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Fundamental Design Considerations For Creating Web Pages

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Fundamental Design Considerations For Creating Web Pages

Abstract

Fundamental Design Considerations for Creating Web Pages is a graduate review paper that was written to increase awareness of the proper use of design principles and web page layout in designing school web sites. This was written in response to the increase of poorly designed web sites that are difficult to read and understand because of the use of improper text and text size, distracting backgrounds, and color combinations that do not match. Information is given as to what design considerations and background information is needed to create a web site. The use of tables and frames is compared along with the four design elements that consist of proximity, repetition, contrast, and alignment. The reader is also given information about readability and navigation within a web site.

Fundamental Design Considerations

For Creating Web Pages

A Graduate Review Paper

Submitted to the

Division of Educational Technology

Department of Curriculum and Instruction

in Partial Fulfillment

of the Requirements for the Degree

Master of Arts

University of Northern Iowa
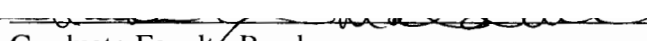
By Damon Staker

March 26, 2001

This Review by: Damon Staker

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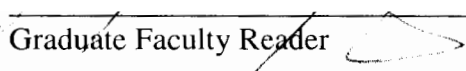
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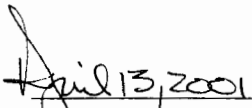Degree of Master of Arts.

Sharon E. Smaldino

April 13, 2001
Date Approved

Graduate Faculty Reader

Leigh E. Zeitz

5/23/2001
Date Approved
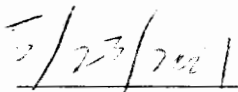
Graduate Faculty Reader

Rick Traw

5/25/01
Date Approved

Head, Department of Curriculum and Instruction

Abstract

Fundamental Design Considerations for Creating Web Pages is a graduate

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Table of Contents

Introduction

This review of information is in response to the increased use of web pages in educational situations. Many teachers and students have been trained to use web page creation tools to develop web pages that can be used in an educational setting. These pages range from assigned projects, informational and personal pages, to class descriptions. A problem that has occurred with this trend is the lack of proper training in design characteristics and web page layout. Web pages are being created that are difficult to read and understand because of the use of improper text and text size, distracting backgrounds, and color combinations that do not match. Many web page creators are also lured to use fancy distractions such as animated images and large banners. These pages do not convey the message that they are intended to and therefore are not readable to the viewer. This problem can be seen by browsing through schools' web sites. Often, the sites have been created by technology savvy students or educators who have not had proper training in web design layout. According to Klein (2000), "The irony is that the medium is so new and goalposts so much in flux that hard-and-fast rules are hard to come by assuming that hard-and-fast rules for something like design are at all desirable" (p.1). He goes on to explain that we are all amateurs and that there is nothing on the web that can be pointed to with any amount of assurance and say, this is the final word.

The intent of this review is to gather common information and web design principles that an educator or student can use to make their pages more legible

and user friendly. The review will cover areas such as web site planning, design, and layout principles. The end product or this review will be a compilation of current thoughts and trends to be used in the creation of web sites and pages.

Methodology:

The sources that were used for this review came from several areas. Since web page design is a new and emerging field, there are not a lot of books written on this subject. In order to review current information, journal articles and online articles were the two primary sources of information. In reviewing the data to compile in this paper, items that were repeated throughout different resources and that were consistent with one another will be used. There is a lot of information in this area and everyone seems to have a different view of what is the correct method of designing and laying out a web site. Other items of consideration when reviewing information was the publication date, the author of the material, and what group or individual published the information. Consideration was also given to how the information could be used in the educational setting and its relevance to educators and students.

Analysis and Discussion

When discussing design considerations for web pages in education, it is important to know the benefits of the web as compared to printed material. There is a place for each one of these mediums. According to Williams and Tollett

(1998), the benefits of print are that it is portable, cheaper to read, and print tools are better developed. With print, you do not need an expensive computer with an internet connection to read the material. Print tools are better developed because they have been around for a long time. Web tools are still in their infancy stage and continue to change as technology advances.

The web offers a relatively low cost for publishing. A computer, software, and web host is all that is needed. There is no need to print web page material on expensive paper. The web offers the advantage of making multimedia, such as sound and animation, available. It is easier to update than print media and can provide immediate feedback to learners. The web offers more color potential because computer monitors use RGB instead of the four-color process (CMYK) that paper uses. These factors need to be taken into consideration when taking into account the medium in which to use.

There are three stages of readership on the web that the web page designer needs to consider (Carpenter, 2000). It is important to know the best tool of each stage. The first stage is Relevance. In this stage, people are asking questions before they read. What is in this for me? This must be demonstrated first because a web page has only 7-10 seconds to capture the viewer's attention. Viewers are scanning at this stage. Tools that can be used to capture attention include headlines, photographs, and captions.

Once the viewer thinks that the web page or the information it contains is relevant, but needs more information to be sure, he/she enters the Confirmation

Stage. The viewer is still in the scanning mode. He/she will spend approximately two minutes in this stage. Tools that can be used in this stage to build interest are limited amounts of body text, sub heads, space between paragraphs, indents, and sidebars.

After the Confirmation Stage, the viewer enters the Action Stage where he/she confirms that the web page is relevant and reads everything. This is also where the designer can move the viewer into an action such as sending email, responding to questions, buying products, etc.

When planning a web site, the first question that needs to be asked is, "Who is the target audience?" There are many items to consider when asking this question. First, according to Lynch and Horton (1997), there are four groups of audiences: 1) web surfers; 2) novice/occasional users; 3) expert/frequent users; and 4) international users. It is important to know the characteristics of each one of these groups. The web surfers like to be enticed with strong graphics and bold statements of content. All the links on your homepage should point inwardly toward pages within your site. The novice/occasional users depend on clear structure and easy access to overviews that illustrate how information is arranged within your web site. Novices tend to be intimidated by complex text menus and may be tentative about delving deeply into the site if the home page is not graphically attractive and clearly arranged. Expert/frequent users depend upon web sites to obtain information quickly and accurately. Expert users are impatient with multiple low-density graphics that only offer two to six choices at a time.

These power users crave stripped down, fast-loading text menus. To satisfy the international users, it is best to avoid local jargon or obscure technical acronyms in your introductory or explanatory pages.

The next question to ask about your audience is, "What browser, operating system, and screen size are they using?" Is your audience using the 640 x 480 or the 600 x 800 screen size? The 640 x 480 size has a browser safe area of 600 x 300 while the 800 x 600 has a safe area of around 780 x 450. When designing around these different size requirements, it is best to think of the process as an allocation of real estate. What needs to be seen by the audience and how much space or pixels is it going to require?

Connection speed of the viewer is a very important consideration. This leads to the usability of the web site. Crouch (2000) says that a large problem is response time. He cited a 1968 study on interactivity that showed response time must be less than one second for interactive content. But today, how often do you go to a web site that takes fifteen seconds or longer to load? Crouch suggests that far too many web sites use fancy java script animations that take too long to load on an opening page before you can evaluate whether the site is any good. Not every user has a T1 connection. Many viewers still use a 14.4 modem. The connection speed will determine the size and complexity of the graphics the designer wishes to use. It will also impact the use of sounds and animations and may not allow for video to be used.

Who is the developer? What does he/she wish to accomplish with the web site? What are his/her goals? According to McKenzie (1997), there are four primary goals for a school web site. They are:

- Introducing visitors to the school

- A tool for pointing to information on the larger web

- The opportunity for the publishing of students' work to both a local and global audience

- An avenue to provide rich data locally collected on curriculum related topics.

This is also a good place in the design process to determine a visual metaphor. This entails coming up with one big idea that will dictate the site's look.

An outline needs to be created during the planning of a site. This gives the designer a quick visual reference of the project without doing any actual construction of pages. It also allows the designer to quickly and easily organize the structure of the site. Within the outline, it is a good idea to plan for the future.

One last consideration in the planning phase of web site design is to look at other sites for ideas. An example would be Amazon.com verses Borders.com. Amazon, a web only store, relies on its web site for prosperity. Where as Borders can rely on stores for income. These sites will often contain proven design principles that can be utilized in other web sites.

The designer of a web page or site needs to also be aware of the interface of the site. Interface consists of how the pages look and interact with the viewer.

Some examples of web page interface are using blue and underlined text as hyperlinks and the cursor changing to a hand when it is positioned over a hot link. Another important interface property is to use the <ALT> tag with every image to ensure that viewers can see a text description of the image before it loads (Carpenter, 2000).

The next item to consider is navigation, or how people get around your site and understand where to go. Proper navigation should consist of clear, consistent icons, graphic identity schemes, graphic or text based overview and a summary screen. Good navigation depends on organization, not fancy graphics. Klein (2000) suggests that people love simplicity. Proper navigation can give the viewer confidence that they can find what they are looking for without wasting time. Users should always be able to easily return to your homepage and to other major navigation points in your local site (Lynch & Horton, 1997). Every web page should contain at least one link. Dead end pages, pages with no links to any other local page in the site, are not only frustrating to user, they are often lost opportunities to bring viewers into other pages in your site. Whether to put the navigation horizontally or vertically is also an important consideration. Do not bury information on your site. Most design articles suggest that visitors should not be any farther than three clicks away from the information they desire. Horizontal navigation works better than vertical if there are over ten links because the viewer has to scroll down on vertical navigation. The primary navigation system to the main sections of your web site should be kept together in a compact package.

There are many styles of navigation that can be used including navigation buttons, navigation bars, plain text links, fancy animated graphics, and more (Williams & Tollet, 1998).

Williams and Tollett (1998) discussed the use of tables and frames in web designs. There is quite a bit of discussion over which one of these layout tools should be used for web page design. The differences between these two tools will be discussed in this paper with no bias towards the better principle to use. Tables allow the designer to place items in columns. This breaks up long lines of text and graphics, which makes it difficult for a viewer to follow. The web designer can also choose between absolute and relative table widths. Absolute table widths will remain the exact size no matter how a visitor changes the size of browser window. If a relative size is chosen, the table will resize to the size of the browser window. Absolute values for the width of tables and the individual cells should usually be used.

Frames are very different than tables, even though they create the appearance of columns on the web page. A frame is a stationary part of a web page that remains fixed while you scroll through another part. Most frames can be spotted by their border. They may or may not contain a scroll bar. Each frame is actually a separate web page. A properly designed frame can be used to keep navigation buttons along the left or right side of a web page or a banner across the top of a web page. The frame holds the buttons or banner in place allowing the viewer to have access to them no matter where the viewer is at on the web page.

Williams and Tollett (1998) stressed the four design elements in their book. The elements consist of proximity, repetition, contrast, and alignment. Proximity refers to the relationships that items develop when they are close together. When items are close to one another, they appear to have a relationship and belong together.

When items are physically separated, they do not have a relationship. Throughout a project, a designer should repeat certain elements that tie all the pages together. This is the repetition design element. On a web site, navigation buttons can be a repetitive element. Colors, style, format and layout can also be repeated. The purpose of repetition is to unify and add visual interest.

Contrast draws a potential reader's eye into the page. Contrasting elements guide a reader's eyes around the page, create a hierarchy of information, and enable a reader to skim through the vast array of information and pick out what he/she needs. If two elements are not exactly the same, then make them really different to add contrast. Contrast can be added through typeface choices, line thicknesses, colors, shapes, sizes, and space.

Alignment simply means that items on a page are lined up with each other. Lack of alignment is the single most prevalent problem on web pages. Alignments should not be mixed. One alignment should be selected and used on the entire page. This means that if a left alignment is selected, the headlines should not be centered. Alignment does not mean that everything is aligned along the same edge, it just means that everything has the same alignment, either all

flush left, all flush right, or all centered. If a visitor's eye has to wander all over the page trying to follow the information, he/she is going to miss something or get tired and leave the site.

A common design consideration is to put the logo in the upper left hand corner of the web page. The upper left hand corner is the part of the page that the viewer sees first. Keep it small. There is no need for large graphics that require a lot of space, the viewer already knows the source of the website. Information is easiest to read if it is put in three columns. Users rarely read long continuous passages of text from computer screens. Most people who are seeking a specific piece of information will be annoyed to have to scan long blocks of text to find what they desire. Small chunks of related information are also easier to organize into modular units of information that share a consistent organization scheme that can form the basis for hypertext links within your web site (Lynch & Horton, 1997). Readability is also important. Text should contrast with the background color. The larger the text size, the easier it is to read. The longer the line length, the more difficult it is to read.

According to Yankelovich (2000), do not publish a page before it is ready. Do not say a page is under construction. This brings up an image of road construction and the problems and delays that it creates. It is also beneficial to list a contact person on your pages for comments. This is an excellent way to receive feedback from your viewers.

Knight (1997) advises that creating an image that downloads quickly depends on two things, choosing the right file format for the image and working with that image until the right balance between download time and image quality has been achieved. There are two file formats for images that are commonly used on the web. They are JPEG and GIFF. GIFF images are compressed images that provide smaller file sizes. This compression is considered "lossless" compression. The images do not lose any quality when they are compressed. GIFF images also have transparency which means a background image can show through. They have interlacing where the image appears in layers. GIFF images are best used for images with large areas of solid color, i.e. illustrations, logos, text.

JPEG images offer the most accurate image. The compression scheme is referred to as a "lossy" compression scheme because the images experience some loss of image quality when the image is compressed and then decompressed in the browser. JPEG's cannot be made transparent. When a JPEG is smaller than a GIFF, the JPEG can take longer to load because the JPEG decompresses in the browser. JPEG's are better for photographs, watercolor images, and anywhere where there is a subtle color change between images.

Color is the final item to consider when designing for the web. It is important to use a limited color palette. A few colors go a long way. D'Angelo (2000) recommends not using more than four colors per screen. This excludes logos and other images. Researchers have shown that cool hues such as blue are seen as calming and relaxing. Warm hues such as red are seen as exciting and stimulating.

Haubner and Benz (1983) found that the improper use of color can even impair performance by distracting a person and interfering with the handling of information. According to Khouw (1999), findings are ambiguous as to if there is a gender difference in the preference of color. The best background to use is white because of its high contrast. There is a reason why printed text is often put on white paper. If you need to use a background color, D'Angelo (2000) suggests using light blue or gray. Only use one color, not all three together. Designers should preview their site designs on several operating systems and different browsers to ensure the best possible results.

<center>Conclusions and Recommendations</center>

Frew (2000) has published a list of seven hot design tips that are beneficial to consider when creating a web site. They are:

- Keep it simple, the power of good design is in its simplicity

- People hate to wait

- People hate to scroll

- People hate to read

- People would rather scroll than wait

- People would rather wait than read

- People are not necessarily rational or consistent, but sometimes they are.

Although Frew's list is not conclusive, it offers a general outline to follow when designing web sites. In conclusion, know your audience. What browser and

connection speed are they using? Design your web site around their needs. Who are you and what do you wish to accomplish? Plan accordingly for your web site. Create an outline of what you would like to accomplish and plan for the future.

The viewer should be able to easily navigate through your web site. Two factors that affect this are interface and navigation. If you are going to use tables or frames, design accordingly and be aware of the limitations of each method. Do not forget about the four design elements of proximity, repetition, contrast, and alignment. Be thoughtful when putting graphics in your web site. Simplicity is still the best. There is no need to go overboard on fancy animated graphics. Utilize the best format, but make sure that the graphics do not take a long time to load.

Finally, use colors that are appealing to the viewer. Do not over use color on your web site. Limit the color per page to four different colors. When considering a background color, try to use white, light blue, or gray.

A well designed web page or site can be a very useful tool that can serve many purposes. As the complexity and technology of web design increases, do not lose sight of the overall goal of the web page or site. Design the site accordingly by using proper design techniques that have been discussed in the preceding paper.

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