DESIGNING FOR WEB AND FOR PRINTED MEDIUM:
A COMPARATIVE STUDY

A THESIS
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FOR THE DEGREE OF
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BY

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MAY, 2001

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ABSTRACT

DESIGNING FOR WEB AND FOR PRINTED MEDIUM:
A COMPARATIVE STUDY

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May, 2001

A thesis comparing two methods of design; the web design and design
prepared for the printed medium, covering the physical differences
between the two, the methods and techniques of content presentation in
both cases, as well, as the perception of the design from the reader's point
of view. Includes a case study.

Keywords: Web Design, Graphic Design, Internet, HTML, Web Site,
Web Page, Homepage

ÖZET

WEB TASARIMI VE BASILI MALZEME TASARIMI: KARŞILAŞTIRMALI BİR ANALİZ

Jakub Michalski

Grafik Tasarım Bölümü

Yüksek Lisans

Tez Yöneticisi: Doç. Emre Becer

Mayıs, 2001

Bu tez, basılı malzeme tasarımı ile web tasarımı arasındaki fiziksel farklılıkları, yöntem ve içeriğe dayalı sunum tekniklerini okuyucunun bakış açısından karşılaştırmalı olarak ele almaktadır. Tezin sonuna bir web tasarımı incelemesi eklenmiştir.

Anahtar Kelime: Web Tasarım, Grafik Tasarım, İnternet, HTML, Web Sitesi, Web Sayfası, Ana Sayfa

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To my family and my girlfriend, Duygu – I would like to thank them for their continuous support and motivation.

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INTRODUCTION

The recent development and expansion of World Wide Web (WWW)

forced many graphic designers to change their design method and to

abandon designing for print in favor of the new, interactive medium. At the

same time many people with no previous design experience started

creating web pages. Both groups of those people brought something new to

the area of web design, sometimes enhancing, on other occasions

damaging the user experience.

The aim of this thesis is to compare the two different design methods;

the design prepared for the printed medium and the web design,

prepared for the Internet.

By doing so, I will be able to show which principles of design are universal

enough to be shared by the different methods of working, and which are

unique and applicable only to one, particular method. By the case study

I will also analyze the existing web site and provide the reader with

information, examples and explanations on the content creation

for the Internet.

The scope of this work concentrates on the text content-based web sites

and printed materials. Since both print and web design can utilize various

design approaches and styles (content presenting, experimental, movie

sites, band sites, art sites, web logs, etc.), I wish to talk mostly about

the designs that are presenting text content such as articles, data charts or essays. This way I will be able to compare similar applications created for different media without the risk of creating the irrelevant comparison between two different approaches that are by the style and approach already designated to be different, even if prepared in the same medium.

The work will start with the brief explanation about both web and printed mediums (Chapter 1). Throughout the rest of this paper it will help those of the readers who are not familiar with both or any of those design methods to understand the topics in-depth.

Following, I will present the comparison of the two methods of design by the means of physical differences (Chapter 2, Section 1), where I will describe how the two differ and resemble each other. I will also provide a range of examples and figures, illustrating the above.

The discussion on the content presentation and perception will follow in the next section as well (Chapter 2, Section 2), where I will concentrate on the applicability of different design principles while presenting the text-based content in both design methods. The principles, which do not apply to the printed medium, will also be introduced, such as interactivity, links or site navigation.

Finally, I will summarize the findings while applying them on the case study (Chapter 3) of the selected web site in order to verify and exemplify them in practice.

Since WWW gives the authors much greater possibilities in presenting the content (web-specific tools and interactivity), in many sections of this work I will abandon the comparative aspect of the topic, and concentrate on the analysis of such applications.

Also it should be noted that I have decided to use the materials published on the Web as my primary reference sources. This decision comes from the fact, that WWW is an evolving medium, and changes in it appear so quick, that most of the printed publications on the subject become obsolete by the time they reach the public. Even some of the web sites discussed in this work may not be already available by the time it is finished.

I believe that such a comparative study may serve both as an interesting work to read in order to analyze the existing content accordingly, or at the same time, as the knowledge base for the people who wish to work and design for the World Wide Web.

CHAPTER 1: DESIGNING FOR THE PRINTED MEDIUM AND FOR THE WEB – OVERVIEW OF BOTH METHODS

1.1 What is the printed medium?

By the term "printed medium" I will refer to the designs prepared specifically for the offset or home printing. Designed by hand or with the use of the computer, all those will end up being printed out on paper (or other surface).

Printed medium examples may include: brochures, books, computer printouts, posters, flyers, etc. The default printed medium document I would usually have in mind and refer to, will be an A4 format brochure, printed on paper[1].

The printed medium documents are device-independent. Once produced, they do not need any additional hardware machinery in order to be viewed. Due to this fact, they will also maintain the original design, unlike the web documents. Printed medium documents are, as well, portable; they can be viewed in most locations.

The qualities of printed medium documents will be explained in-depth in the Chapter 2.

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[1] It is a most common, text content-based presentation.

1.2 What is web medium?

By the term "web medium" I will refer to documents accessible via World Wide Web[2]. Due to the nature of this paper I will exclude standards such as Flash, Shockwave, VRML and other WWW-based applications[3], since they were not primarily designed for the needs of text-based content presentation over Internet.

My primary object of interest will be the HTML documents as the most widely spread and standard technology of presenting content over the Internet. I will both analyze the single HTML documents, as well as the Web Sites consisting of a number of those.

The primary characteristics of web medium is the device dependency. Accessing and viewing web medium documents requires the hardware (computer, monitor, WAP-enabled telephone, handheld device), the software (browser) and Internet connection (network card, modem, telephone, device drivers).

The market offers the users various types and configurations of computer systems, different software used to access Internet. Users can also themselves manipulate the preferences, according to which the web content will be displayed. Those factors contribute to the fact that web medium

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[2] The glossary of terms is located at the end of this paper.

[3] They will not be totally omitted from the text, however they will not pay a major significance in it.

content can display differently on different users' computers. Web medium is therefore not a solid one, and instead of being displayed in one definite way, it is rather being interpreted by the computers.

Very important characteristics of web medium are its accessibility and interactivity. Those, and other functions enabled by the WWW will be further explained in the following chapters.

CHAPTER 2: A COMPARISON BETWEEN THE TWO METHODS
                OF DESIGN

2.1   Space, color, time and touch – the physical differences between the two methods of design

The physical differences between the two methods of design and content

presentation may seem very obvious and simple at the first glance. Anyone

could try to claim to know and understand them. However, I believe that

there is a need not only to state the differences, but also to analyze them in-

depth, and draw the appropriate conclusions from the findings.

The important matter is not only how the two differ and resemble each

other, but also what are the causes and results of those. When comparing or

analyzing the two, I will put the strong emphasis on the technological and

psychological elements constituting to the medium's behavior and its

perception by the viewer.

To simplify the process of analysis, I have extracted four major areas in

which I will evaluate the two methods of design; space, color, time and

touch. On the basis of those I believe I can explore all the physical

properties of two design methods and analyze them in organized manner.

2.1.1 Space

Differences in sizes and dimensions are the easiest to observe, and perhaps, the most straightforward in this analysis. Still, we can withdraw some interesting conclusions from the observed facts.

The typical, European "A" standard sheet of paper[4] (A1, A2, A3 etc.) has the aspect ratio of 1.44[5]. The typical computer screen with the proportions of 4 to 3 creates aspect ratio of 1.33[6]. It may not seem as a big difference judging from the numbers themselves, but in fact, the geometries of both the sheet of paper and the computer screen create diametrically different design areas on which the designer can operate.

It must be noted, that designs prepared for print come in much wider range of formats than the ones explained here[7]. The designer has virtually unlimited choice of the paper size, shape or binding. However, due to the fact that this work focuses on the text-based content, I decided to talk about most commonly spread standards only – the ones one would see in most of printouts, brochures or magazines.

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[4] American and British standards use respectively slightly different format with aspect ratio of 1.444

[5] More information on paper standards can be found in:
Kuhn, Markus. *International Standard Paper Sizes*. 22 February 2001.
< http://www.cl.cam.ac.uk/~mgk25/iso-paper.html>.

[6] "Displays." *The PC Technology Guide*. 23 February 2001.
<http://www.pctechguide.com/glossary/08displays.htm>.

[7] Conover, Theodore E. *Graphic Communications Today*. St. Paul: West Pub. Co., 1985.
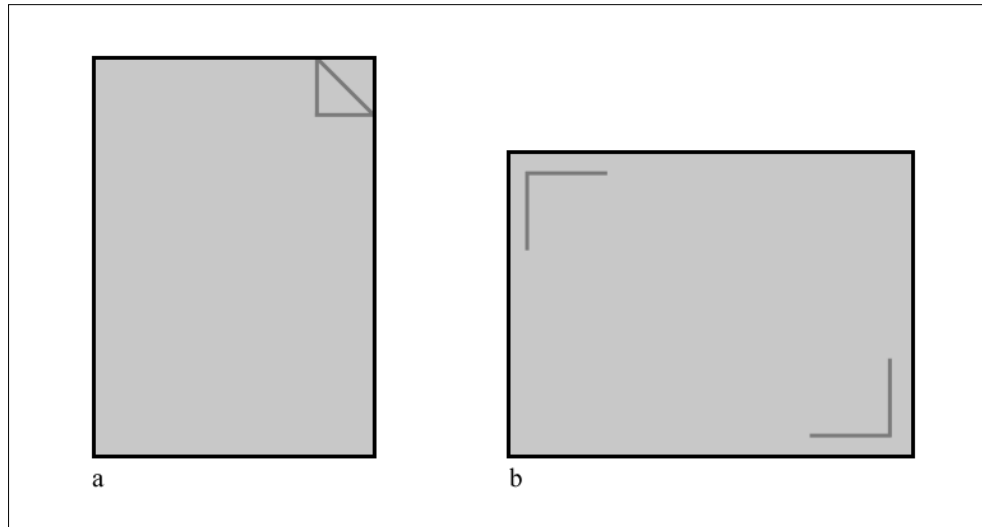
Figure 1: Default orientation and proportions of different
media: **a**. A4 sheet of paper, **b**. Computer monitor

The biggest difference in the spatial behavior of both design methods

does not lay in the aspect ratio though, but rather in the positioning of

the design space.

By default, the assumed arrangement of the sheet of paper is portrait[8], and

that of the monitor (apart from a small number of innovative designs[9]) is

always landscape. The default assumed arrangement comes from a number

of various factors, such as the field of view of the human eye, the eye

movement when analyzing content, or simply, the handiness[10].

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[8] I will refer to the design area proportions and arrangement as landscape and portrait (see glossary),
   and to the positioning of the design area in the external three-dimensional environment, as vertical
   and horizontal.

[9] Such as discontinued Apple A4 Display.

[10] For more information, refer to:
   "Video display technology page." *ePanorama.net*. 23 February 2001.
   <http://www.epanorama.net/videodisplay.html>.

We are more likely to present and view the dynamically changing content on the landscape-positioned surface. That comes from the fact, that the human's field of view is arranged similarly. The angle of our vision is much higher on the horizontal axis, and then smaller on the vertical one. [11]

Setting up the computer monitor (as the output device for the web design medium) in the landscape position, enables the viewer to observe the whole surface with one look, rather than part-by-part, as it would be with the portrait format.

In fact the 4/3 screen size proportions offered by almost all of today's computer monitors and TV sets are already slowly becoming redundant, in favor of 16/9 wide-screen models, much more resembling the cinema screens. I would not, however, like to speculate whether those dimensions of the screens would be the future of the web design. As long, as for the movie playback they pass their role very well, most probably, for content presentation they would not.

The 4/3 proportions (1.33 aspect ratio) of today's monitors offer the user fairly good design/presentation area for viewing or creating the web content. It must not be forgotten, however, that in terms of content presentation (more widely discussed in the second section of this chapter,) we are still in favor of the portrait format.

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[11] Arthur, Kevin. *References on field-of-view issues for head-mounted displays.* 24 February 2001. <http://www.cs.unc.edu/~arthur/pubs/fov-bib/periph.html>.
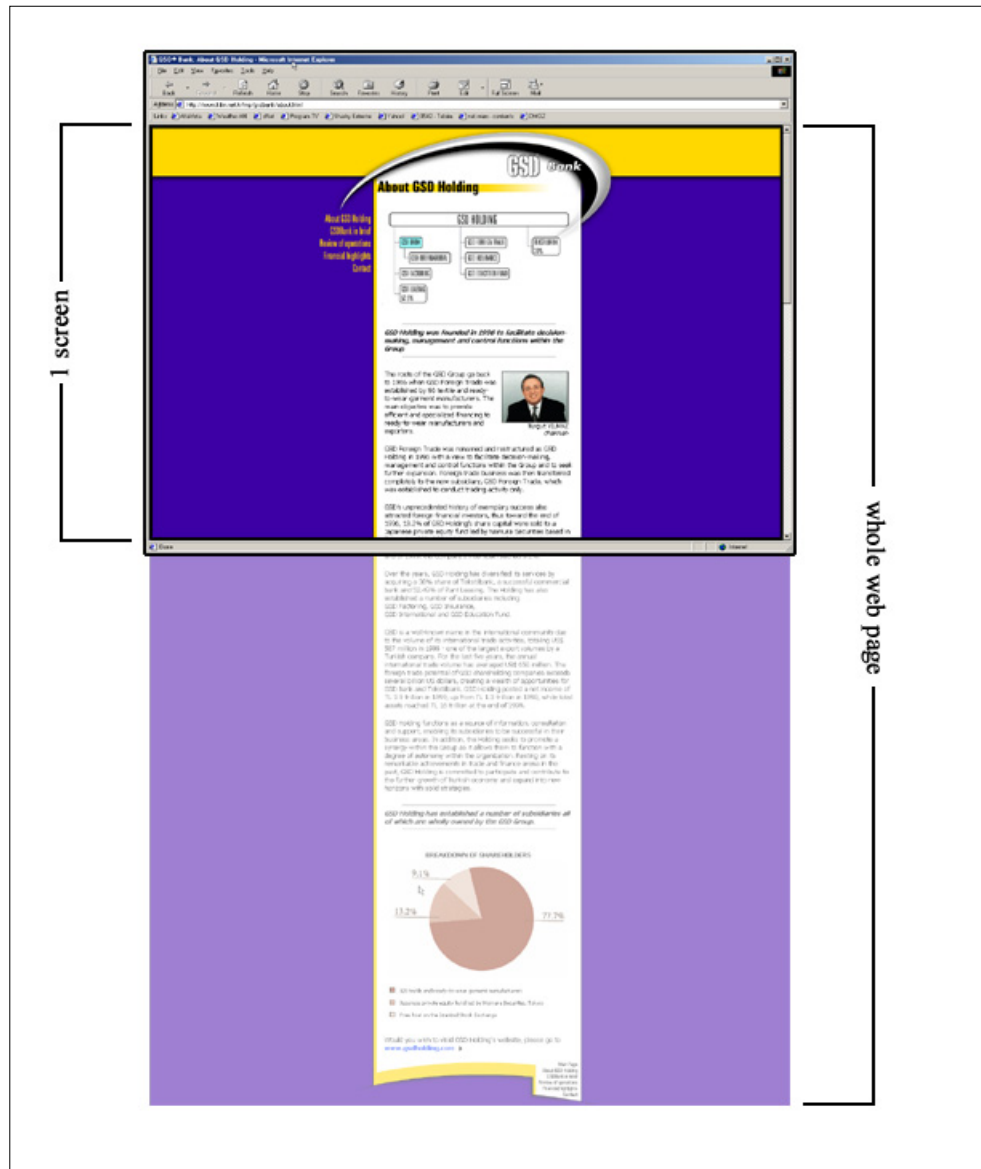
Figure 2: Monitor or browser window as the passé-par-tout
for the web page.
Source: *GSD Bank: About GSD Holding*.13 December 2000.
<http://www.gsdbank.com.tr/about.html>.

Most of the web pages we view are created in the portrait manner, and the monitor screen is our passé-par-tout[12] for viewing them (Fig. 2). What can be the reason for such a strong ties of the design and portrait positioning of the area?

The determining factor for the portrait arrangement of the content is the presence of text as one of the most crucial elements of the design – the content. We are not likely to read very long lines of text. Neither are we to read a large number of text columns positioned one next to another[13] in a horizontal arrangement.[14]

Perhaps those principles could be broken in the societies where alphabet used allows top-to-bottom text direction, but that cases we can count as the exceptions, since the majority of web sites (and perhaps printed materials) are created with the horizontal text direction.[15]

Apart from the considerations of portrait and landscape arrangement of the design area, its position within three dimensional space, and relation to the reader should be discussed.

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[12] Passé-par-tout (fr) to look through. Frame.

[13] In fact there are some design motivations why such idea would not work in web design. They will be discussed further in the third chapter.

[14] "Typography." *Web Page Design for Designers*. 30 February 2001. <http://www.wpdfd.com/wpdtypo.htm>.

[15] Alternative text positioning techniques are widely discussed in: *W3C Internationalization and Localization*. 30 February 2001. <http://www.w3.org/International/>.

Most of the printed material we can manipulate when reading. We can move[16] the page, tilt and shift it, we can rotate it, or even bend it. This allows us to find the most comfortable and pleasing angle, light condition and distance for reading. Computer monitor, however, has the fixed position, and usually we do not attempt to move and reposition it too frequently.[17]

Virtually all the computer monitors have the screen situated vertically in front of the user, in a relatively small distance[18]. The easiest way to change the view of the content presented is moving the reader rather than the monitor, or using various tools, discussed more widely in the fourth part of this section, named "Touch".

Under the heading of the design "space" we must also take under the consideration the resolution of the medium we are presenting or viewing the content in. In print, we are dealing with the infinite resolution of the paper. Printing machines set certain limitations to the resolution of the text and images presented to the reader. Still, the paper itself (or any other material we are printing on) does not enforce any limitations to the amount of data presented on the certain physical area.

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[16] We must of course exclude such instances as posters, billboards or framed reproductions.

[17] Proper display placement is analyzed in-depth in:
   "Monitor Placement." *All About Vision*. 15 February 2001.
   <http://www.allaboutvision.com/cvs/placement.htm>.

[18] Compared, for example, to the similar devices such as the TV set.
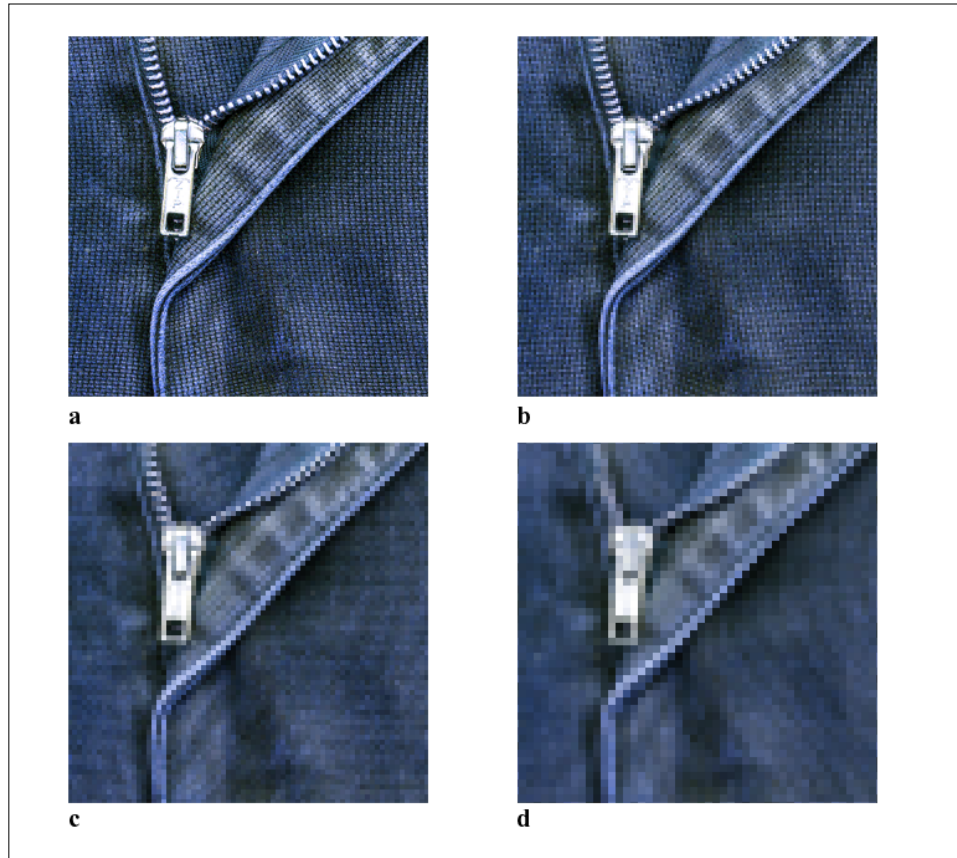
Figure 3: Close-up of the image of the same physical
dimensions in different resolutions:
a. 600DPI   (high quality print)
b. 300DPI   (normal quality print)
c. 150DPI   (low, home printer quality)
d. 96DPI   (standard PC monitor)

In print we are usually working with the resolutions of 150, 300, 600 or

1200 DPI[19] (Compare: Figure 3a, b, c). These allow the content to reach

nearly photographic quality of the images. The higher resolution we set

in printed design method, the smaller the ink dots[20] that constitute

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[19] In fact, printmakers relay on the LPI (Lines Per Inch) as the measure of the resolution but I would
rather talk about the DPI in order to make comparison with web design easier.

[20] The process of creating images in print is explained more carefully in the next part of this section,
named "Color"

to the image as a whole will become, and the reader will no longer be able to see them. The edges of the text would be smoother, and the images would look more "natural".

In web design, however, we are facing very strong limitations of the space and resolution. By default, most of the monitors work with the resolution of either 72 or 96DPI (Compare: Figure 3d). The great difference from print, being the result of relatively very low resolution is clearly visible[21].

Moreover, computer users own different size monitors, running at different screen settings. All those factors affect the ways in which web content is presented and built.

On the Figure 4, I have illustrated how different screen setups may affect the rendering of a sample web page. All the images show the web page, as it would display on a 17" monitor. As it is seen, depending on the current settings the particular viewer is using, the amount of information displayed simultaneously changes. We could compare it to using different size passé-par-tout while viewing the same image[22].

Moreover, even the screen settings themselves do not completely determine the amount of data presented on the screen.

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[21] For more information on screen and print resolutions refer to:
Bear, Jacci Howard. "Resolution Inch by Inch." *Desktop Publishing*. 22 March 2001.
<http://desktoppub.about.com/compute/desktoppub/library/weekly/aa101800a.htm>.

[22] *The Straight Scoop on Resolution*. 21 March 2001.
<http://home.zdnet.com/zdhelp/stories/main/0,5594,2285533-2,00.html>.

The content of the web page is displayed inside the browser window, which occupies a certain amount of space, so that we are never able to use the whole monitor for displaying web content[23].
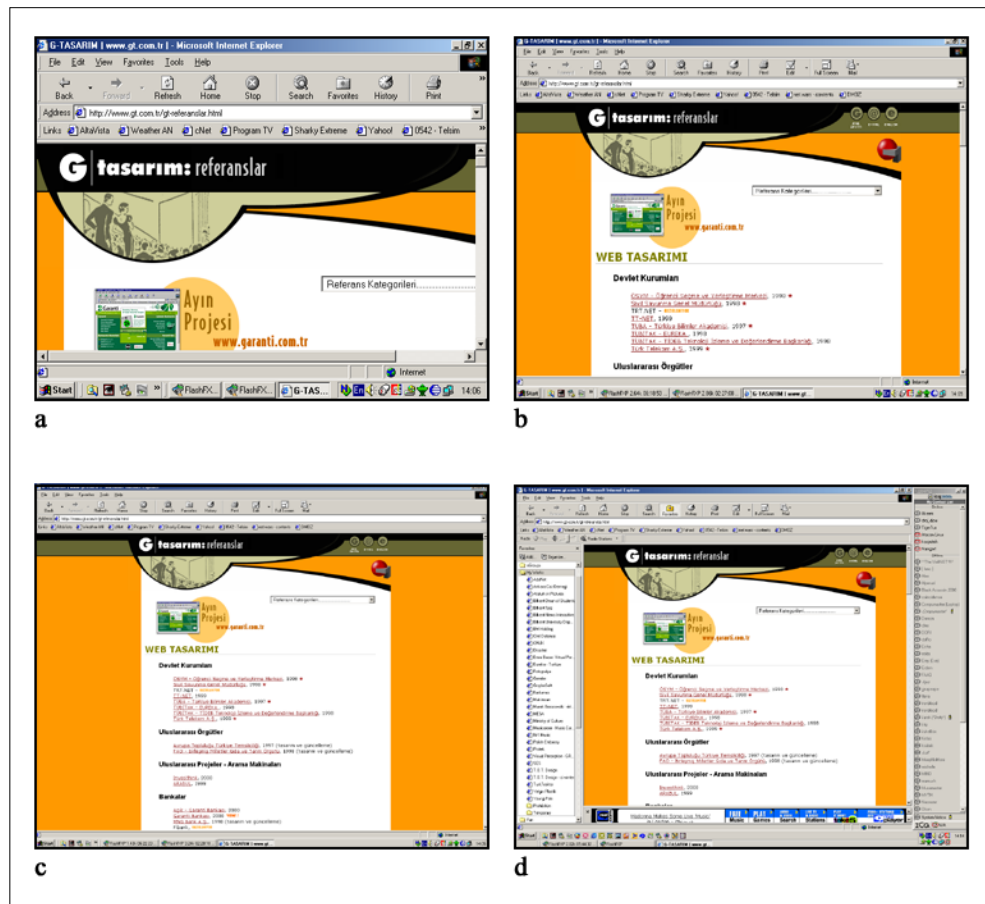
Figure 4: Various screen setups affecting the rendering of the same web page.
a. 640x480 pixels, **b**. 1024x768 pixels, **c**. 1280x1024 pixels, **d**. 1280x1024 pixels with additional windows open.
Source: *G-TASARIM | www.gt.com.tr |*. 15 October 2000.
<http://www.gt.com.tr/gt-referanslar.html>.

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[23] Even the "full-screen browsing" feature introduced in Microsoft Internet Explorer browser does not utilize the whole monitor screen – it always leaves a small navigation bar visible, accompanying the web content.

Additionally, any other windows the user may be running whether inside or outside the browser, further limit the available area. On the figure 2d we may see quite typical computer screen with several programs running. Even though the resolution of the screen is high, the area available to the web content is very limited.

2.1.2 Color

The two methods of design: web and print, operate within different color spaces. The technologies used to create colors in both of them differ as well. Due to this fact, not only both methods provide access to different color ranges, but also the behaviors and perceptions of color are not similar.

In print, color is created by the subtractive color synthesis: by mixing various amounts of four basic pigments in the CMYK color model (cyan, magenta, yellow and black[24]). In web design, color is created on the monitor screen, in additive color synthesis, by mixing different colors of light and operates within the RGB color model (red, green, blue)[25].

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[24] The actual subtractive color synthesis does not require the black pigment. It is used in print process in order to minimize the usage of the other three.

[25] Different color models, in scope of digital media production are described in-depth in:
"Adobe Photoshop 6.0 User Guide." *Adobe Photoshop 6.0*. CD-ROM. Adobe Systems INC, 2000.
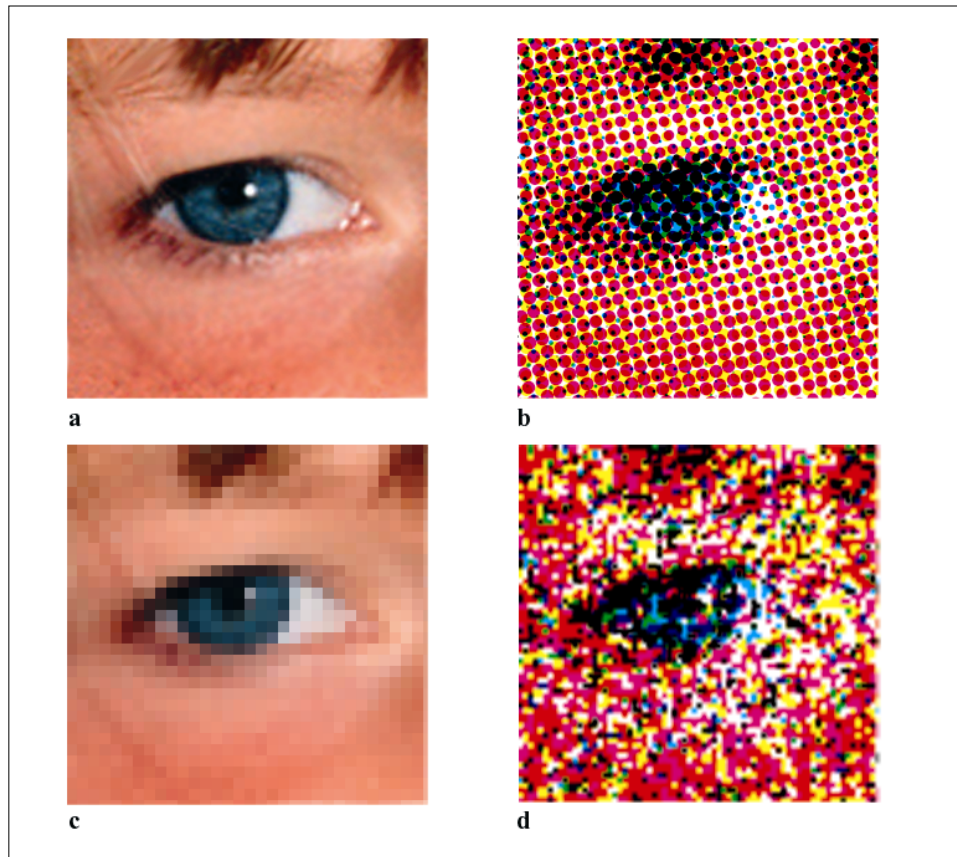
Figure 5: Close-up of the same image displayed using different media:
a. Original image (photograph)
b. Offset (using CMYK halftone screens)
c. Monitor (grid of pixels)
d. Inkjet (random CMYK dots)

The basic colors from which the full range is being composed create certain patterns on the surface. By viewing them, one can understand what technology has been used in order to create the image. Laser and offset printers use the color halftone screens (patterns of dots in different sizes) for all four basic pigment colors. Inkjet printers create more chaotic sequences of dots. Finally computer displays create colors on a grid of miniature squares (pixels). The comparison of the three methods can

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be seen on Figure 5. Please note that viewed from a distance all images will look similar. Slight changes in colors will be also obvious – those are the limitations of the devices.

The CMYK and RGB color spaces are not identical. There are some certain colors that can be displayed using one, but not the other. The more detailed representation of both color spaces (gamuts), as in reference to L*a*b color model is presented on the Figure 6.

Apart from the difference in gamut between the two models, affecting the colors that can be used in designs, there is also a great difference in the way the reader perceives colors when viewing the printed or web content.

Looking at the monitor can be compared to staring at the lamp. Since computer monitor emits the light (rather than reflecting and absorbing it, as it happens with printed materials,) viewing intense and bright colors such as pure white or bright green (also known as "lime") tends to tire the eyes. In opposition, printed material viewers rather rarely experience discomfort due to the colors themselves.

Still, both in RGB and CMYK it is a general rule that the intense complimentary color pairs (such as Green-Red) should not be used as

foreground and background for one element, unless the creation of

discomfort is intended[26].
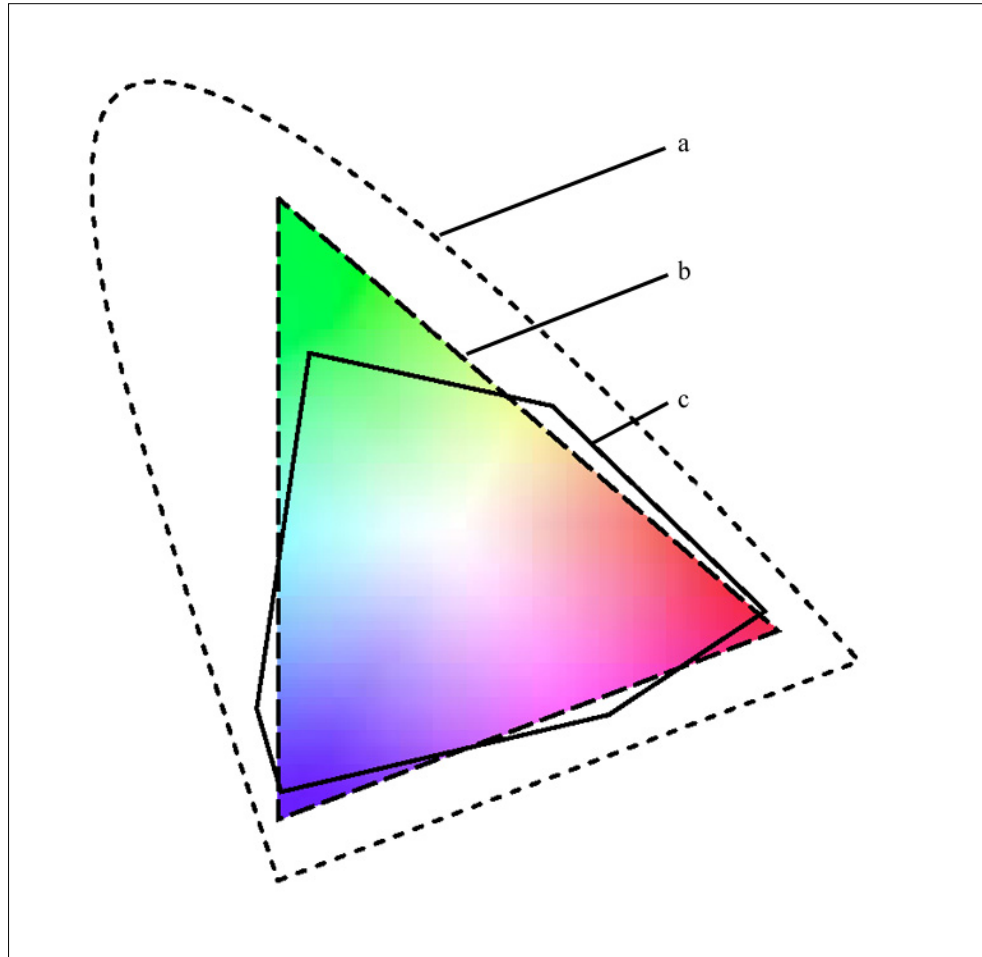
Figure 6: Color spaces in relation to each other
a. L*a*b color, **b**. RGB, **c**. CMYK
Source: "Adobe Photoshop 6.0 User Guide." *Adobe Photoshop 6.0*. CD-ROM. Adobe Systems INC, 2000. 114 pp.

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[26] Berry, Susan, and Judy Martin, eds. *Designing with color: how the language of color works and how to manipulate it in our graphic designs*. Cincinnati, Ohio: Quarto, 1991.

The pleasure and discomfort related to the color usage affects and limits the author's choices while designing either a web page or the material for print. One has to carefully evaluate the usage of large areas filled with bright colors in order to avoid viewers' negative response.

Many web designers tend to place black text on the white background in the body elements of long articles. Although through similarity with designing for print this could be considered proper, in fact reading long texts becomes tiresome and often irritating[27]. One easy way of overcoming the problem related to the brightness of white is using a slight tint of some other color as the background.

Texts written on the pale, and slightly "off-white" colored background are more easily adaptable for the eyes, though paleness of the background may decrease the dynamic look of the page that many designers wish to achieve.

Both print and web have certain color systems (palettes) designed to enhance the navigation and communication within the available color ranges. In print, examples of such palettes could be the PANTONE® systems, incorporating a wide palette of colors that can be reproduced in print (by the usage of pigments) and providing each with an unique name that can be used for quick reference[28].

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[27] Nielsen, Jakob. *In Defense of Print*. 13 January 2001. <http://www.useit.com/alertbox/9602.html>.

[28] *Pantone: Product Catalog*. 22 March 2001. <http://www.pantone.com/catalog/catalog.asp>.

Web provides the designers with the Web-Safe Color Palette (216 colors). However, in this case, the quick reference is not the main goal of creating such a system.

Since the web content is viewed on multiple platforms (Macintosh, Windows, Unix etc.) and different types of color settings are available for each of those, Web-Safe Palette was developed in order to construct a set of colors that should be available and viewable on any system. The Web-Safe Palette consists of colors belonging to the RGB gamut, and created by mixing the amounts of different lights only at certain values[29].

The difference between whole RGB spectrum and the Web-Safe Palette[30] can be easily understood through looking at Adobe Photoshop color picker window, which is illustrated on the Figure 7 or the color palette window of the same program (Figure 8). It is obvious that while RGB allows you to freely move along the available color set (gamut), Web-Safe Palette enforces certain limitations.

In the Color Picker window such limitations are visible as a grid dividing the whole palette into the set of colors matching Web-Safe colors. In Color palette, user is given specific points on the scale of each component's

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[29] In hexadecimal code those values can be represented as 00, 33, 66, 99, CC and FF, which are the equivalent of 0, 51, 102, 153, 204 and 255 in the decimal 0 to 255 scale.

[30] A complete reference and explanations about Web-Safe Palette can be reached at:
Weinman, Lynda. *The Browser-Safe Color Palette*. 22 February 2001.
<http://www.lynda.com/hex.html>.

(R, G, B) intensity, and is limited to use those values only, rather than

moving freely through it, as it is the case with RGB color model.
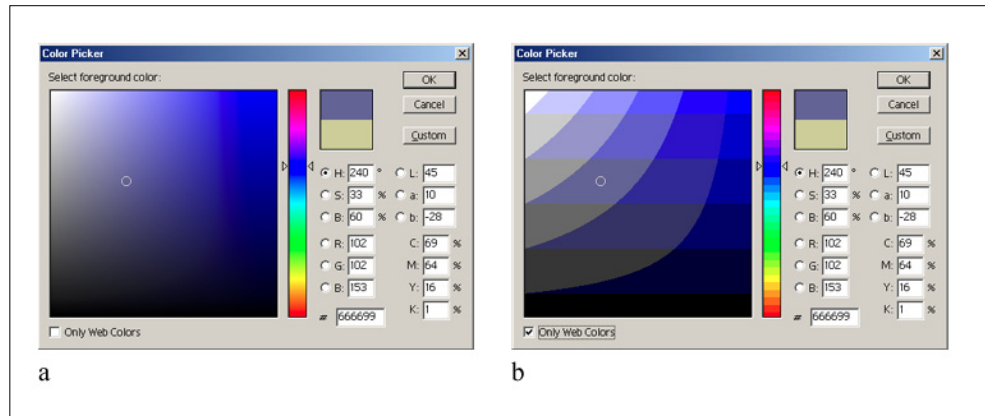
Figure 7: Adobe Photoshop's Color Picker window
a. RGB colors, **b**. Web-Safe Palette colors
Source: *Adobe Photoshop*. Vers. 6.0. 20 December 2000
<http://www.adobe.com/products/photoshop/main.html>
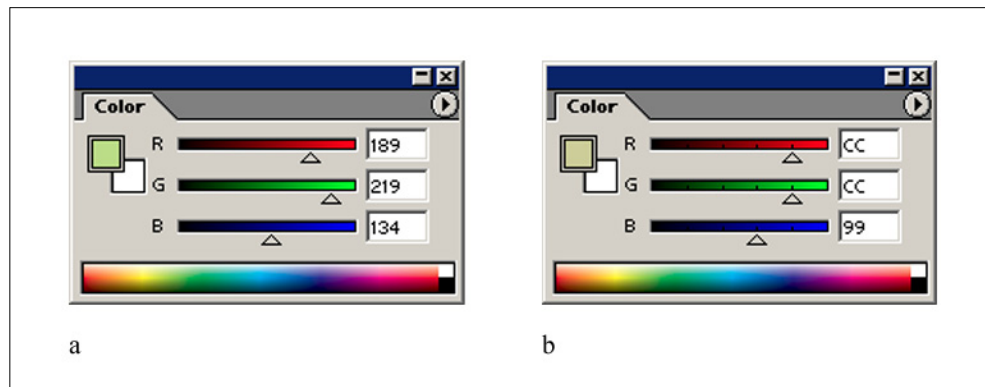
Figure 8: Adobe Photoshop's Color Palette window
a. RGB colors, **b**. Web-Safe Palette colors
Source: *Adobe Photoshop*. Vers. 6.0. 20 December 2000
<http://www.adobe.com/products/photoshop/main.html>

Web-Safe Palette is slowly becoming obsolete since very less Internet users

work on the computers limited to the 256-color displays. Still, among many

web designers it is a common practice to work within this palette when

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designing the basic color scheme for the pages, and to use them when

covering large block areas (such as backgrounds and large single-color

fields)[31]. This comes from the fact that some of the colors may be

interpreted and displayed in different ways among different platforms,

browsers and monitors, while Web-Safe Palette is (in theory) bound to stay

untouched and rendered perfectly the same in all of them[32].

Different computers, platforms and monitors affect both web design and

print in a very negative way. Often a graphic or a document that looks and

prints exactly as the designer intended may suddenly lose colors, saturation

or overall contrast when viewed or printed from another device. To prevent

it, the International Color Consortium (ICC) designed the standard, named

ICC Color Profile[33]. Each device can be configured according to its

specifications and the information about its gamut, color mode, dot gain

(for printers) and other parameters – saved in the ICC Color Profile File.

Later, when the document cerated on one machine is being opened on

another one, the program interprets the Color Profile information and

understands how was it supposed to be rendered at the original machine,

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[31] More about web graphics and color usage can be found in:
Weinman, Lynda. *Designing Web graphics*. Indianapolis, Ind.: New Riders Pub., 1996

[32] "Graphics and Palettes". *Web Page Design for Designers*. 27 February 2001.
<http://www.wpdfd.com/wpdgraph.htm>.

[33] *Guidelines for device-independent color data processing in accordance with the ICC-Standard*.
Vers. 1.1. <http://www.color.org/eci-guidelines.pdf>.

and reinterprets color information to match the display and print with the intention of the designer. This mechanism is essential when working for print in order to achieve best possible similarity between the images seen on the monitor (in RGB) and the ready, printed medium (in CMYK).
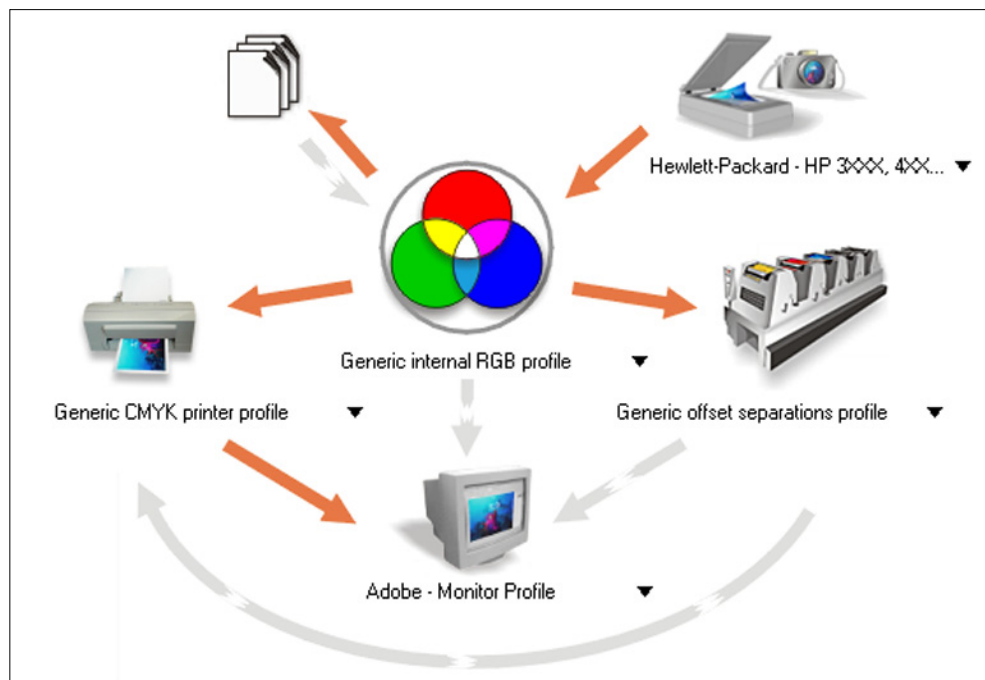
Figure 9: Corel Draw's Color Profile selection screen.
Source: *CorelDRAW*. Vers. 10.410. 23 December 2000
<http://www3.corel.com/cgi-bin/gx.cgi/
AppLogic+FTContentServer?pagename=Corel/Product/
Details&id=CC1IOY1YKCC>

For a long time web lacked the Color Profile mechanisms, and at the time of writing this paper, it still does. The only format fully supporting ICC standards is Adobe's Portable Document Format (PDF), however, as the name suggests, it is a format for presenting documents, rather than constructing web sites. Due to big sizes of PDF files, it is also not suitable for constructing web sites.

Work is in progress though, to implement the Color Profiles in the next version on Cascading Style Sheets (CSS level 3). Such move will mean the color revolution in web design. No longer will the Web-Safe Palette be necessary. Instead, any designer will be able to specify the color profile of the machine web site was constructed on, and be sure that every single color will be displayed or printed as close as possible to the original, on any other machine supporting the technology[34].

Since the CSS specifications are being developed by the World Wide Web Consortium (W3C), the current leader in standardization of the web, it is rather certain that soon the ICC Color Profiles will become a worldwide standard for the color manipulation over the Internet.

2.1.3 Time

The time factor creates probably one of the biggest differences between print and web design. It determines the way the content is presented to the viewer and viewer's perception of it.

Printed materials are presented to the viewer "as they are". Once printed, all the elements are set and positioned on the page[35] (or any other medium the print was made on,) and do not change. The viewer is presented the whole

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[34] *CSS3 module: Color.* 5 March 2001. <http://www.w3.org/TR/css3-iccprof>

[35] I will assume that "the page" is the general term for the printed medium surface.

page at once and he or she decides how will it be evaluated, observed, read or analyzed.

The web pages are behaving in a dynamic manner. They take certain amount of time to load, to format according to the device specifications and to display. They as well often do not fit in viewer's monitor (passé-par-tout) and may contain dynamically changing elements such as animations, video clips, sounds etc.

Most important of those elements is the page loading[36]. As long as the animations and other dynamic content elements are optional to use, in the web design it is impossible to avoid the download time. The content is generally placed on the machine different than the one it is viewed from and the data must be transferred, interpreted and then, finally displayed[37]. The machine hosting the content is known as the server. Viewer's machine is known as the client. Finally the program that performs all the operations related to the presentation of the web content is known as the browser[38].

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[36] The process of loading pages and the effect of waiting on the user was analyzed in-depth in: Nielsen, Jakob. *The Need for Speed*. 3 March 2001. <http://www.useit.com/alertbox/9703a.html>.

[37] More information on the technical aspects of data transfer over the Internet can be found in: Halabi, Bassam, and Danny McPherson. *Internet routing architectures*. Indianapolis, IN: Cisco Press: New Riders Pub., 2000.

[38] In fact the proper term for such program is "user agent", but since user agents can be as well the search engines, Internet bots and other devices, I will use much simpler and well-known term "browser".

The basic timeline of the loading of page can be summarized in the following steps:

1. Viewer chooses the link to some document and activates it.

2. The browser sends the message to the server requesting the document.

3. The server sends the HTML document and the information about any additional files to the client (additional files can be JPEG and GIF images for example).

4. Browser sends a request to the server for the additional files.

5. The server sends additional files to the browser.

6. While receiving data from the server, the browser interprets and displays it. Some browsers display the page as it is loading, some wait for all the content to be downloaded. The web designer should design the page in a way that the browser will be able to start displaying it even before all the images and content are loaded[39].

7. The viewer reads the content by scrolling the document to reach the areas that do not fit in the single screen.

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[39] The techniques that can be employed to achieve such effect are explained in detail in:
Ragget, Dave, Arnaud Le Hors, and Ian Jacobs, eds. *HTML 4.01 Specitication*.
<http://www.w3.org/TR/1999/REC-html401-19991224>.

Depending on the length of the document, amount and size of the images, the presence and size of any additional elements, Internet connection bandwidth, the distance between the client and the server and finally the speed that the client machine renders the pages in browser, the process of loading the page can take from the fraction of the second, to even half an hour during the peek hours. Some more information on creating the web pages that load fast and keep the viewer attracted will be included in the second section of this chapter, dealing with the content organization and presentation.

Typically when displaying the web page, the browser first loads all the text elements and then the images. If any of the elements are positioned within the table, they are displayed after all the contents of table's cells are fully loaded or recognized. Elements placed below the unloaded sections may (but do not have to) be hidden, even if loaded, until the preceding section is displayed fully[40].

Figure 10 illustrates the process of loading the http://www.amazon.com/ web page. First (fig.10a) the browser confirms the establishing of connection with the server by cleaning up the window contents and displaying the proper URI in the location bar.

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[40] For more information about proper design and structure of web pages, refer to:
Siegel, David. *Creating killer fourth-generation sites*. Indianapolis, IN: Hayden Books. 1997.
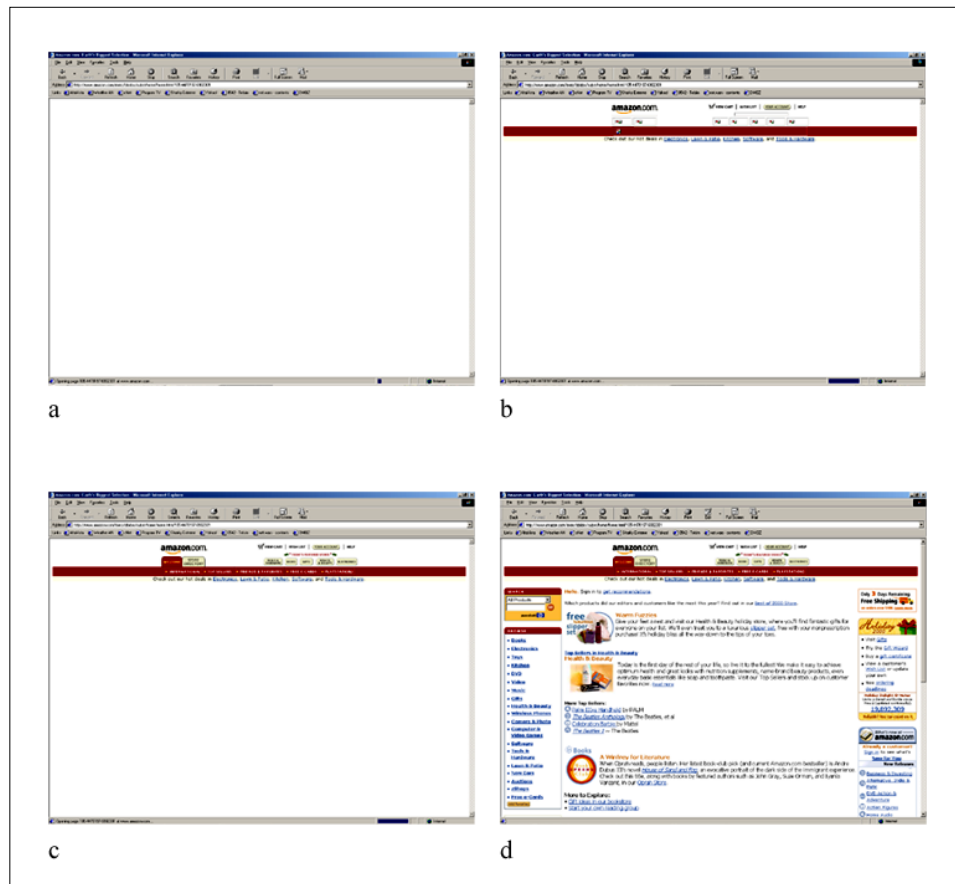
Figure 10: Step-by-step process of loading a web page
Source: *Amazon.com—Earth's Biggest Selection*.
24 December 2000. <http://www.amazon.com>

As the second step (fig. 10b) the basic layout of already loaded elements is displayed. All the text elements and background colors are shown, and the images are signified by the image placeholders, into which later on proper image files will be loaded.

In the third step (fig. 10c) the images are already loaded and displayed on the screen, but the browser seems to still be processing some data. Nothing new is being displayed in the window for some time.

Finally (fig. 10d) the rest of the page appears suddenly. Since it was placed inside a table[41], it could not have been displayed step-by-step[42] as the browser was processing the data, and appeared at once on the screen when the whole content of the table was already known.

While the page is loading, the viewer is presented the content step-by-step[43] and generally is allowed to view some elements earlier than the others. Often the text of an article would load first and then the images illustrating it would appear, as the viewer already started reading the text. It makes a great difference from the printed materials, where all the contents are already placed on the page and the viewer is the one who chooses the order of viewing them.

The fact that the viewer must wait for the web page to load, affects one's concentration in a negative way. Viewers of the web content are much more likely to perform multiple tasks, (often reading many documents at the same time,) than the viewers of the printed materials. It has been proven as well that generally web audience does not read but only scans the page with their eyes[44].

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[41] Generally, tables are used by the web designers to format web pages into rows and columns, similarly to the grids and guidelines used by the designers in print.

[42] The latest version of HTML (XHTML 4.01) allows the tables to be displayed step-by-step, while loading. Unfortunately the browsers currently available on the market are not yet programmed to utilize these mechanisms.

[43] There are exclusions from this rule, such as Flash web pages.

[44] Flanders, Vincent. "How Big Can I Make My Page?" *Vincent Flanders' Web pages that Suck.com*. 15 February 2001. <http://www.webpagesthatsuck.com/478.html>.

Time factor does not only show through the process of the page loading,

but also affects the presentation of the pages themselves. Certain elements

transform and change the way they look on the page, in time. Animated

banners can be a good example illustrating it. Since animated or moving,

those elements easily grab the attention of the viewer. Virtually all

advertisement banners on the web use the animated GIF technology to

attract potential clients to click on their graphic.

Figure 11: Sample advertisement banner, divided into
separate frames.
Source: Tık kiralık. Advertisement. 22 December 2000.
<http://www.ada.com.tr/>

GIF animations themselves are not the only changing elements on web pages. Many authors use Macromedia Flash technology to create ads, menus or even whole web sites in this vector-animated format[45].

Dynamically updated pages can change certain areas of the page in regular intervals, or reload the whole document after a set amount of time[46]. Other elements that add dynamism to the web pages are scrolling texts (java applets), scrolling the whole document automatically (java script), button mouse-over effects (java script) or embedded sounds and video clips, to list just some of the possibilities.

Even the static page, though, will gain a limited amount of dynamism through the user interaction. When reading any printed medium, viewer generally sees the whole page at once, reads the texts, watches the images and then flips the page to access the continuation or another information. In web, one can only view the page through the (mentioned earlier) monitor that acts as the passé-par-tout.

To access the area that did not fit on the screen at one time, the viewer is forced to perform the action of scrolling, in order to change the area of the page currently displayed on the monitor. This action will be discussed further in the following sections of this work.

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[45] For more information on Flash, refer to:
Macromedia – Flash. 24 March 2001. <http://www.macromedia.com/software/flash/>.

[46] Those are often used on pages presenting weather forecasts, traffic reports, stock quotes etc.

2.1.4 Touch

It may be observed, that in general, people tend to pay much closer
attention to the content presented to them in the form that they can access
physically. One would pay much more attention while reading the book
(held in hands) than when looking at the poster. Newspaper would require
more attention than the billboard. This can be true for the web content as
well. It has been proven that most of the Internet users do not actually read,
but only scan the text with their eyes[47].

Browsers for a long time strive to make viewing the pages over Internet as
pleasant and natural as it can be. However, the tools that they offer, often
do not manage to efficiently substitute those of the real life.

In fact, as it can be seen on the Figure 12, WWW offers much wider variety
of tools and possibilities than the printed medium. Still, the lack of physical
contact with the medium often creates a mental discomfort and renders
those tools much less usable then the real-life ones.

Perhaps with the use of touch-screen and high resolution technologies, this
situation could be changed, but currently, the users are still forced to
manipulate the images on the screen by the use of mouse, trackball,

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[47] The differences between content creation for web and printed medium can be found in:
Nielsen, Jakob and John Morkes. *Writing for the Web*. 20 March 2001.
<http://www.useit.com/papers/webwriting/>.

keyboard and other input devices that often appeal unnatural, especially to

the new users with no prior computer experience[48].

Function	Real-life tool/action	Web browser tool/action
Access to specific sections of the document.	Locating the item in the table of contents, finding the page by the number	Locating the item in main page or site map and clicking the link
Access to the previous or next page.	Flipping the page	Clicking the link or Back, Next buttons of the browser
Marking the place for further reference	Inserting a bookmark or folding the corner of the page	Creating a bookmark entry or a shortcut to the address
Noting comments	Writing on the margin on the book, sticking a piece of paper with the note	Creating text entry in the bookmark file comment field
Correction of the display error on the page (as the author)	Revising the document, printing again or editing an errata	Correcting the document and uploading to the server
Correction of the display error on the page (as the viewer)	Acquiring a new copy of the publication	Clicking Reload button
Closer look at some element of the page	Using magnifying glass	Changing the text or image settings, using additional programs or changing display settings. Also, in Flash, using zoom tool.
Cross-reference	Locating or acquiring the additional source	Clicking the link
Search for specific keyword	Looking carefully throughout the text or using the glossary	Using Find command or using the glossary

Figure 12: Comparison of different tools and actions
available for print and web manipulation

It cannot be denied that the web pages require higher level of interactivity

than the printed materials. The viewer must load and scroll pages, click

links, make conscious decisions about the next destination, sometimes fill

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[48] Computer mouse, for example, is operated by moving it over the flat, horizontal surface, while the cursor, which it directs, appears on the vertical screen. For many first-time users this creates a great discomfort and confusion.

the forms and so on. Still, the artificial quality of all those tools makes them less appealing than printed medium.

It could be observed, however, that young children, especially at the elementary and pre-school age have no mental blocks when accessing and utilizing software interfaces. They have the tendency to adopt into the computer environment much easier than the adults[49].

The problem with assimilating and getting used to web medium, may then lay not in the nature of the medium itself, but rather within the public, unable to adopt fully to the technology developed recently – the technology they did not grew up with.[50]

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[49] Feldman, Dara. *Technology and Early Literacy: A Recipe for Success*. 13 March 2001.
<http://www.childrenandcomputers.com/Articles/technology_and_early_literacy.htm>.

[50] Davidson, Jane Ilene. *Children and computers together in the early childhood classroom*. Albany, N.Y.: Delmar Publishers, 1989.

2.2 Content organization and presentation

In both of the methods of design; print and web, there are certain rules and principles of content presentation. Some of those are common to both methods while the others differ. This chapter will discuss the various ways of presenting content to the reader, outlining the medium-specific techniques that are being employed to enhance the user experience.

2.2.1 Interactivity

One of the most obvious differences between the two methods of design and content presentation is the way in which the reader navigates through the document. Providing the reader with the choice of the content one wishes to read next, allows the interaction between the two.

A certain level of interaction is employed, in fact, in almost any action a person could take towards another person or the object. While reading the book, one has to take it, open on the certain page, view and read the text, fold the pages etc. Web, however, does not only allow the interaction between the reader and the object, but rather with the content of the article or articles. The action is not only "allowed". It is the very essence and base on which the whole concept of hypertext and World Wide Web resides[51].

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[51] More information on hypertext can be found in:
Woodhead, Nigel. *Hypertext and hypermedia: theory and applications.* Wilmslow, England: Sigma Press; Wokingham, England; Reading, Mass.: Addison-Wesley Pub. Co. 1991.
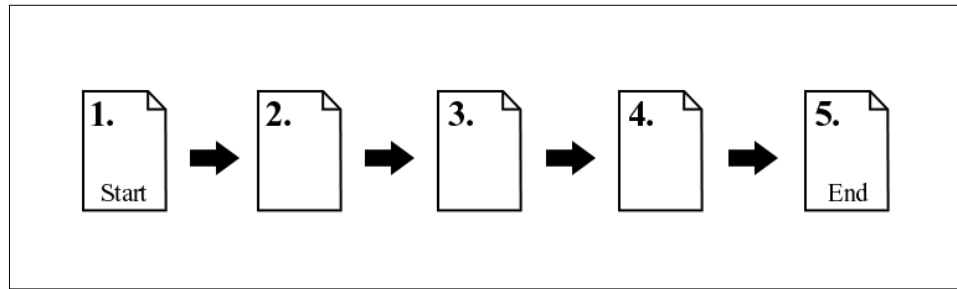
Figure 13: The reading order of a typical printed article.

Reading any printed article[52] is usually a very straightforward process. The reader starts from a page on which the article begins, and reads the content, occasionally folding a page until the end of the article is reached. Most often the articles are split on a number of subsequent pages. In some cases, the article may be broken into sections printed either in a number of issues of the same periodical, or on the pages not directly following each other. In such cases, the end of each section indicates where the continuation of article could be found.

It should be important to note at this point, that such information, even though it acts as a "link" to the next section of an article, does not provide options for the reader, only the exact place of the continuation. This technique should not be considered as the interactive feature therefore, since the only choice it provides to the user is whether to continue reading

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[52] There were certain attempts of breaking a scheme, publishing the interactive adventure books, where the reader decided on the next action of the character, but those were only the adaptations of the ideas of hypertext into the books, rather than a standard on their own.

the article, or to stop it. The reader can as well, take such decision at any given moment without any indication within the article.

The other feature of the printed medium articles, the bibliography, (especially in the academic writings) could be considered as an attempt towards interactivity. Yet again, I believe it does not match the criteria in a satisfactory way, as to be entitled to such function. The reader is provided with a number of references for further study of the topic, but the medium itself does not provide any mechanisms for accessing such sources quickly and easily.

Other actions and writing techniques within the printed material could be analyzed in the similar way, but we would always come to the similar conclusion: Printed materials are not interactive by their nature, and if they appear to be, it is whether only illusory quality, or the author intended them to utilize some of the mechanisms that do not originally belong to the syntax of printed medium communication and content presentation.

Normally, printed materials are to be read in a linear way, from the beginning until the end, creating a self-contained whole without any significant need to refer to any outside sources in order to accomplish reading them.
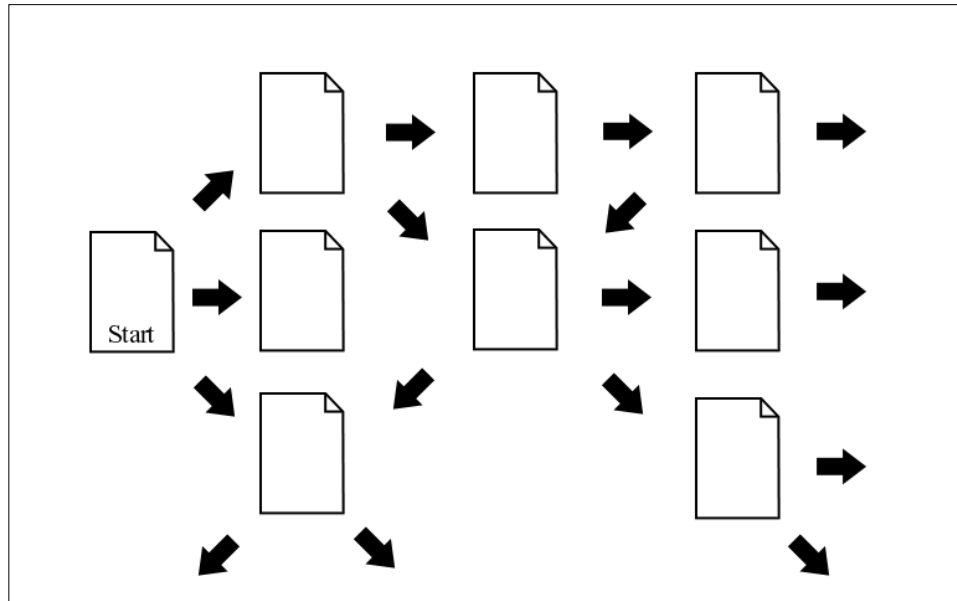
Figure 14: Multiple possible reading orders
of web documents

In the web, the reader faces a non-linear presentation of content. There usually is a certain order in which the author intends the article to be read, yet that order is not forced upon the reader, and alternative possible directions are most likely provided[53].

The mechanisms of hypertext allow the creator of the content to provide the reader with links to other sources of information, articles, graphics, glossaries, etc. The reader does not need to know where such resource is located, which makes the whole process easy and enjoyable.

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[53] For information on writing for the web, see also:
Schriver, Karen A. *Dynamics in Document Design: Creating Text for Readers*.
New York: John Wiley & Sons, Inc. 1996

Due to the format and physical characteristics of the web, and on-screen computer displays, it is usually a common practice to split the articles themselves into a number of smaller HTML documents (web pages) which have to be accessed and read one by one in order to complete the single article. Those sections are to be linked to each other as well[54].

Although hypertext brings many new possibilities to the designer, it has its drawbacks as well. The designer has to carefully weight the amount of external links[55] in order to maintain the important balance:

- The amount of links should be high enough to give the reader the feeling of choice and freedom in decision-making. Too less links can create the feeling of entrapment within the content of a certain document. Those can also arise the feeling as if the author of the page was not confident enough about keeping the reader interested in the content and tried to keep one within the web site or document by refusing to provide any exit.

- On the other hand, a number of external links should be small enough not to distract the reader. Too many links can "tempt" the reader to escape from the site. The large amount of links can, again, create the feeling of lack of confidence in the content expressed by

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[54] Nielsen, Jakob. *Microcontent: How to Write Headlines, Page Titles, and Subject Lines*. 11 March 2001. <http://www.useit.com/alertbox/980906.html>.

[55] Links, which direct the reader to the other, related pages, not belonging to the currently read site.

the author in referring to too many external sources. Finally, large

number of links within the page (usually indicated by different color

of the text and the underline effect) can destroy the visual harmony

of the text and make it difficult and unpleasant to read.

One of the interesting qualities of the web, as opposed to the printed

medium, is that there almost always is no actual end of the content. The

printed articles end in the certain place, but the web documents always

provide, or should always provide, some sort of continuation of the topic. It

can be expressed by the links to the works on the similar subject, or to the

other documents created by the same author. It can be the feedback form or

a link to the discussion group on a given subject. The possibilities are

virtually endless.

It is very rare that the web document would simply end, providing no

follow-up links of any sort to the user. In fact, the readers are in favor of the

sites providing them with more freedom, and continuous browsing

experience, usually avoiding content-based sites that finish with

a "dead-end page".

2.2.2 From page to page – folding the page against scrolling and clicking links

It is often the case that a full-length document does not fit on one page, be it the article printed in the magazine or content published over the WWW. In such occasions the designer has to split the content into several sections and distribute them among the available pages[56].

Since folding the page of the printed material is a very simple action that could be performed fast, the designer has more freedom in the way he transfers one part of the article into another. One can decide, for example, to split one sentence between two succeeding pages, or even to hyphenate the word from one page to another. The ease of continuous reading is guaranteed by the nature of the printed medium. The process of moving from one page to another is fast enough for the reader to remember the first part of the sentence and flawlessly continue it with the segment located on the new page. Even in the case that the reader would forget the sentence's beginning, one can always quickly fold the page back and re-read the missing content.

The fact that pages of the printed medium design correspond so tightly with each other is often used by the designers especially in various types of small flyers and brochures, where alternative ways of folding the paper can create different compositions (Fig. 15).
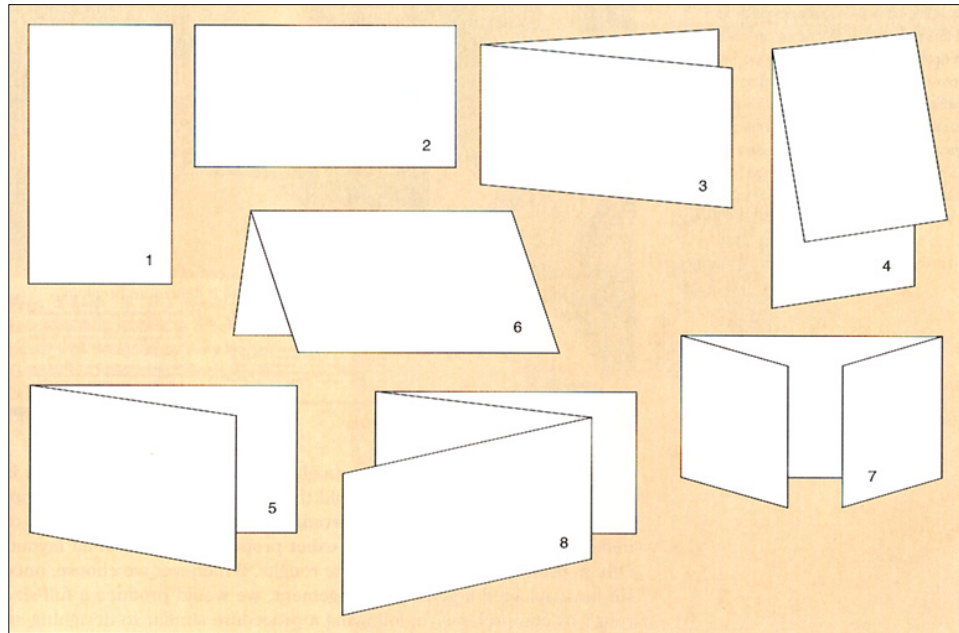
Figure 15: Different types of folds for brochure design:
1. vertical parallel fold, **2**. horizontal, **3**. book fold,
4. short fold vertical, **5**. short fold horizontal,
6. tent fold, **7**. gate fold, **8**. z fold
Source: Conover, Theodore E. *Graphic Communications Today*. St. Paul: West Pub. Co. 1985. 233 pp.

In web, the documents are presented in the entirely different manner. Although each web page belonging to any given site or multi-page document, undoubtedly is a part of the bigger whole, at the same time it has to be able to stand on its own, independent from the rest of the site[57].

The way long texts are split into separate web pages is a direct consequence of those properties. In web, the content has to be split into logical blocks,

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[56] Adequate for both pages of printed material, and web pages.

[57] Nielsen, Jakob. *How Users Read on the Web*. 14 March 2001.
  <http://www.useit.com/alertbox/9710a.html>.

similarly to the splitting of the novel into chapters and sections. The reader can then read the chosen section as a whole, and then proceed to the next page, without the need of direct continuation of any line of reasoning from the previous one.

Writing for the web is not an easy task. The texts not only have to be constructed in the different way than while writing for the print. They also should be much shorter and operate by keywords rather than by the long explanations. The reader should be able to grasp the quintessence of the text much faster than while reading from paper or other printed material[58].

There are multiple reasons for enforcing such techniques on the writers and designers working with the web. Some of them, coming form the physical characteristics of the medium, I have explained in the earlier sections of this work. One of the most important ones has not been discussed yet, however.

As described earlier, moving from one page to another is a quick and easy process when one reads printed material. In web, this simple action becomes a three-step process, involving user interaction with the web medium, hardware and software operations, data transfer over the network, and due to those, is additionally spread in time.

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[58] For more information, refer to:
  Nielsen, Jakob. *Inverted Pyramids in Cyberspace*. 5 March 2001.
  <http://www.useit.com/alertbox/9606.html>.

When reading the content of a web page, the reader has to perform the following three steps in order to complete the task and to reach the continuation of the article (or any other document one wishes to read):

1. Scrolling the page: As explained earlier, the whole content of one web page rarely fits onto the screen at one time. Therefore while reading the text, user has to move through the document using scrolling, in order to view the whole content. One already faces with the issue of text fragmentation at this level, since it is usually impossible to see the whole content at once, and again the viewing area is limited by the display device's screen.

2. Once the reading process is completed, the reader must locate the adequate links that will grant access to next sections of the article, or another document. It is very crucial that the web designer takes into consideration the way the document will be read. Often, designers place the links to other sections of the site only on the top of the page, forcing the reader to scroll back all the way up, once he or she finished reading the text in order to be able to proceed further. Properly placed links should allow the user to access other pages easily at any given moment[59].

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[59] This issue will be discussed more in-depth in the following part named "2.2.4 Information about current location and links"

3. Finally, the reader must activate the chosen link and then wait for the process of loading next page to complete. Since currently most of the worldwide Internet users are still connecting to the web via telephone modems[60], the process of loading pages takes a considerable amount of time. Even with the fast connections, most of the systems still need additional time to render the page on the screen, and therefore the access to the continuation of a document is almost never as fast as in the case of printed material.

2.2.3 Navigation

Since, in print, the whole process of navigation can be summarized into creation of table of contents that informs about the location of the articles in the publications, I will concentrate on the web site navigation and site maps in this section.

Constructing a proper site map and navigation system is perhaps the most important aspect of designing for the web. Without carefully planned

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[60] The analysis of Internet traffic and devices used for connecting to the net can be found in:
    Nielsen, Jakob. *The Need for Speed*. 3 March 2001. <http://www.useit.com/alertbox/9703a.html>.

structure, the readers are likely to fall into the "lost in cyberspace" syndrome[61] easily, and dislike the web site because of it.
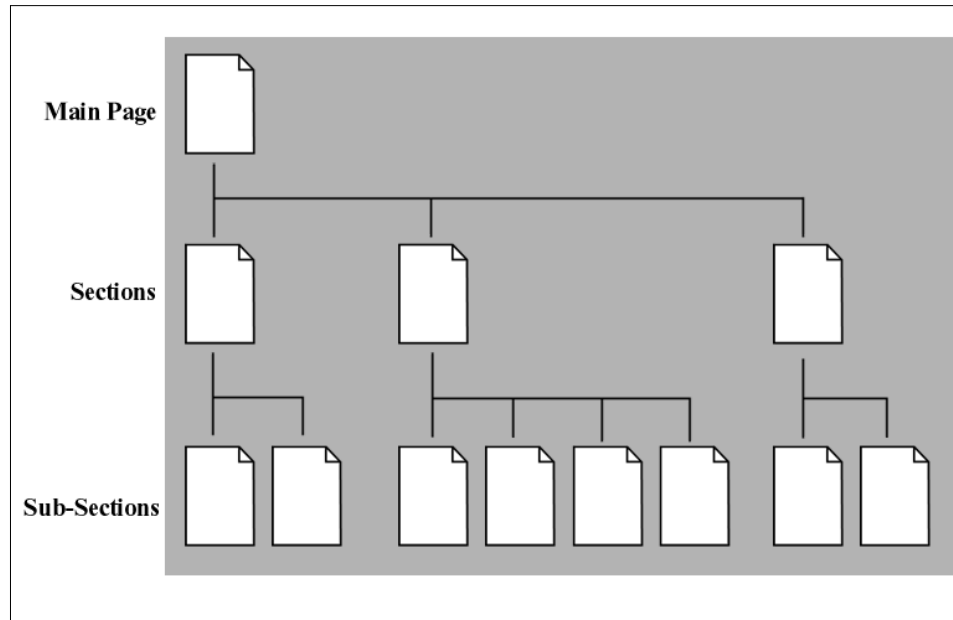
Figure 16: Sample site map

Proper web site should split the content into smaller sections according to the subject matter. The content of each section can be further split into smaller sub-sections etc. However, too many branches and levels in the sitemap, instead of clarity – can bring even greater confusion, and therefore such choices should be taken wisely, and tested with a larger group of people whenever possible[62].

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[61] This occurs when the reader loses the track of the current location, the alternative exits from the document etc. finally deciding to give up stop browsing the site, and to come back to the well-known location by manually selecting the URI of site other than currently viewed.

[62] "Information Breakdown." *Crating Web Pages with Hot Metal Pro 6.*
9 March 2001. <http://www.shef.ac.uk/~cics/docs/aphtml4/aphtml4.html#21>.

Figure 16 illustrates the sample site map with 2 levels of branching:

sections and sub-sections. The proper navigation should provide the user

with the following[63]:

- On the main page – access to any of the section pages, and

  optionally, descriptions or links to the sub-sections[64]. When

  designing a large web site, the link to the site map should be

  provided, from where the reader could access any document

  directly. Site map should be clean and easy to understand,

  preferably with the graphical representation rather than text only.

- On each of the section pages – link back to the main page, links to

  other sections and links to the sub-sections of the current section.

  Also, if present, the link to site map should be provided.

- On each of the sub-section pages – link back to the main page, link

  back to the section page and links to the other sub-sections of the

  current section. Optionally, if the content appears in the continuous

  way, link to the next and previous sub-section should be provided.

  Also, if present, the link to site map should be provided.

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[63] Discussed in:
Siegel, David. *Creating killer fourth-generation sites*. Indianapolis, IN: Hayden Books. 1997.

[64] The sample site is very small and therefore the designer can provide all the links directly from the main page. In the larger sites only links to the sections and, optionally, selected sub-sections should be provided to avoid confusion.

Additional links should be also placed, allowing users to access any given page within the site when the content of such page can bring additional information to the currently read page. For example, while on the page with a C.V. of the designer, the reader comes across the mention of some award; the link to designer's portfolio and the award-winning work could be placed as well as the link to the web site of the organization that awarded the work.

The proper design of the web site should also permit more than one way of getting to the document. Designer should take under the consideration the different approaches that users may take in order to reach the searched content[65]. For example, to locate a document describing the installation of drivers for a graphic card on Windows ME operating system, the user can take following steps:

- Go to "drivers" page, then access the sub-section of drivers for Windows ME, then locate the product and finally the instructions on the list.

- Go to "products" page, locate the graphic card and click the link to the instructions on driver installation for Windows ME.

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[65] Flemming, Jennifer. *Web Navigation: Designing the User Experience*. Richard Koman, ed. Sebastopol, CA: O'Reilly & Associates. 1998. pp.18-20.

- Go to the site map and look for the direct link to the instructions for a specific model and operating system.

Each of those ways should lead the potential reader to the same location as a result. If the site design fails to allow multiple paths of navigation, it must be assured that the existing path is easy to locate and understand by anyone.

Designers may also feature additional links on the main page of the site, allowing direct access to the most visited pages, spotlights, news etc. or a simple search engine that looks for the specific words or phrases within the web site.

Figure 17 shows the proper construction of the web site's main page. Although the site[66] is a big one, there is no site map provided. This is the result of the nature of the web site, introducing new articles every day, making it very difficult, if not impossible to create a clean and easily updated map covering all the documents within the site.

Sharky Extreme does not categorize the articles too well, which is also one of the causes for the difficulties in creating a proper site map (compare with the case study on *CNET.com*).

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[66] http://www.sharkyexterme.com/ - hardware and software reviews.
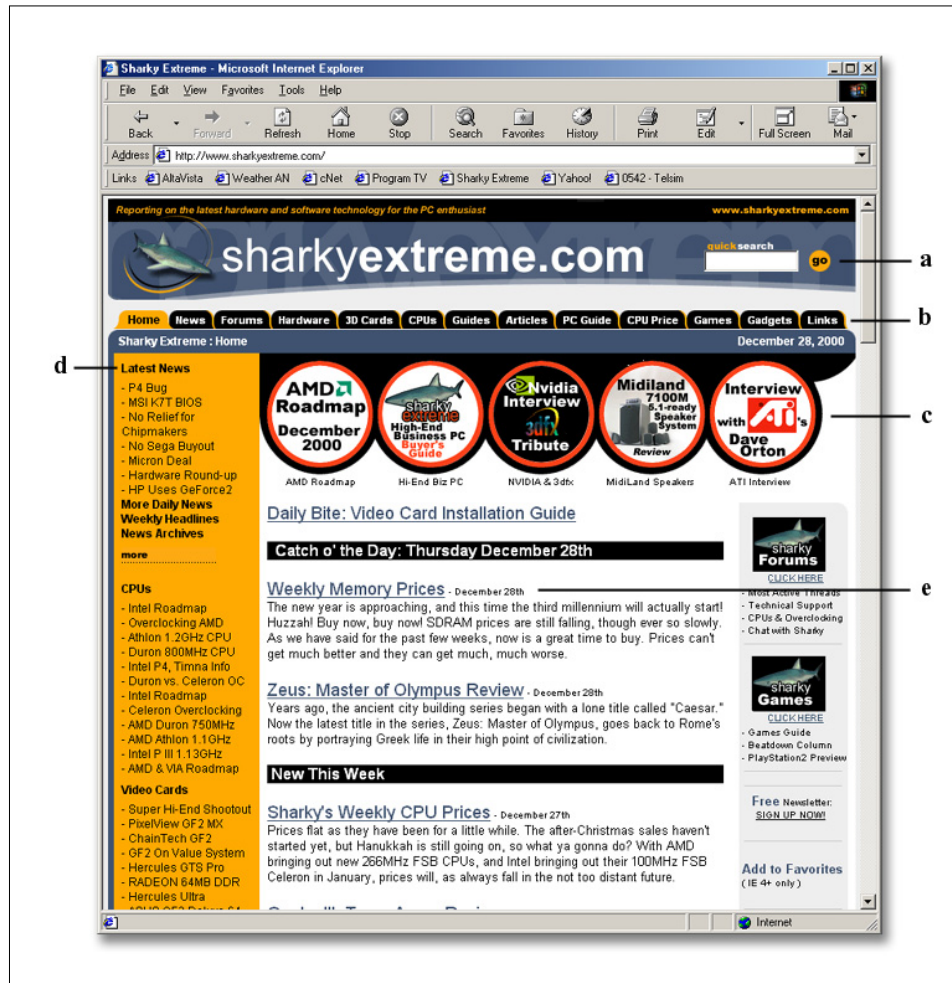
Figure 17: Proper construction of the main page
a. Quick Search, **b.** Links to the thematic sections of the site,
c. Links to the featured spotlight articles, **d.** Latest News,
e. List of recent articles and short summaries.
Source: *Sharky Extreme.* 28 December 2000.
<http://www.sharkyextreme.com/>

When designing large web sites, it is often unavoidable that the reader will

have to access multiple levels and branches before reaching the content.

The next section discusses the ways to assure that the reader will not get

lost within the site, and will always be able to find the way to the desired

document.

2.2.4 Information about current location and links

Well-organized academic paper is the example of printed medium document that comes closest to web application. It usually utilizes a proper combination of header and footer to provide the reader with the information on the current location within the publication. It should as well contain table of contents, table of figures, glossary, references and other additional information.

Often in print such information is considered useless and omitted. In the web design however, providing the reader with constant information on current location and with links to other sections of the site is very crucial.

The reason for such need is very easily explainable. If, for example, a reader is to access a random page of a printed article, one is already holding the publication in the hands and can anytime look at the cover, check the table of contents or simply flip a number of pages in order to learn more about the paper as a whole.

In WWW the user will be often forwarded to the middle of a web site through the link from some other place[67], and unless provided proper information by the designer, one would not be able to understand the location of the document within the site's structure. Without such

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[67] For example another web page or search engine.

information, the user would also not likely decide to browse other areas of

the site, or in an extreme case, would not even know about visiting the site.
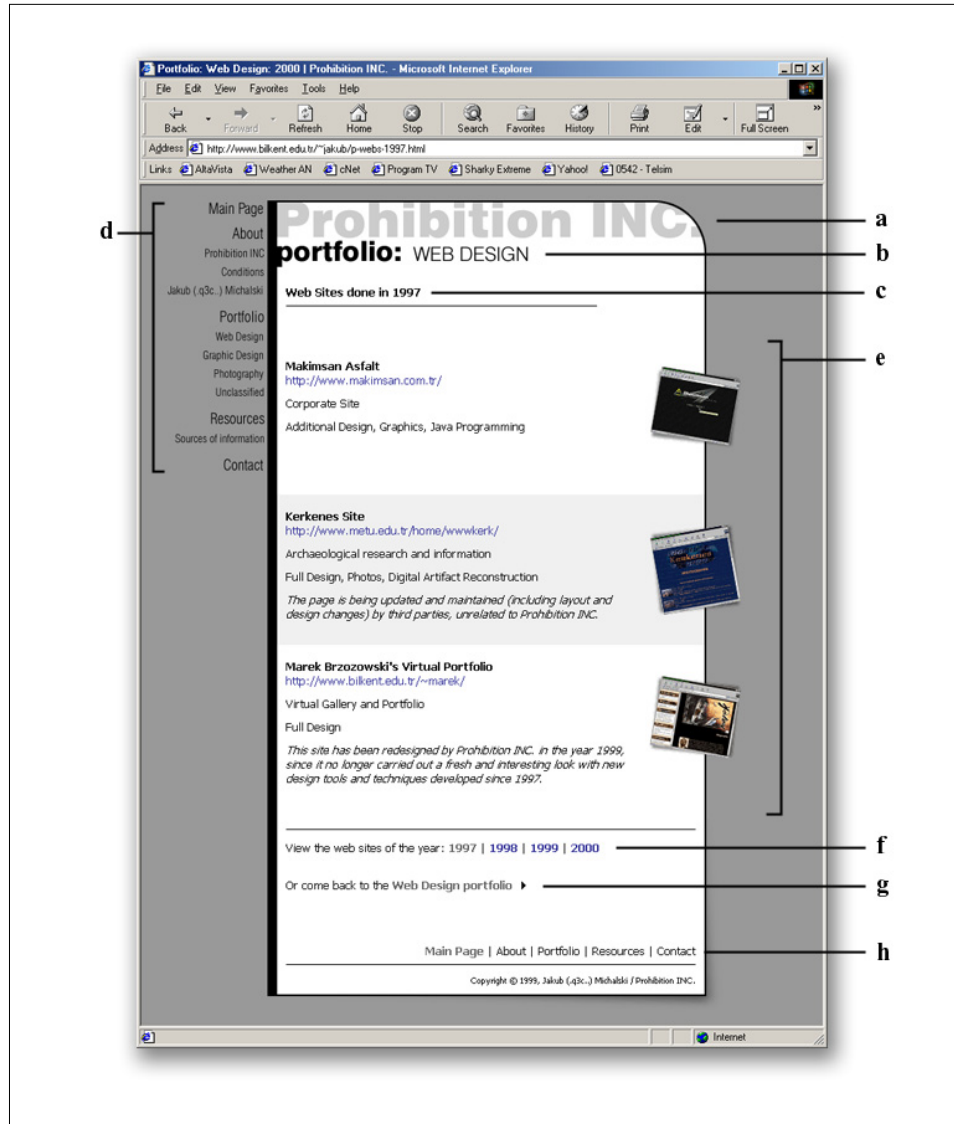
Figure 18: Correct organization and information placement
on the web page
a. Name of the site, **b.** Current section and sub-section,
c. Detailed location within sub-section, **d.** Menu allowing
access to other areas of the site, **e.** Body of the document,
f. Links to other documents within sub-section,
g. Link back to the main page of sub-section,
h. Footer links to main sections of the page.
Source: *Portfolio: Web Design 2000 | Prohibition INC.*
10 December 2000. <http://portfolio.ProhibitionINC.com/>

In order to provide the proper information to the user, each page of the web site should contain a direct indication about the site name, current location within this site and proper links to other sections of the site.

Figure 18 illustrates a correct organization of the web page that complies with all the above rules. The page clearly states the name of the site "Prohibition INC." (Fig. 18a), the section "portfolio" and the sub-section "web design" (Fig. 18b) as well as the current location within the sub-section "Web Sites done in 1997" (Fig. 18c). This information constitutes the header of the document and quickly introduces the user to current location within the site.

Many companies decide to include the slogan next to the logo on all the pages of their sites. This way the user can have a clearer idea not only about the site's name but also – its purpose.

In order to clarify the site's layout, to the left of main area, the basic menu is located (Fig. 18d). In the menu, all the main sections (slightly bigger typeface) and sub-sections (smaller typeface) are listed, so that the user could easily understand the whole site's construction without the need of viewing the site map.

It is not visible on the screenshot, but the menu on the left, as well as the header section act as links, allowing the user to directly access other areas of the site. When moving the cursor over any of those, it will change

into the finger image (indicating link) and also a tool-tip will be displayed explaining where does the link direct the browser (Fig. 19).

The header part of the web page is a very crucial element of design, since it appears directly in the first screen of the page, before the user scrolls down[68]. The designer should always assure that enough of important and attractive elements are seen in this section, in order to create a good first impression on the viewer and to provide one with immediate access to all key features of the page.

As stated earlier, a proper header construction alone is not enough for providing the user with easy to use and intuitional navigation around the site. For that reason, after the body of the web page, additional links should be provided in order to allow the user to proceed through the site without the need for scrolling back to the top of the web page (Fig. 18f-h).

The example web site finishes the body part separating it from the footer with a page-wide horizontal line. It is a clear indication of the change in the subject matter, similar to the horizontal line placed between the header and the body part, in the upper part of the page.

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[68] Compare the concept of monitor acting as a passé-par-tout, introduced earlier in the work in the section 2.2.1 Space, and Figure 2.
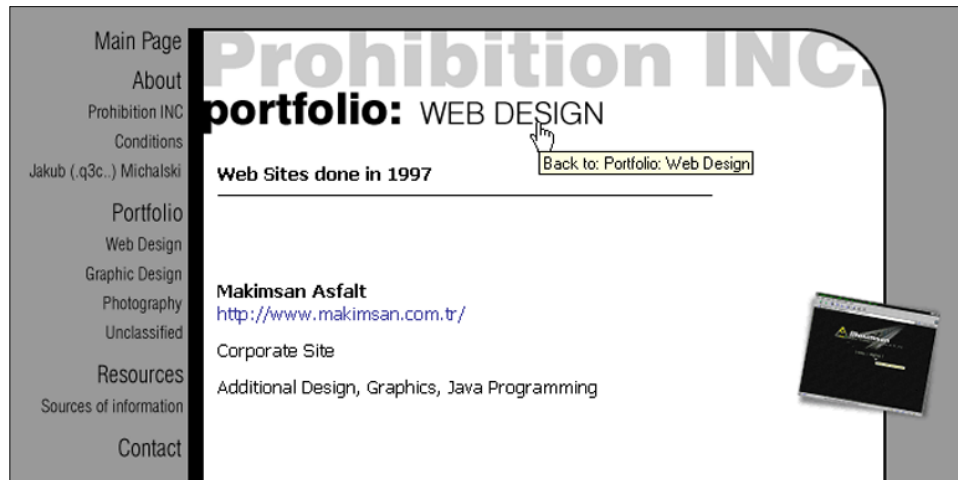
Figure 19: The use of header and tool-tips in site navigation
Source: *Portfolio: Web Design 2000 | Prohibition INC.*
10 December 2000. <http://portfolio.ProhibitionINC.com/>

While the header offered information on current location and the links to

the major sections and sub-sections of the site in general, the footer content

concentrates on providing the user with the links related to the current

section. Since the example page is a part of web design portfolio,

presenting the web sites prepared in the year 1997, the natural consequence

is providing the user with links to the pages presenting the sites done in

other years (Fig. 18f). In the list of available years "1997 | 1998 | 1999 |

2000", the year "1997" is presented in a different color than the rest (it is

grayed-out and does not provide a link). Such presentation functions as a

reminder, that "1997" is the year the user is currently viewing.

Another link placed in the footer is a "go back" link, directing the user to the web design portfolio sub-section (Fig. 18g). It is the page located one level higher in the site's hierarchy. Alternatively, the user can access that page directly through clicking on a link in the left-side menu, or on "portfolio: web design" text in the header.

Finally, the last set of links provided in the footer allows the access to all the main sections of the site "Main Page | About | Portfolio | Resources | Contact" (Fig. 18h). Those links are in fact the simplified version of the left-side menu on the top of the page, with the sub-sections removed. They allow the user to quickly access other crucial parts of the site, directing the browser two levels higher in the site's hierarchy.

The footer also contains a copyright indicator; however it is not crucial for the navigation evaluation.

Additional information on the current location within the site is put in the title bar of the browser. Unfortunately, it contains a mistake, informing the user that the current location is "Portfolio: Web Design: 2000 | Prohibition INC.". The date "2000" should be replaced by "1997" and is probably a typographical omission made by the designer.

2.2.5 Style continuity and basic design principles

Although both design methods (print and web) have a lot of differences, in the field of style continuity and design principles they are often to be treated in exactly the same way.

Whatever design method is used, style continuity is one of the most important issues for the designer to consider. An end product (be it packaging, web site or a magazine) should appear unified and easily distinguishable from other designs of similar type. In other words, the design should create an identity for the product, and manage to maintain it throughout the whole series of separate entities.

Since many of today's big web sites consist of a number of smaller sections that have different purposes and functions, at the same time constituting to the whole image of one big company[69]. In most cases, placing the logo of the main company is not enough to create the proper identity. Other steps are therefore taken to assure that web sites will be recognizable.

One of the most commonly used techniques is working with a specific color and typeface scheme. *CNET* sites[70], for example each feature similar header, using yellow color and red "c|net" logo in a circular composition.

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[69] *Yahoo!* for example contains a web directory, hosting, web-based e-mail, news, weather forecast, TV program, chat, discussion boards, and many other services. <http://www.yahoo.com/>.

[70] Explained in detail in 3.1 Case Study: CNET.com

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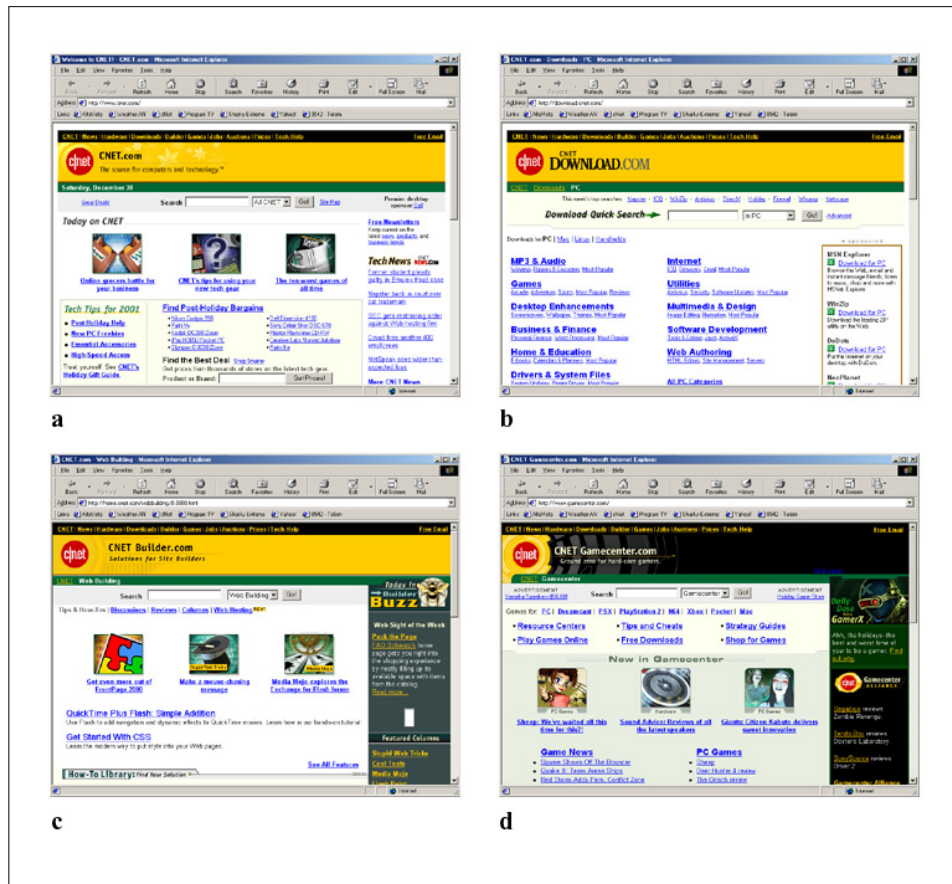
Figure 20: Different sites belonging to the CNET group
a. cnet.com, **b.** download.com, **c.** builder.com,
d. gamecenter.com
Sources:
a. *Welcome to CNET! – CNET.com*. 4 December 2000.
<http://www.cnet.com/>
b. *CNET.com – Downloads – PC*. 4 December 2000.
<http://www.download.com/>
c. *CNET.com – Web Building*. 4 December 2000.
<http://www.builder.com/>
d. *CNET Gamecenter.com*. 4 December 2000.
<http://www.gamecenter.com/>

Main menu allowing access to all the sites of the company is always the same, and the content presentation techniques are very consistent among different topics and sub-sites.

CNET's professionalism in developing corporate identity, and strict accordance with the fixed set of design rules were the main reasons why I have decided to conduct one of my case studies on this particular web site.

Not only design integrity and corporate imagery should be kept in mind when designing a web site. Due to the fact that web is so much different from print, many designers do not realize that many of the basic design principles have to be employed while designing for Internet.

Issues such as typeface selection, color usage, typographical rules, image weight, should all be considered and revised carefully. Many of them share common points with the designs prepared for print[71]. Those include:

- Text line length
  Should be within the range of 50-70 characters per line, including spaces and special signs.

- Foreground to background color relations
  Text should not be in the complimentary color with the background color, preferred combinations are dark on light.

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[71] Collier, David. *Collier's rules for desktop design and typography*. Wokingham, England; Reading, Mass.: Addison-Wesley. 1991.

- Typeface size

  When working with light color text on dark color background, the typeface size or weight should be increased to enhance readability.

- Background images

  Should not conflict with any foreground elements, and therefore are best when saddle with low contrast and no dithering.

- Visual balance

  Unless desired, the less important elements should not disturb the perception of other areas on the page.

- Text alignment

  Body text is most readable when aligned left flushed right, rather than justified.

- Number of typefaces used

  Should not exceed 3 typefaces (excluding variations such as bold or italic) per document.

- Consistency in elements usage

  Both text and images should all have set properties that do not change throughout documents within the site.

Those are just a few basic rules that should be considered (and applied whenever possible) in both print and web design. There are, however some differences, that have to be kept in mind when designing for a specific medium. One of such differences is the use of serif and sans serif typefaces.

While much better in print, serif typefaces should not be used extensively in web design. Screen resolutions[72] are not high enough to render the little details such as serifs properly, especially when small typefaces are used. To avoid problems with reading the web documents, sans serif typefaces should always be used, unless in the big headings[73].

There are certain typefaces designed for the on-screen displays such as Tahoma, Verdana, Geneva or Lucida. The designers should assure that the typefaces used would be easily readable, and also accessible on different platforms (Macintosh, PC, Unix, Linux).

Outlined earlier, other differences include the use of white, the division of longer texts into sections, creating user interface and navigation[74] or considering linear versus non-linear structure of the document flow.

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[72] 72 DPI in typical Macintosh system, 96 DPI for PC

[73] For more information on sizes, typefaces and colors for web see also:
   Microsoft Typography. 22 March 2001. <http://www.microsoft.com//typography/default.asp>.

[74] Not necessary for designs prepared for print

The designer should skillfully apply graphic design principles accordingly with the advantages and limitations of the web medium. Trying to develop a completely new design schemes is impossible and, in fact, pointless. While working with web, or print, however one should always bear in mind not only the similarities, but also the differences of the two, to assure that the design uses the available possibilities in the extensive way, rather than only converting the same design from one medium to another.

CHAPTER 3: CASE STUDY

In this chapter I will no longer explain the ideas and concepts differentiating web design from designing for the print in theory only, but instead, conduct a step-by-step analysis of a web site, *CNET.com*, being an example of very good understanding of the principles of web design.

In evaluation of the web site I will not talk about HTML coding and problems that may come through the scripting mistakes. Instead I will solely concentrate on the principles of visual and structural presentation that the authors intended to build.

3.1 CNET.com

CNET Networks, Inc.[75] defines itself as "the global source of technology and commerce-related information, data, exchanges and services for people and businesses. […] The company's vision is to educate and empower people and businesses by unlocking the potential of the technology world to make things easier and faster, and by helping them to make smarter buying decisions[76]".

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[75] In this work often referred to as "c|net" or "CNET"

[76] *CNET.com – About CNET.* 10 February 2001. <http://www.cnet.com/aboutcnet/0-13611.html>.

3.2 CNET: Site structure

CNET Networks, Inc. consists of a number of sub-networks, whether created or purchased by the company. Those include *CNET*, *ZDNet*, *mySimon*, *CNET Data Services*, just to mention the most important ones.

For the purpose of this work, I will analyze only the CNET itself, since it is an integral element of the whole network, and also the original[77] part of it.

The analysis will not be precisely following the order in which this paper was arranged into chapters and sections, however it will, in the end cover all of the issues addressed in the earlier chapters[78].

CNET web site can be divided into a number of smaller sections, each with its own, unique web domain. Each of those sections acts as the entity, on its own, at the same time contributing to the whole. Main entrance of the CNET site is located at the following URI: http://www.cnet.com/. From this address all the sub-sites can be easily reached.

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[77] By the term "original" I wish to imply, that CNET was the first and the central element of the whole set of web sites, and therefore its development was at most taken care of.

[78] This decision comes from the fact that the reader should first understand the general information about CNET, and only later be introduced to the detailed analysis of the smaller elements. For example discussing the layout of the single CNET page should not precede the explanation of the overall structure of the whole site.

The thematic sub-sites of CNET include:

- **Builder.com** (http://builder.cnet.com/)

    A web site for the WWW content creators, web designers etc.
    The articles in Builder include latest software reviews, web-
    programming tips and tutorials, Internet security and hosting
    information, references and resources.

- **News.com** (http://news.cnet.com/)

    Constantly updated content of this site features new software and
    hardware release information, market quotes, articles on the
    important issues in the Internet world[79] as well as the video clips of
    authorities speaking on the latest news in the computer business.

- **Download.com** (http://download.cnet.com/)

    This site offers free and shareware software downloads for PC,
    Macintosh, Linux and handheld devices. The entire software
    catalogue is properly categorized and features both CNET's and
    user's reviews and comments.

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[79] Such as the Microsoft antitrust case, or the controversial Napster software and MP3
music piracy issue.

- **Computers.com** (http://computers.cnet.com/)

  This CNET section offers a wide variety of hardware reviews,
  ranging from personal computers, through laptops, handheld
  devices and accessories to portable MP3 players or digital cameras.

- **Gamecenter.com** (http://www.gamecenter.com/)

  Currently in a shut-down process, this site used to offer reviews,
  previews and downloads of games, and patches for both computers
  and consoles. With the acquisition of ZDNet, CNET Networks, Inc.
  decided to move all the game-related topics into ZDNet's
  GameSpot.com.

There are many more sites that belong to the CNET network, but outlining
and explaining all of them misses the point of this analysis. The full list of
featured sites can be found on the CNET's site map at:
http://www.cnet.com/sitemap/0-2253447.html

Each of CNET's sub-sites feature discussion boards, e-mail newsletters
and search engine. It is also very important to indicate that all the sub-
sections of CNET are tightly related, and constantly linked to each other.
For example and article on the Napster case published on News.com[80]

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[80] *Fans rush to Napster ahead of court ruling - Tech News - CNET.com.* 10 February 2001.
 <http://news.cnet.com/news/0-1005-200-4773834.html>.

would feature links to a number of other articles on the subject, as well as to the Napster's own web site, Napster program download form download.com, etc.

3.3 CNET: The main page

The default starting point on the exploration of the site is CNET's main page, which provides the user with links to all the underlying sites, as well as to the three selected feature articles, chosen from all the content[81]. The feature articles are rotated daily, always presenting the returning user with fresh, new content.

Apart from allowing the user to access the sub-sites of CNET, the main page also features search, where the visitor can either look for specific keywords within CNET's network or the entire Internet.

Apart from the three feature articles, CNET's main page also presents a "product spotlight" – a review of a chosen hardware or software either popular among the buyers or chosen as an attractive by the CNET's editorial staff.

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[81] It must be noted that by the time this thesis is completed, CNET started making attempts on rearranging the layouts and structures.

Other features of main page include market stock quotes, current headlines from News.com, selection of interesting product links and (occasionally) a survey on a current interesting computer-related topic.

The complete listing of the features that can be found on the CNET's main page (as shown on Figure 21) includes:

a. Black Shortcut Bar, shared among almost all[82] of pages featured in CNET and its sub-sites, allowing the user to quickly navigate through main sections of the site. (Compare with Figure 20)

b. The logo bar with the name of the site, its logo and motto. In various variations, it exists on all CNET sites. (Compare with Figure 21)

c. The green bar with the current date. In the internal pages, the information on the current location can be found placed on it.

d. Advertisements. It is important to note, how CNET separates its content from the advertisements (discussed later).

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[82] Recently News.com started following slightly different design style, and therefore in most of the cases when I write "almost all", it could be understood as "all, but News.com".

Figure 21: Construction of CNET's main page
Source: *Welcome to CNET! – CNET.com*. 10 February 2001.
<http://www.cnet.com/>.

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e. Today on CNET: Links to three featured articles. The style of the graphic and presentation of featured articles is shared among almost all of CNET's sub-site main pages.

(Compare with Figure 20)

f. CNET Services: Links to all the main pages of CNET's sub-sites, and to the chosen sub-sections of those. Following the design style of *Yahoo!* CNET allows the users not only to easily access the content, but also by the placement of sub-section links, gives an idea of what can a user expect to find there.

g. Also on CNET: More links to the sub-sections of sub-sites. The selection of those is determined according to the network traffic analysis – allowing users to quickly access the most frequently visited areas that could be otherwise more difficult to find through "CNET Services" links.

h. Product spotlight and products table: Also determined according to net traffic, CNET presents the links to the most popular hardware reviews, allowing the users to learn and compare their prices among different distributors. This area features a product search, as well.

i. New reviews and features: Items in "Today on CNET" are kept for the period of one day only. Once removed from there, they are moved to this section. It could be alternatively named as "Yesterday on CNET".

j. Search engine and sitemap: Located on the top of the page, provides the users with even more options of finding the content in the easiest way possible.

k. Free newsletters: Mentioned earlier in this paper, CNET's e-mail newsletters cover all of the areas of interest found in the sub-sites. This selection of the links allows user to instantly subscribe to variety of those.

l. Tech news News.com: Current headlines and links to the articles on News.com. They allow the user to read the latest articles bypassing the News.com main page.

m. Quote snapshot: Current (about 20 minutes of delay) quotes from the stock market. This section also features small search engine for learning a specific company's rating, symbol lookup and the link to the CNET Investor sub-site.

n. This week on CNET: The selection of the most interesting articles either presented or upcoming in the current week.

o. Top 5: In this case "Top 5 bargain cameras". CNET is continuously

building up various "Top 5" lists, and features them on the main

page, as well as within the specific, thematic sub-sites.

p. Contact us: Link to the contact information

q. Back to top: a small text link allowing the user to quickly jump

back to the top of the page without scrolling.

r. Copyright statement and CNET's privacy policy links

s. Footer: For those users who already scrolled down, the links to

main pages of possible interest are repeated.

3.4 CNET: Organization of links and common design elements

As it is clearly visible, CNET constantly duplicates the same links, placing them in the various spots of the page. This technique, outlined in Chapter 2 of this paper, allows the users to access the desired content fast, whatever path they would attempt to take on their way to it.

By sharing common interface and design elements among different sub-sites, CNET assures that the proper site identity will be recognized, and all the sites will be understood as one. Again, Figures 20 and 21 can be referred for the comparison of different sites. Common elements include:

- Black shortcut bar, seen on all CNET pages
  (Figure 21a, Figure 20a, b, c, d)

- Logo bar, seen on all CNET pages, in various forms
  (Figure 21b, Figure 20a, b, c, d)

- Green bar, seen on all CNET pages, excluding News.com,
  showing the date on CNET main page, and location on all the
  other pages (Figure 21c, Figure 20a, b, c, d)

- Three featured articles, seen on most of CNET's main pages,
  (Figure 21e, Figure 20a, c, d)

- The division of the body of page (between the header and the footer) into two main panels, seen on all of CNET's pages (Figure 21d-o, Figure 20a, b, c, d):

  - Thicker one is located on the left, containing main text, such as table of links and featured articles on the main pages, or the text body on the article pages.

  - Thinner one is located on the right, and contains additional links, related or unrelated to the article's content.

- The footer, seen on almost all CNET's pages (Figure 21p-q)

- The style of the graphics, usage of typefaces and colors (especially a characteristic yellow), present everywhere on CNET.

3.5 CNET: Presentation of advertisements

CNET pays very close attention to the content organization. Apart from their concern about the navigation within the site, the editors carefully separate all the advertisements from the featured articles and elements designed by the network.

This practice is necessary, since in the past the viewers would often mistake the advertisements with the content made by CNET and take the banner slogans as the suggestions from the CNET's experts.

It may be easily noticeable that CNET is filled with advertisements – careful steps must be taken therefore to avoid misunderstandings, especially that CNET editors are considered experts in their fields, and their suggestions are often taken for granted by many users without any verification through other sources.

Two advertisement types can be found on CNET. First of them is the "typical" horizontal banner, usually placed in the header of the document. Those banners are kept without any further explanations about their functions, due to the fact, that the shape and size of the images are commonly known and recognized on the Internet as the ad-content.

The other type, the ads placed within the text of articles and in many other areas of the site, are however not so easily distinguishable. Advertisement placed within the body text of the article is considered as an illustration[83], and therefore CNET places a special graphic (Figure 22) above them.

Figure 22: Advertisement indicator graphic
Source: Welcome to CNET! – CNET.com.
10 February 2001. <http://www.cnet.com/>.

3.6 CNET: Presentation of the articles

During the years of its existence, CNET has mastered the style of writing for the web. Every article presented on its pages is carefully edited and cut into parts that allow quick loading of the content, and easy navigation within the text.

I have chosen the recent review of the new Netscape 6 browser[84] as an example of the content organization and presentation within the article. It is important to note, that I could have chosen any other article for that

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[83] Personally, I do not understand why did CNET decide to locate some of the ads in such places, especially that such practice is not usually seen anywhere (even in printed magazines or TV, advertisements have their own, separate spots, easily distinguishable from the content).

[84] *Netscape 6 Revisited – CNET.com*. 10 February 2001. <http://www.cnet.com/internet/0-3779-8-4574578-1.html>.

purpose, since CNET has one specific style of publishing articles, and all of them follow the same routine and organization.

The snapshot of the first page of the article can be seen on the Figure 23. I intentionally do not provide snapshots of the remaining pages of the review, since they more or less repeat the same elements of the design, and nevertheless will be explained in the text.

Every review by CNET starts with the rating and outline of features of the analyzed product. This feature is of course absent in the articles of a non-evaluative nature[85]. The rating is given in a scale from 1 to 10, where bigger number signifies better quality (Netscape received the overall note of 4 in this review). The outline of the features includes three one-sentence statements labeled "The good", "The bad" and "The bottom line".

Such presentation allows the user to get a general idea about the product in the first seconds of viewing the review, without actually reading any of the body text.

The next feature of the article is an introduction (occupying most of the first page of the review). It is composed of four short paragraphs, and explains the general reason for the review, information on the product and the general background information.

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[85] One could point out in here, that the review started with a header, then the title, sub-title, credits, etc. but I would like to concentrate on the content in this section of the case study, and leave the design aspects for the proper place.
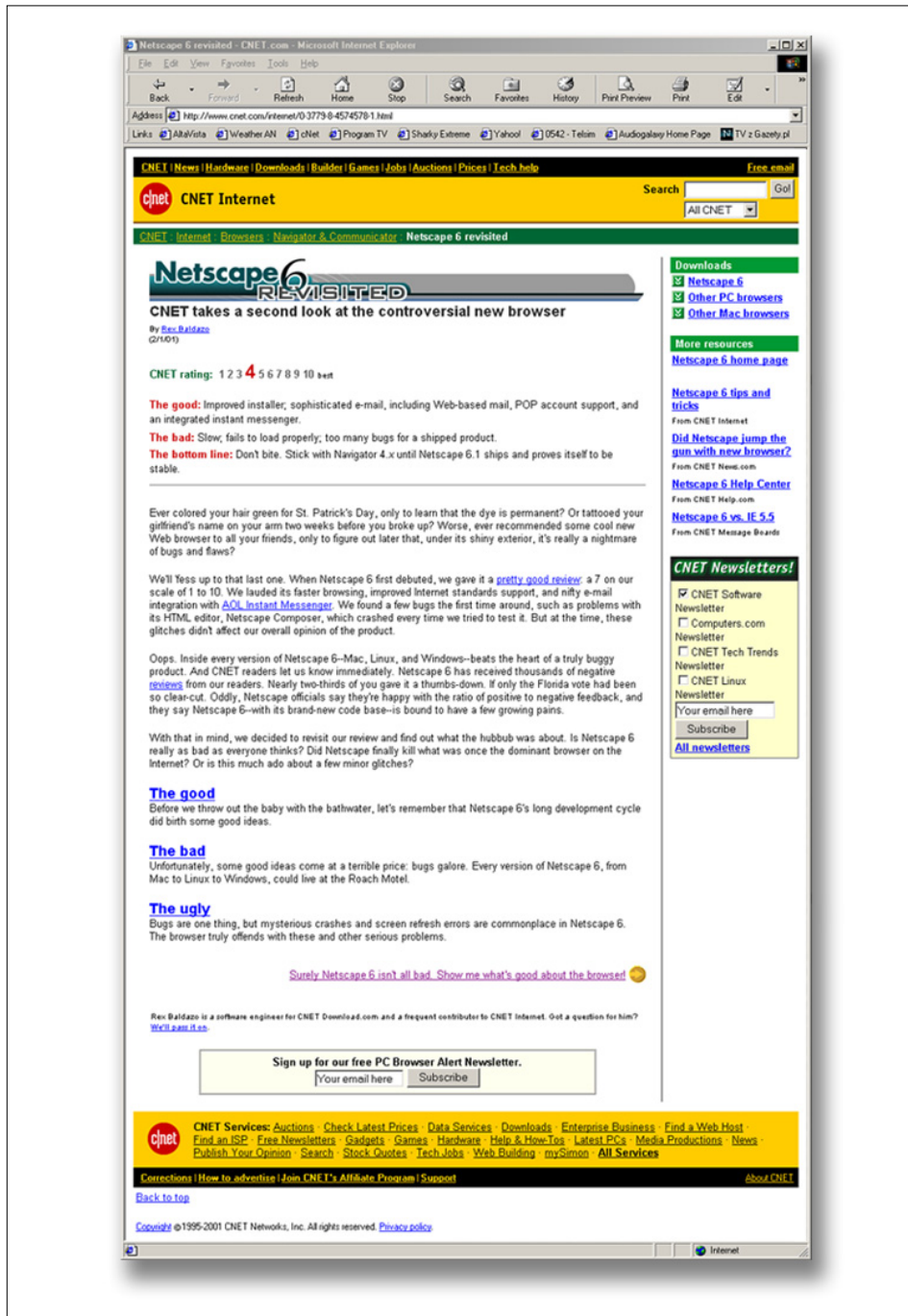
Figure 23: First page of Netscape 6 review by CNET
Source: *Netscape 6 revisited - CNET.com.* 10 February 2001.
<http://www.cnet.com/internet/0-3779-8-4574578-1.html>.
Note: For the clarity of the image, advertisements have been
removed using the Norton Internet Security 2001 program.

One may notice three hyperlinks within the introductory texts. They allow the reader to get more in-depth information on the discussed issues. First link refers to "pretty good review" and allows the user to view previous review of Netscape 6 published on CNET[86]. Another link mentions "AOL Instant Messenger" and Netscape's integration with this program. The link will provide the reader with the review of this piece of software. Finally, underlined "reviews" (as in the sentence "Netscape 6 has received thousands of negative reviews from our readers.") forwards the reader to a page on which CNET readers' opinions are published, so that one could see what do other people, unrelated to CNET thought of the previous review and the Netscape 6 itself.

After the introduction, three links are provided. They respectively forward the user to the second, third or fourth (last) page/section of the review. Each of the pages has their own title and the short paragraph explaining what can the user expect to see on the page.

It is a very practical application of document splitting, since the reader searching, for example, for only negative sides of the program, can immediately proceed to the adequate section without reading the other pages.

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[86] In their first review, CNET editors were very enthusiastic about the Netscape 6 browser. However after more careful examination it appeared that their views were strongly biased by such enthusiasm, and that is why new "revisited" review had to be made.

A link under those will forward the user one page ahead in the review (next page). It is useful for those, who wish to read the review in the whole.

There are two more items below the link to the next page. One of them allows the reader to send the mail to the author of the review (thus enhancing the interactivity of the content presentation). The other, is a sign-up form for the newsletter named "PC Browser Alert Newsletter" which, when signed-up for, would notify the user by e-mail whenever new browser for PC is released or reviewed.

Earlier, in the section named "CNET: Organization of links and common design elements" I have mentioned CNET's practice of dividing the body text into two panels: thicker, containing the main information and thinner, hosting additional links and content. So far we have discussed the contents of the thick panel.

In the thin one, CNET provides the reader with the following items (the list applies to this particular article only, and the contents are different according to the article):

- **Downloads**
  Links to the pages from which one could download Netscape 6, or other PC or Macintosh browsers

- **More resources**

  Links to the homepage of the Netscape 6 browser (its original web site) and to other articles in which Netscape 6 was evaluated (former review, tips, help center and comparison with Microsoft's Internet Explorer 5.5)

- **CNET Newsletters!**

  This section allows the user to instantly subscribe to one of four proposed newsletters that are related with the topic.

When we jump to the next page of the review, we will notice that only the contents of the main (thick) panel have changed. All the other elements are identical with the previous page (and will remain identical throughout the rest of the review) so that now a careful reader, who wishes to read all the contents of the pages will no longer be bothered by additional information, but still have access to it at any time.

Following a good practice of writing for the web, the articles on CNET do not bore the readers with long texts. Instead, they are edited and divided into smaller sections, each with it's own heading and the body text no longer than 2-4 paragraphs.

The second page of the review, named "The good" is divided into four smaller sections: "Improved installer", "Sophisticated e-mail", "Fun new interface" and "Better standards support". It should be noted, that even

without reading the body text, a reader immediately could understand the strengths (and in the following pages – the weaknesses) of the program.

The sub-headings are clearly distinguishable from the rest of text, so that one can easily navigate within the page, or skip certain parts. Following the text, there is a simple link to the CNET newsgroups, where the reader can discuss the opinions about Netscape 6 with other users, or read already expressed concerns and opinions.

The bottom of the page (excluding the footer) consists of the link to the next page of the review, and a shortcut list allowing the user to access any of the pages of the review instantly. The shortcut list is significantly smaller than the one presented on the introduction page, and although all of the pages of the review are listed, the currently viewed page has no link and is dimmed out – a simple technique helping the reader to figure out the current location.

Pages three and four of the review are presented in a very similar way to the page two, with one little exception: On the last page, the link to the next section has been replaced with the link named "Show me more Internet coverage", which leads the reader to the main page of CNET Internet (http://www.cnet.com/internet/), filled with reviews of other Internet-related hardware, software and services.

To summarize, the important key elements leading CNET to successful presentation of articles are:

- **Excellent style of writing for the web:**

  Splitting the articles into smaller sections, proper usage of headings and sub-headings, limiting the size of each section and paragraph to the length easily readable from the computer screen, summarizing the article on the first page.

- **Direct, intuitional navigation:**

  Providing the reader with multiple paths of reading the article, allowing the understanding of article's length and structure right on the first, introductory page, well-positioned links, additionally providing the user with the information on a current location.

- **Additional links:**

  Positioned within text and on the right panel, those links allow the user to access additional resources related to the article.

Overall, it must be said that CNET has mastered the ways of presenting content in the WWW, and in fact became a standard according to which many other designers develop their web sites.

3.7 CNET: Layout, typefaces, images and design

CNET is designed for viewing on the minimum screen resolution of 800x600 pixels. Even though most computers still offer the options for working in lower resolutions (for Microsoft Windows it is 640x480), most web sites assume that there are very less users who would still browse the web in such low settings.

As we can see on Figure 24, when opened in the screen resolution of 640x480, CNET web pages do not fit the screen and both vertical and horizontal scrolling is necessary in order to view the content.

Setting the resolution to 800x600 or higher, however, assures proper placement of the elements on the screen. When viewed with the resolution higher than 1024x768, lines of text in the articles often become too long for smooth reading, but in such case, the page can be viewed in smaller browser window rather than in full-screen mode.

Unlike many other pages (compare Figure 4), CNET web pages stretch to fit the width of the browser window. Using such technique has its pluses and minuses. The biggest plus is that on high-resolution screens there is no waste of space – the content fills the window from left to right. The biggest disadvantage is, mentioned earlier stretching of lines of text.

Figure 24: CNET's pages in various screen resolutions:
a. 640x480, **b**. 800x600, **c**. 1024x768, **d**. 1280x1024
Left column: *Welcome to CNET! – CNET.com*. 10 February 2001. <http://www.cnet.com/>.
Right column: *Macromedia Dreamweaver UltraDev 4.0 – Web Building – CNET.com*. 10 February 2001. <http://www.cnet.com/webbuilding/0-7255-8-4719592-2.html>

When viewed with the minimum required window size (800x600), the page layout manages to fit all the crucial information in the first browser screen[87]. On every page of the CNET website, three bars constituting to the header are displayed on the top of the page. Those include (outlined earlier) crucial information about current location and basic set of links.

Also a part of body of the document fits within first screen. In case of the main page of CNET or of any of the sub-sites, the links to the feature articles are visible (graphics and titles), as well as a small part of the following text, which helps the user to understand that there is more content if one scrolls down.

On the pages with articles, apart from the header (and an advertisement banner included in it), usually the first paragraph of the article is displayed. On all pages, few items from the right panel can be seen on the first screen, as well.

Although in the resolution of 800x600 all the items are properly displayed, there is not enough room for providing a proper spacing between items, and the layout may appear quite busy. In my opinion, the ideal resolution for browsing CNET is approximately 1024x768. Such setting assures a proper positive to negative space balance and even more content fitting in a single browser screen.

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[87] The contents of browser window, when page is loaded, before any scrolling has been done.

Another advantage of using slightly higher resolution is the fact that all additional content (especially the right, thin panel with additional resources) separates better from the main content, thus allowing easier reading of the actual articles.

CNET's interface is in fact an extremely busy one. There are many elements that could easily distract the user. However, through the limited use of graphics and colors, and careful layout planning, the designers of the site managed to achieve a pleasing result and visual balance.

When compared with other sites, CNET uses very limited set of graphic elements, substituting them with text in most of the cases. The only graphics used in the site are the illustrations for the heading of the article, logos, small buttons[88] and illustrations. Almost all of the links are provided by text. This allows faster loading and displaying of the pages, and therefore enhancing the user experience.

While loading any given web page in CNET site, the first item, loading almost instantly is the header. It contains the important information on what is the user viewing at the moment, and by indicating the fact that the page is currently loading, prevents the viewer from "clicking away[89]".

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[88] Such as: "Editors' Choice", "Next page arrow" or "Advertisement indicator".

[89] Going to another site, due to a long wait for the content.

All the typefaces used on CNET belong to the sans-serif family and are by default Arial or Helvetica (depending on the system). The links are underlined, according to the "classic" web look, and no special effects are used such as blinking, sound etc.

Most of the pages can be directly printed and will properly fit into A4/Letter format printer. For the pages that may not print properly, the links to the printable version of the page are provided.

Rarely used graphic elements are commonly shared among all of the sub-sites of CNET, so that the browser only has to load them once[90]. Such use of graphics also allows them to be more easily recognizable. It is a very important factor, since some of them, such as "CNET Editors' Choice" (Fig. 25) are then often used as a quality proof on other web sites.

Figure 25: CNET Editors' Choice image
Source: *CNET Editors' Top 5 Portable MP3 Players – Music - CNET.com*. 10 February 2001.
<http://music.cnet.com/music/0-1566073-7-3420794.html>.

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[90] They are then stored on browser's disk cache.

3.8 CNET: Summary

CNET is one of the best text content-based web sites on the Internet, covering the computer related information and news. Their editorial staff and contributors create some of the best articles in the field.

All those advantages would, however not mean much if not for the years of development of the content presentation techniques, visual language, layout and writing style, that CNET is so famous for.

The site is probably one of the best examples one could give when talking about the correct understanding of the web design. Combining high quality content with clean, simple and fast-loading layout has placed CNET among top 10 web sites, and it would not be easy to remove them from that location.

My analysis only touched the surface of CNET web site in order to present it in the light of the principles explained in my paper. There are, however many more things that could be said about this site, and really very less of them could be the negative opinions.

CONCLUSION

World Wide Web is a very specific medium, where the designers are given almost endless possibilities and at the same time – very strict limitations. It is by all means very different from the graphic design and the printed medium.

The style of design[91] is determined by technical conditions and properties of the medium. Those, both provide access to new techniques and technologies, and at the same time delimit the possibilities of expression.

Successful web design should be based on the same basic graphic principles as a design prepared for any other given medium.
The principles of visual balance, positive and negative space relation, contrast, colors, typography, etc. – all must be taken under a careful consideration when designing a web site layout. In addition to those commonly shared qualities, web design has to utilize new elements – that is, the navigation and interactivity.

While the graphic design principles must be used in the preparation of the visual aspects of both the web pages and printed-medium materials, the web sites additionally require new approach, very different from the one used with print.

The web pages should not only create entities on their own. They must

at the same time work as a part of a dynamic whole – the site.

The style of writing the texts, splitting them into smaller sections,

positioning them properly within bigger structure, counting the value

of each byte of the information – all those aspects call for new

challenges and attitudes to be undertaken by the web content creators.

I have spoken of the similarities and differences between the printed

medium and web design. I have analyzed two sites – one often

considered the best of the Internet, the other – an insignificant

misunderstanding of the basic design principles.

As careful reader could notice, in the further sections of this paper,

I was concentrating more on the web design and leaving the printed

medium design aside. It is not by chance that such decision was made.

In fact, the style in which this paper is written reflects somehow the

attitude a web designer should represent while working with World

Wide Web. The principles of graphic design must be understood first,

then compared and verified through the prism of web design approach.

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[91] Both web design and printed-medium design.

Finally, one should gain a proper understanding of the WWW

and the ways of working with it, never forgetting the graphic design,

but at the same time understanding that the Internet calls for new

school of design, new attitudes and new principles.

GLOSSARY

Additive Color Synthesis. The technique of achieving colors by mixing different colored lights. See: RGB

Aspect ratio. The number defining the geometry of any rectangular space. Calculated with the formula x/y, where x is the length of the longer side of the rectangle, and y – the length of the other side.

Bandwidth. The capability (upper limit) of the speed with which the data can be transferred through a specific connection. Usually measured in Kb/sec (1000 bits per second) or KB/sec (1000 Bytes per second).

Banner. On WWW – the advertisement graphic. Typically in the characteristic shape of a wide rectangle.

Browser. (User Agent) The computer program or a device allowing the user to load, display and navigate through the WWW content. Commonly used browsers include: Microsoft Internet Explorer, Netscape Navigator and Opera.

Client. The computer connected to the network in order to retrieve data from the servers.

CMYK. Color Model based on the light-absorbing quality of ink printed on paper. As white light strikes translucent inks, part of the spectrum is absorbed and part is reflected back to your eyes. In theory, pure cyan (C), magenta (M), and yellow (Y) pigments should combine to absorb all color and produce black. For this reason these colors are called *subtractive* colors. Because all printing inks contain some impurities, these three inks actually produce a muddy brown and must be combined with black (K) ink to produce a true black. *(K is used instead of B to avoid confusion with blue.)* Combining these inks to reproduce color is called *four-color process printin*g.

Complimentary Colors. The colors positioned opposite to each other on the color wheel. They tend to create strongest contrasts. Example: Green and Red.

CSS. (Cascading Style Sheets) The standard markup language allowing the designer to manipulate styles of certain elements on their web pages. Typical CSS properties include color, size or alignment and can be applied to elements within HTML code (both text and images).

DPI. (Dots Per Inch) The measure of the resolution, expressed in the number of ink dots or pixels that can be fit on the line one inch long,

without overlapping and losing their sovereignty from the others. Used generally, often instead of more adequate terms LPI or PPI.

Flash. A popular vector animation format for the WWW, popularized by Macromedia.

Gamut. The range of colors that a color system can display or print. The spectrum of colors seen by the human eye is wider than the gamut available in any color model.

HTML. (Hyper Text Markup Language) The standard web design markup language, managed by W3C. It allows web designers to incorporate text, images, sounds and other multimedia components into their hypertext pages.

Hypertext. Firstly popularized by Macintosh application HyperCard, currently the base of all WWW applications – a text format allowing certain elements to provide links to other locations when activated.

Internet. International network, connecting millions of computers across the world in order to share and distribute data globally.

L*a*b. Color model based on the model proposed by the Commission Internationale d'Eclairage (CIE) in 1931 as an international standard for color measurement. Designed to be device independent, creating

consistent color regardless of the device (such as a monitor, printer, computer, or scanner) used to create or output the image, L*a*b color consists of a *lightness* component (L) and two chromatic components: the *a* component (from green to red) and the *b* component (from blue to yellow).

Landscape. The positioning of the design area, where, relatively to the spectator and/or content position, the longer sides of the page are on the top and bottom, and the shorter ones – on the sides. Name comes from the fact that such positioning is presumed to be the most suitable for the landscape imagery.

Link. (hyperlink) In hypertext, the mechanism allowing the user to access another location by clicking indicated text or graphic (button) within the currently read document.

LPI. (Lines Per Inch) The measure of the resolution, expressed in the number of halftone screen lines that can be fit on the line one inch long, without overlapping and losing their sovereignty from the others. Used in offset printing.

Newsletter. An automated system notifying the subscribers by e-mail about the events concerning the given topic.

PDF. (Portable Document Format) PostScript-based document format developed and popularized by Adobe. Preserves the document formatting, colors and typefaces on any operating system and platform.

Placeholder. (Image placeholder) A border displayed by the browser, indicating where the image should be placed. Appears when the image file could not be found (together with error icon), before the image was loaded (later replaced, once loaded) or if the image display was turned off.

Plug-in. A small piece of software enhancing the capabilities and adding new functions to another, bigger program.

Portrait. The positioning of the design area, where, relatively to the spectator and/or content position, the shorter sides of the page are on the top and bottom, and the longer ones – on the sides. Name comes from the fact that such positioning is most suitable for the portrait pictures (due to the proportions of human head and/or body).

PPI. (Pixels Per Inch) The measure of the resolution, expressed in the number of pixels that can be fit on the line one inch long, without overlapping and losing their sovereignty from the others. Used in monitors.

Resolution. The density of the appearance of the smallest image component (dot, pixel, line) in a given length. The higher the resolution the better the image quality is. Common resolution units are: DPL, PPI and LPI.

RGB. Color Model in which the colors are created by mixing red, green, and blue (RGB) colored light in various proportions and intensities. Where the colors overlap, they create cyan, magenta, yellow, and white. Because the RGB colors combine to create white, they are also called *additive color*s. Adding all colors together creates white - that is, all light is transmitted back to the eye. Additive colors are used for lighting, video, and monitors. Computer monitor, for example, creates color by emitting light through red, green, and blue phosphors.

Screen. **1**. The output device responsible for presenting the data visually to the user (monitor screen, TV screen). **2**. In web design – measurement of the length of the web page (one screen is what fits in the maximized browser window at one time).

Scrolling. An action of moving the content of a document displayed on the screen in order to view the parts that extend the size of the screen at one time.

Server. (Host) The computer on the network, where the data is being stored. Responsible of providing data to the incoming requests.

Sitemap. A page within a web site explaining (often graphically) the structure of the site, and allowing direct links to the shown locations.

Subtractive Color Synthesis. The technique of achieving colors by mixing different light-absorbing substances (pigments). See: CMYK

Table. In HTML – an instruction (tag) allowing the design to be placed in a number of cells organized into columns and rows.

URI. (Universal Resource Identifier). A universal naming scheme for locating resource over the WWW. Often referred to as URL (Universal Resource Locator - a subset of more general term URI) or "web address"

W3C. (World Wide Web Consortium) Organization responsible for establishing and maintaining the standards over the Internet. Authors of current versions of HTML, CSS, XML etc.

WWW. (Web, World Wide Web) The service offered by the Internet allowing the users to view the content prepared in the form of HTML.

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