principal Investigator it is my responsibility to ensure that this research and the actions of all project personnel involved in conducting the study will conform with the IRB approved protocol, IRB requirements/policies, and all applicable HHS/FERPA/PPRA/HIPAA regulations.

- I recognize that it is my responsibility to ensure that the study has been reviewed for scientific merit
- I recognize that it is my responsibility to ensure that the study has been reviewed for ethical content.
- I recognize that it is my responsibility to ensure that there is constant open dialogue between myself and the co-investigators to ensure that the study is conducted correctly, and the safety and protection of the subjects are ensured
- I recognize that it is my responsibility to ensure that valid informed consent/assent has been obtained from all research subjects or their legally authorized representatives I will ensure that all project personnel involved in the process of consent/assent are trained properly and are fully aware of their responsibilities relative to the obtainment of informed consent/assent according to the IRB guidelines and applicable federal regulations I will use only the currently approved, IRB stamped informed consent form or script for recruiting subjects
- I will promptly inform the IRB of any event that requires reporting in accordance with IRB policies and procedures on Unanticipated Events Involving Risks to Subjects or Others and Adverse Events (Serious and/or unexpected
- I will not initiate any change in protocol without IRB approval except when it is necessary to reduce or eliminate a risk to the subject in which case the IRB will be notified as soon as possible
- I will maintain all required research records and recognize the IRB is authorized to inspect these records
- I will inform the IRB immediately of *any* significant negative change in the risk/benefit relationship of the research as originally presented in the protocol and approved by the IRB
- I understand that IRB approval is valid for no more than one year with continuing review by the IRB required at least annually in order to maintain approval status I will not enter subjects on the study before IRB approval or if IRB approval expires In the latter case, I will immediately contact the IRB to obtain permission to continue subjects in the research study
- I will inform the IRB immediately if I become aware of any violations of HHS regulations (45 CFR 46), FERPA regulations (34 CFR 99), PPRA regulations (34 CFR 98), HIPAA regulations (45 CFR 164 530) or IRB Policies and Procedures for the protection of human subjects
- I understand that failure to comply with all applicable HHS/FERPA/PPRA/HIPAA regulations IRB Policies and Procedures and the provisions of the protocol as approved by the IRB may result in suspension or termination of my research project, notification of appropriate governmental agencies by the IRB, and/or suspension of my freedom to present or publish results
- I certify that as faculty sponsor that the student investigator is knowledgeable about the IRB Policies and applicable federal regulations governing research with human subjects and has sufficient training and experience to conduct this study in accord with the approved protocol In addition I will meet with the student investigator on a regular basis to monitor study progress Should problems arise I agree to be available personally to supervise the student investigator in solving them If I will be away, I will arrange for an alternate faculty sponsor to assume my responsibilities

- I certify that all study personnel have completed the HIPAA education program and are certified
- I understand that per OHRP FDA guidelines the IRB will be monitoring adherence to approved research protocols The oversight process does not end with approval of a proposal I understand that I am part of the collaborative effort to maintain the integrity of the human subjects research approval process and procedures to ensure continuous quality improvement and academic excellence at WIU

Roger L Runquist	[redacted]	2 Apr 09
PRINCIPAL INVESTIGATOR S NAME	SIGNATURE	DATE
CO INVESTIGATOR S NAME	SIGNATURE	DATE
FACULTY ADVISOR S NAME	SIGNATURE	DATE

Student Investigator's (Co-Investigator's) Assurance. By my signature as student investigator, I certify the above applicable assurances and that I will meet with my faculty sponsor on a regular basis to monitor study progress If my faculty sponsor is away I will meet with his/her arranged alternate faculty sponsor who will assume his/her responsibilities

CO INVESTIGATOR S Printed Name Signature & Date

TO BE COMPLETED BY INSTITUTIONAL REVIEW BOARD CHAIR:

A. Date materials transmitted to IRB members

B. Date reviewed by IRB

C. Action taken by IRB (attach minutes)

☐ Disapproved ☒ Approved or ☐ Approved conditionally at

☒ Minimal Risk ☐ More Than Minimal Risk (Note conditions here)

For a period beginning 04/13/09 and ending 04/12/10

Approved [redacted]

Date 04/13/09

Chair, Institutional Review Board

GUIDELINES

In order to ensure a timely review, investigators are encouraged to be **brief, clear, and concise. Avoid the Use of Discipline Specific Language.** The narrative statement protocols should be typewritten and numbered according to the following requirements in the order in which they appear here. If a particular item does not relate to your study, indicate "not applicable" next to the item number. If you have further questions please consult the Policy and Procedure Manual for Human Subjects.

The narrative statement of the protocol must include:

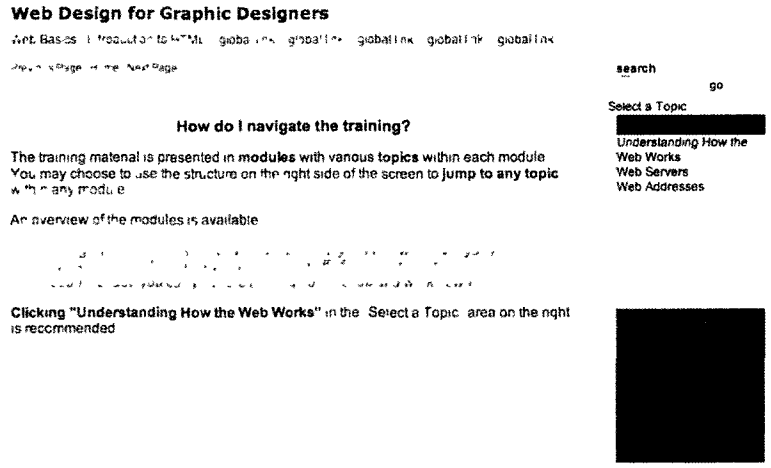
1. A brief description of the purpose of the proposed research project, including approximate beginning and ending dates of data collection [illegible] specific description of procedures and/or activities which subjects [illegible]

   The proposed study design will expose participants to the development of requisite skills needed to develop web content through an online educational multimedia system. The educational system utilizes a variety of multimedia (images and video) to explain important concepts.

   The online educational system provides students with information relevant to their understanding and encourages them to work interactively in the subject matter. The online educational system is designed in modules and requires the user to interact with the content in order to proceed through each module. This interaction includes creating HTML tags and viewing the results as well as

WIU IRB [illegible]

watching animations on a variety of related topics. Reviewers can access the system by accessing the following web site: http://www.wiu.edu/user/murlr/dis/ and the image below represents a typical screen found in the educational training system:



The study will utilize the following procedure:

1. The primary investigator will recruit students. The primary investigator will ask to speak in each upper division Graphic Communication class that he does not teach. The proposed script is attached (Attachment A) Permission has been obtained from the instructors of the classes where recruiting will be done and the permission is attached (Attachment B). As an incentive, those completing the study will be placed in a drawing to win their choice of either a 32GB flash drive or an iPod shuffle Only one such prize will be offered

2 Students choosing to participate in the study will meet as a group with the principle investigator at a time outside of the class in which they were recruited to discuss the informed consent document and to obtain signatures. The informed consent document is attached (Attachment C). Once the signatures are obtained. the participants will be asked to complete a brief questionnaire to determine their level of expertise (Attachment D).

3 Each student choosing to participate in the study will be asked to sign an informed consent document (Attachment C). Once completed, the participant will be assigned a unique ID number, which will be used as a data file identifier. The data file identifier will be used to track the

progress of the student through the evaluation process of the educational system and throughout the study The informed consent document will be separated from this data file and secured in a locked file cabinet, accessible only by the primary investigator The locked cabinet will be located in the primary investigator's department office

4 Following completion of the Informed Consent, participants will receive an email outlining how to access the system and how to complete the evaluations A copy of the email to be sent to the participants is attached (Attachment E) Study participants will access the system and work through the modules from the beginning

5 Upon completion of each module, participants will complete a brief online form evaluating the instructional effectiveness and satisfaction with that module The questions to be used are included as an attachment (Attachment F) This data will be stored in an online database by assigned participant number for later evaluation by the primary investigator The participant will complete any remaining modules, again completing evaluations in the process

6 Once all of the modules are completed, the participant will be asked to complete an overall system evaluation Following the completion of the evaluation, the primary investigator will contact and interview each participant to gain more insight into his or her experience The interview questions are attached (Attachment G)

2 A description of the characteristics of the subject population in the project (e g , number, gender race or ethnicity [if known] age range sampling frame, general mental and physical health and any other unique characteristics) and an explanation of the rationale for using that particular population

The participants for this study are students enrolled in Graphic Communication 300- and 400-level courses at Western Illinois University Recruitment of participants will be done by soliciting classes not taught by the primary investigator or any relatives of the primary investigator

3 If relevant, a description of why any vulnerable populations are necessary to the research project (e g , prisoners, children, persons with disabilities, pregnant women, or any group whose ability to give a voluntary informed consent may be questionable)

No populations of this nature will be used in this study

4 A description of how and where voluntary informed consent will be obtained from subject(s) You should include a copy of a final informed consent form

and/or final survey instrument or a list of interview questions In addition, copies of any recruitment material, research agreements, and debriefing material that will be used are also needed

Students will be recruited by the primary investigator The primary investigator will ask to speak in each upper division class that he does not teach The proposed script is attached (Attachment A) Permission has been obtained from the instructors of the classes where recruiting will be done and the permission is attached (Attachment B)

A final interview will be performed by the primary investigator and the final questions are attached

5 A description of procedures to ensure the confidentiality of the subjects (e g where and how data will be stored and who will have access)

Each student choosing to participate in the study will be asked to sign an informed consent document (Attachment C) Once completed, the participant will be assigned a unique ID number, which will be used as a data file identifier The data file identifier will be used to track the progress of the student through the evaluation process of the educational system and throughout the study The informed consent document will be separated from this data file and secured in a locked file cabinet, accessible only by the primary investigator The locked cabinet will be located in the primary investigator's department office

Five years after the completion of the study, all materials will be destroyed All paper documents will be shredded Data stored on external media will also be destroyed

6 A description of any anticipated risks and/or inconveniences that might occur to the subjects as a result of participating in the research including a statement of the approximate amount of time required of the subjects **Note: Stating that there is no risk associated is not an acceptable answer, risk is always present but may be no more than normal daily activities.**

There are minimal risks to participants in the study Risks are no greater than the exposure one might have to academic materials that they would be required to master throughout the course of the semester

Participants may become frustrated or embarrassed as a result of a lack of understanding of the material being presented

7 A description of procedures that will be used to minimize potential risk(s) to subjects and the probable effectiveness of those procedures

An informed consent will be presented to the participants indicating the issues they may confront in the study Informed consent will be obtained before participants are allowed access to the content of the educational system Likewise, participants in the study will be reminded that they are able to

withdraw from the study whenever they choose

8 A description of any anticipated benefits that might occur for the subjects and any anticipated beneficial knowledge that might occur as a result of the proposed research project **Note: Extra credit and payment for participation *are not considered benefits.***

After completing the online training, the participant will be more familiar with the process of building web sites The intent is to expose the learners to the necessary skills early enough in their academic careers to allow them ample opportunity to practice their skills The acquisition of this knowledge would be the primary benefit of participating in the research study

ILLINOIS STATE
UNIVERSITY

Research Ethics and Compliance

Campus Box 3330
Normal, IL 61790-3330
Telephone: (309) 438-8451
Facsimile: (309) 438-3592

April 14, 2009

Roger L. Runquist
637 Malpass Library
Western Illinois University
Macomb IL 61455-1390

Thank you for submitting your research protocol and approval information for the protocol titled **Graphic Communication Student HTML Training System** which was approved by the Western Illinois University at Macomb Institutional Review Board on April 13, 2009. The Illinois State IRB will maintain this documentation for our records, however if any changes or modifications are made to this research project or any adverse reaction reported, you are responsible for reporting these immediately to the Research Ethics and Compliance Office.

This letter in no way grants you access to any faculty, staff, students and/or facility at Illinois State University. Access must be secured, by you, through the appropriate institutional units. If you have any further questions regarding this issue, please feel free to contact me.

Sincerely,

Joseph Casto, PhD
Assistant Director of Research Ethics and Compliance

APPENDIX E

SURVEY RESPONSES

Module Evaluated: Web Basics
Responses: 11
Average Time to Complete: 8.64 minutes
Average Usefulness Score: 3.91 out of 5

Module Strengths:

- The examples that you could click on to help you understand the reading better.
- Definitions of terms
- I believe that the strengths of this module are that the information is presented in a manner that is very easy to understand. The new terms are broken down as they are presented so that the reader can easily pick up on it.
- For someone who does not know how the internet works, it is very informative. Great breakdowns of the basics of how the internet actually works. I found it to be a good refresher.
- Explanations are in simple, easy to understand terms.
- Informational and makes you think how websites work.
- easy to read and follow
- Breaking down each part of a web address and how they work together.
- The visualizations were nice. While it was basic info for me, it could be new advanced info for newbies, but I felt you covered the topics well.
- Was simple and easy to follow. Showed the basics of web development that we know, but may not know the actual definition of.
- It was short and simple. The information was straight to the point;

Module Weaknesses:

- Highlight important words in definitions to help remember the term.
- I think that the layout could be changed a little bit. It seems that in the URL breakdown box had a couple holes in it. I just think that the way that the information is presented should look more polished and streamline without sacrificing readability.
- You may go over this later on, if so disregard this, but I would like to have seen what you meant by the folder on the server(In the part where you break down a URL). I have noticed that most people do not understand that its just like a real computer, its a file, just like on a regular computer.
- Effective for its purpose.
- none
- Nothing
- hrm... well, and I'm really reaching for some feedback here, but you could add more visual effects. But seriously, it flowed well, and had the right amount of each topic.
- Nothing, everything that was placed on the pages was explained.

Module Evaluated: Introduction to HTML
Responses: 9
Average Time to Complete: 21.67 minutes
Average Usefulness Score: 4.89 out of 5

Module Strengths:

- Examples and definitions
- All of the extra hands on tools where you can do it yourself to see how its done. It was a very helpful section, being able printing off the list of HTML codes is nice.
- Very clear and easy to understand.
- Again, the explanations are very straight forward.
- I think that this module is great for people that want to learnt the basics of HTML. It shows many helpful things, the best though is probably the fact that you are able to type your own text. That is a very helpful feature.
- Again Informational.
- It was easy to follow, I liked that it was interactive.
- I enjoyed the Flash® tutorial that showed how to create a tag. Also the listing of commonly used tags was useful. The information was clear and easy to follow.
- I liked that there was extra links that were placed to help us understand more about a topic. The HTML trainer helped show what was trying to be explained in a visual manner, which helped understand.

Module Weaknesses:

- Give more examples and activities.
- On the Building HTML Tags section when I clicked the See more on builing HTML and read the part on greater-than signs after I dragged the three sections into the right order and clicked continue it took me back to the very beginning of the webpage, not the the page where it lists the different modules on the side..that is the only improvement I can see. It was a helpful section.
- more examples on how each tag worked.
- Building html tag section: I was only able to drag and drop the beginning tag into the appropriate box and was taken to a black screen stating I was correct, but then it kicked me back to the welcome page. Tried twice and it did the same thing. Maybe consider having the "click to continue" available immediately instead of having a delay on it.
- Im not sure if there is much that can be done with this page. It didn' leave any unanswered questions as far as what the main heading was about.
- It was effective for its purpose. In more extensive settings possibly the exploration of other common languages like CSS or PHP.

- Maybe try a few more tags.
- I feel that all the information and links within the module were very useful. I almost feel that instead of having to click on the links on the side panel there should be a next button at the bottom. Also, if there is a way to not let a user pass the page until all links have been read. That will help them in the long run because not everyone likes to click a link to a new page.

Module Evaluated: Getting Started with Dreamweaver®
Responses: 8
Average Time to Complete: 13.57 minutes
Average Usefulness Score: 4.38 out of 5

Module Strengths:

- The only exposure I've had to Dreamweaver® is a one-day seminar a couple months ago, so anything I can learn is going to be great.
- It goes over many things about Dreamweaver® and has many spots to take a look and see exactly what it is talking about.
- Gives light to the Dreamweaver® Application.
- The use of images to explain what everything does
- Pictures
- Actual Pictures to go with the text.

Module Weaknesses:

- Im not sure that the folder part in this section is in the right area. I might have that at the end of this section or at the begining of working in Dreamweaver® section, or possibly even its own short section before the working in Dreamweaver® section.
- It could go more into depth about different tools of Dreamweaver®. Once again, the module was effective and efficient for this purpose.
- The sections were very short and I think some of the stuff could be explained more.
- Too much reading

Module Evaluated: Setting Up Dreamweaver®
Responses: 4
Average Time to Complete: 11.25 minutes
Average Usefulness Score: 4 out of 5

Module Strengths:

- It mentioned how to start a site.

- It was very easy to follow, and the images to show where to click really helped.
- Detailed and easy to follow.

Module Weaknesses:

- It needs to tell more of what to do when setting up the site. like the url, do we leave it blank or do we put it in? a more in depth tutorial is needed or i am still in the dark.
- Nothing, the way it was worded made it easy to understand and to follow.

Module Evaluated: Building a Basic Site
Responses: 3
Average Time to Complete: 18.33 minutes
Average Usefulness Score: 4 out of 5

Module Strengths:

- the videos helped tremendously. It showed the usability of css and styles.css.
- The videos helped a lot and again the wording was easy to follow.

Module Weaknesses:

- It could go more in depth about link attributes and customizing the styles more further.
- I couldn't figure out how or if I could move my photo to underneath the text. It just stayed at the bottom of the page and wouldn't move.

Module Evaluated: Web Graphics
Responses: 2
Average Time to Complete: 14 minutes
Average Usefulness Score: 4.5 out of 5

Module Strengths:

- It showed the usefulness of keeping file size down.
- It was a lot of helpful information, it helped a lot to know when to use which type of file.

Module Weaknesses:

- It could talk more about the optimization of image files.

- nothing, it was more reading than images or videos but very useful and helpful

Module Evaluated: Uploading Your Site
Responses: 3
Average Time to Complete: 9.33 minutes
Average Usefulness Score: 3.33 out of 5

Module Strengths:

- it tells us we can make changes and ftp in Dreamweaver® which is helpful.
- Pretty easy to follow

Module Weaknesses:

- it doesn't tell us anything about how to go about setting up the ftp. Thank you for these tutorials though. I really appreciate them and I hope there will be more web learning opportunities in the years to come.
- I went through the steps at www.wiu.edu/guava and clicked on the create a website option, I don't know if we are suppose to upload the example we did through the module but I couldn't figure out how to do it.
- Need to have a step by step on how to put your FTP information into Dreamweaver® to have site on the internet.