

Using Web-Based Technology to Teach a Computer Network Course

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ABSTRACT: *This paper looks at the techniques involve in implementing a web technology in teaching. There is a need to develop a multimedia teaching class these days since the technology is moving so fast toward new discovery everyday. This is the first phase of a research and development project to determine the effectiveness of the web-based teaching. As part of this project we will study a process whereby an educational presentation is recorded and reformatted to make it suitable for Internet delivery. The presentation format utilizes a combination of conventional WWW media including 'jpg' and 'gif' images, combined with audio. The innovations in Internet technology use and the appropriate teaching strategies for that media are based in the Virtual Classroom. In using the learning tool of creating a web site we are seeking to create a concrete learning experience in technological advances. Since the process is a hands-on experience, it will be especially effective with the visual and kinetic learners while still inclusive of other learning styles. The creation of a Web site is an excellent experience in teaching. To be successful, students would be required to research, plan, and then execute their design. There will be a great deal of problem solving during the actual creation of the Web site. This is real life learning and very functional. Students would be able to take these skills and use them outside the classroom. This web page could become an integrated tool in their education. The benefits of doing the web site, as a group cooperative experience are that you expand the learning environment with group dynamics. Working on a Web site project in a cooperative learning situation mirrors future working environments. In business, many people work in group's situations to complete a common project. Creating this web site will not only give the students a chance to learn real life computer and research skills but also increase their interpersonal skills. This type of learning situations is our future. The process of creating a Web site in a cooperative learning situation provides a meaningful educational experience.*

1 INTRODUCTION

Thanks to information technology, nowhere is remote any longer today. Every place has the same access to information, because the best and up-to-date data is available online from anywhere. The Web also provides the chance for people to meet and learn. The internet is applied as a new learning tool and is an educationally efficient supplementary media. For the student's comfort and maximization of learning effectiveness, the practical internet courseware techniques are employed.

Compared with conventional courses which use textbook and broadcasting programs, web-based courses shows higher course completion student performance. That is, about 75% of the students who took the web-based courses for a project, completed their courses and about 85% scored 80 or over out of 100. An average completion rate in the conventional distance course is about 50% with about 60% of those who completed the courses receiving scores above 60.

2 RESOURCES

2.1 The Virtual University Trial Project

The Virtual University is defined as an institution that provides access to its educational services without the need for students to be physically present to receive them. The communication technology such as the internet system is needed as a main instructional and communication tool. The Virtual University Trial Project is a project that government encouraged both partnerships among universities and the private sector, and sharing of existing resources in providing web based instruction to the university students and adults. The Project has inspired about 25% of the formal higher education institutions and five private companies in Korea to collaborate in providing virtual courses using advanced technologies. PC network and internet along with telephone and fax have been used as a formal channel for students to ask questions to their instructors and to interact with other students.

2.2 Planning

A typical web based courses consists of learning contents on the web, small group inter action among learners and relevant information library. It is clear that students must be able to feel that they are a part of the course and not left on their own. It is obvious that a virtual classroom has to be dynamic (changeable). It must be easy to receive information and to communicate with other students. New information has to be displayed when students need it. Students must have access to the virtual classroom on a reliable server. Accessibility is elementary; it is a basic requirement, which creates reliability and user friendliness.

For successful online learning, both the visual layout and the information architecture need to be user-friendly, and attractive. All visual, graphic, as well as navigational tools need to be relevant to and to be consistent with the content and aims/objectives of the course; but also need to be employed in a systematic, consistent (font type, size etc.). And also, the interface design must be interactive, helpful and responsive.

Learners need to feel that they can easily make contact with others as the need arises. It might be a very good idea to place a discussing forum in the virtual class. Thus, users have a communication way to discuss the class topics. Very good and easy way to prepare presentation of each topic is to use MS Power Point. Because it can be converted to HTML format, designer can integrate it to the virtual class web page. Virtual Lab is very important section of the virtual class. If it is designed in attractive, interactive and funny way, user will focus on the topic easily. For this section, java applet can be chosen because of its specification to implement virtual lab. Also video and audio materials can be used in this section. Announcement section will be very good way to inform users on new information in the virtual class webpage.

In order to make the classroom user-friendly and attractive, suggested outline of the page layout is given in Figure 1.

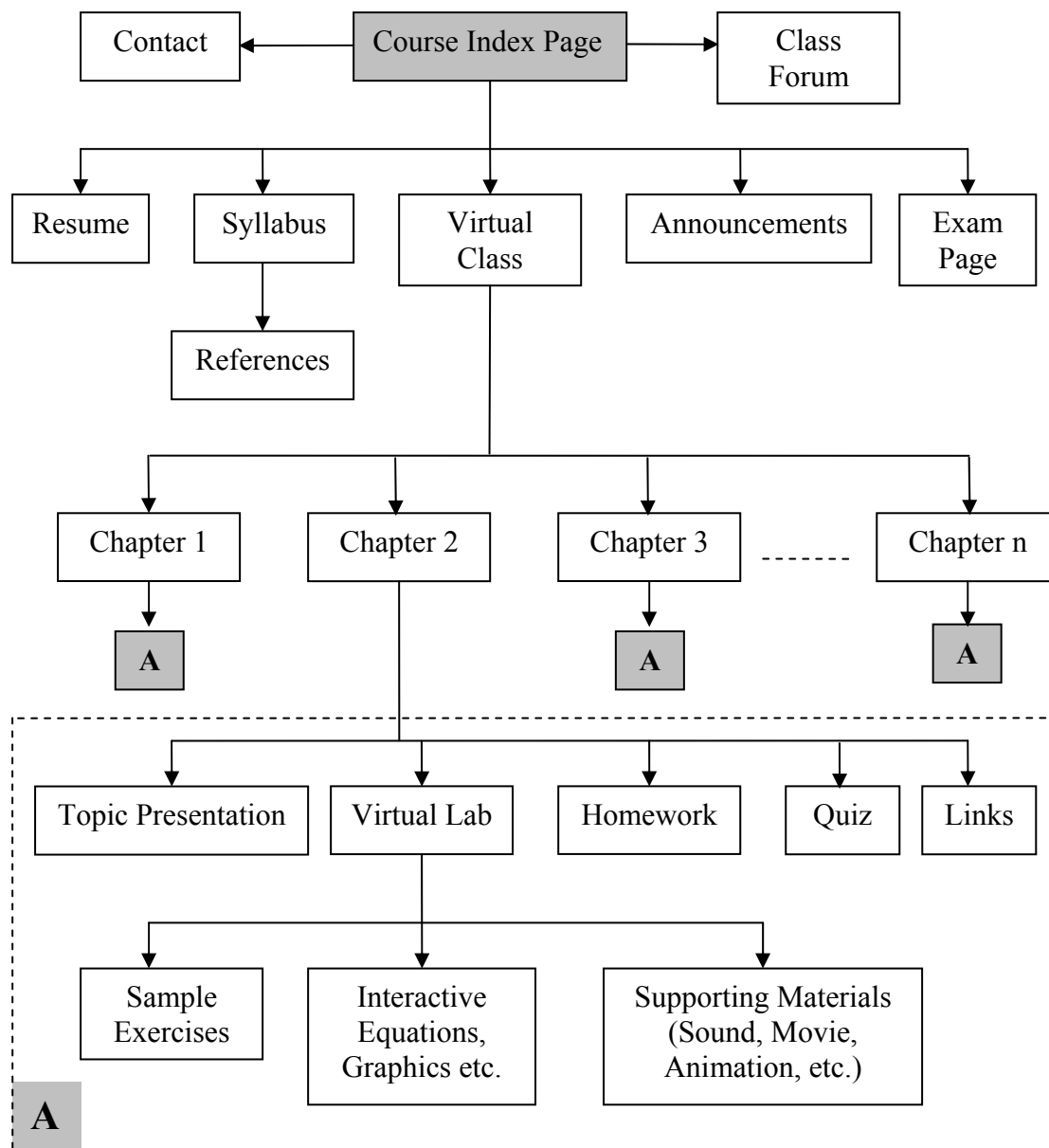


Figure 1. A sample outline of virtual class web-page layout

3 DESIGN PROPERTIES

3.1 Strategy

By creating an effective balance between the technical aspects of web design, and the aesthetic properties of design, it is possible to create sites that are both great interactive sources of information, as well as fun to explore. The hardest part of web engineering however is actually finding the balance between these two parts of design. You will have to know exactly what you require before you even begin designing a web site. How interactive and attractive do you need it to be? What kind of images are you going to use, how should you structure your directories, what is the theme of your page, and how can you use this theme to get hits on your counter? These are all questions that you will have to ask yourself before you start rolling out the HTML for your site.

3.2 Effective Page Layout

Getting to layout all your images, text, and applets and other plug-ins give you a feel for the site before you have even started to publish it. The main thing this exercise aims to do, is to allow you to visualize your site, before you start coding it. Once you have chosen a layout, make sure that you keep it consistent throughout the whole site. It is not advisable to change the layout of each page dramatically as this could confuse your visitors, and they may think that they have surfed on to another site.

3.3 Lists

It has been scientifically proven that the brain can usually only process lists of less than 5 items at a time. So avoid giving the viewer long streams of lists, as they may become irritated with them, or find it harder to concentrate on each item in the list because there are so many of them. If you can try a break down any long lists into smaller sections, this will make it more comfortable for the viewer of your site, and easier for them to process each item in the list. This also helps you break your page down into controlled sections, thus making it easier to maintain.

3.4 Core Page

In today's sites, you are often greeted by a welcome page, and then taken to what is known as the core page, or in some cases you are led through an 'entry tunnel(s)' and then arrive at the core page. The core page is where your visitors will return to choose a different topic, or part of your site that interests them. This core page should work in conjunction with the links in your pages, to subtly guide the surfer through your site. A layout of core page is shown in Figure 2.

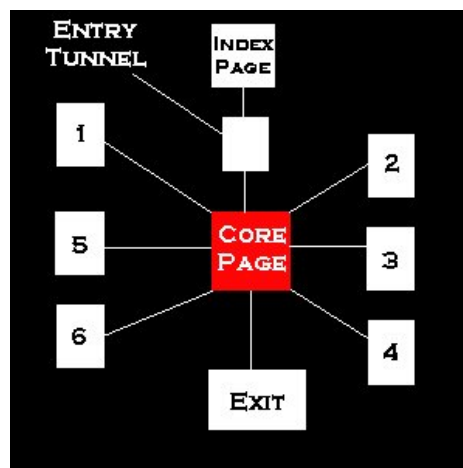


Figure 2. Core page layout

3.5 Typology

This is one of the important elements of your site. It is the main element that holds your site together. Your choice of font is crucial to the success of your site. You should ensure that all your headings etc use the same font, and also you use heading sizes to logically break down your pages into sections. The main font that you use for your text should be clear and easy to read. A good choice Sans Serif, or Times New Roman. Both of these fonts are very clear and easy to read.

4 DESIGN RELATED STRATEGY

Structure: Making it easy for users to find what they need. People develop expectations for how to find different types of information and how to accomplish particular tasks. They may expect to search alphabetically (as when using a phone book), according to groups of similar items (as in a grocery store), or in a sequence of steps to fulfilling certain tasks.

Navigation: Making sure users can move around in the site easily. Use labels that accurately describe the destination and/or resulting action of links.

Text: Designing text that is easy to scan and read.

Media: Using animation and other media effectively.

Visual layout and elements: Providing page layouts that meet users' needs; simple, natural to use, and completely in tune with users' needs and experiences. Achieving these solutions is in the design of technology products.

5 DESIGNING A WEB PAGE

It is found that content design strategy is the most important factor affecting student satisfaction ($r=0.509$). In addition students who studied web-based courses in a LAN environment showed more satisfaction than those in a modern environment ($p<0.05$).

5.1 HyperText Mark-Up Language

Perhaps the most exciting aspect of the Web is that anybody can create a Web page and, with proper hardware and Internet connection, make that page available to the rest of the world. The most common and easiest way to create an HTML, or HyperText Mark-Up Language document is the coding language in which web pages are written.

5.2 Image Formats

When you create a good list, you'll want to add links so users can click on each item and see where it leads. To make the page more interesting, you need images. Two ways to include graphic images in your Web document are: as an inline image, which appears on the Web page, or as an external image, where the reader has to click on a link to a separate page where the image is displayed. The image must be stored as a GIF (Graphics Interchange Format) or JPEG (Joint Photographic Experts Group). The JPEG format is often better for photo-quality images because it takes up less space and can be transferred more quickly, but for simpler drawings, the two formats are fairly comparable in size. The decision of which type of graphics file to use is often made for you by the application you are using. The GIF format supports up to 256 unique colors from a palette of 16 million whereas JPEG format –a compressed-image format- supports millions of colors.

There is also Animated GIF that is graphics image with motion but not a video. It is not written using an advance technology like Java or Shockwave, so it doesn't require fancy plug-ins or helper applications to be viewed.

5.3 Sound and Video

You may also want to add audio and video files to the Web page. The concept is the same as that of a graphics image file, however, the viewer's computer must be equipped with a sound card and speakers and also may require installation of a plug-in or a helper application.

5.4 Java and Java Script

JavaScript is a simple, object-oriented scripting language you can use directly, that is, Java and JavaScript can both be used to add animation, process input, and run cool applications on the Web page. Java is a robust programming language that allows for the creation of programs that can be transmitted over the Internet and they are called applets, which means "small applications". On the other hand, JavaScript is a code that can be embedded in the HTML document. A simple way of using it is to locate the one that will meet your needs and simply copy and paste the script into your Web document.

6 WEB-PAGE DESIGN METHODOLOGIES

Web-page designers and people who organize collections of information give the collections a structure to make them easier to search. The process is simple: All of the information is grouped into a small number of categories, each of which is easily described. This is top-level classification. Then, the information in each category is also divided into subcategories and so on in order to make it possible to look through the whole category to find the desired information. This structure is called hierarchy and it works well not because of what we choose, but what we don't choose.

A web designer can choose from a variety of approaches. No one way necessarily works best all the time; therefore, a web designer even might consider varying approaches while developing the same web.

6.1 Top Down Approach

If web designers have a good idea about what a whole web should contain in advance, a top-down method of design might be best. In the top-down methodology, designers start with a front or top page (often called the *home page*) for a web and then branch off from there. The benefit of the top-down approach is that designers can develop pages according to one central theme or idea. This provides a good opportunity to affect the look and feel of the whole web very powerfully because all pages are designed according to the top page look and feel. A good way to do this is to design a set of templates for types of pages in a web and use these during the implementation process.

6.2 Bottom Up Approach

If web designers know how specific pages will look and work, working from these specific pages to the top page might be the way to proceed. This is particularly true if they already have existing pages as a result of the development of some other web or service.

If web designers have no pages from which to start, they can begin by designing leaves or pages that accomplish specific objectives and then link them through intermediate pages to the top page. The benefit of this design is that the designers aren't constrained by the style of a top page in the leaf pages. Instead, they design the leaf pages in exactly the right style based on their functions. Later, they adjust the pages to create a common look and feel for the whole web.

6.3 Incremental/In-Time Approach

Similar to the top-down and bottom-up approaches, the incremental/in-time approach develops pages "just in time" when they are needed. An initial home page might be needed as well as specific leaf pages that implement particular objectives. These are created and linked with the understanding that later, intermediate pages might be added. This works well if web developers want to very quickly have a working web that grows incrementally rather than deploying all at once.

7 CONCLUSIONS

Teaching and learning online involves more than simply transferring old curriculum to new media. But it is like all teaching in that it necessitates:

- Being clear about goals, and the learning needs of students;
- Knowing the limitations and possibilities of resources at hand; and
- Deciding how those resources can most effectively be deployed to meet the learning goals.

Teaching or supporting face to face teaching, on the Internet simply offers a new set of resources and therefore a new set of possibilities and restrictions. The information technology situation is getting better in education. In the near future every home will be accessed to information superhighway. In that case the digital library system or Internet courseware for self-study is going to be more active utilized by students.

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