Designing for the Web

Design Issues
Technical Issues

Some Web Design Issues
• Breadth vs. Depth
• Navigation vs. Content
• Seller vs. Buyer (i.e., Designer vs. User)
• Colors and Images

Several images in this presentation are from “Designing Web Usability” by Jakob Nielsen [New Riders 1999]
Breadth vs. Depth

Numerous studies starting in the 1980s showed that when designing menu structures, you should aim for breadth over depth, but not too broad.

Miller’s famous $7\pm2$ study shows that people’s short term memory consistently was limited to about 7 things. The good news is that he also observed that people could “chunk” things, and thus remember more.


Sure enough, optimal menu design typically has about 7 chunks of related items.

**It is typically different when navigating on the web!**

Breadth vs. Depth on the Web (I)

It is possible to create a page that follows the $7\pm2$ model:

http://www.cs.umd.edu/~egolub/real.index.html

Although this is not commonly done because there is not enough information being presented.

Maryland’s old inforM web site was close in that it had $7\pm2$ chunks of information, each of which being divided into $7\pm2$ chunks of information.
Breadth vs. Depth on the Web (II)

In practice, many designers have gone to far broader designs:

www.yahoo.com
www.nytimes.com
www.cnn.com
www.lycos.com

Some sites (www.washingtonpost.com) seem to change layouts every six months in attempts to make things easier to find. This can lead to user frustration as learned tricks must be unlearned.

Breadth vs. Depth on the Web (III)

So, what is different on the web?

• Data -vs- operation links
• Slow download (exploration) times
• More flexibility in layout
• Sites aren’t typically designed for maximum on-page search efficiency
• Search tools for within a page
• Concept of a “portal”
Breadth vs. Depth on the Web (IV)

The following study examined this question.  

They compared 512 items from Encarta encyclopedia in structures of size:  
8x8x8  16x32  32x16  

Note: They did not have the “slow link” factor so this experiment might not apply to the Web in general right now.  

- Short term memory is only one factor  
- Limiting depth is more important than increasing breadth  
- Chunking is a likely important factor

![Figure 1: Average reaction time for each hierarchy.](image)

Navigation vs. Content

Nobody “wants” to navigate.  
Navigation is a necessary evil.  
Screen space taken up with explicit navigation typically takes away from actual content.
**Seller vs. Buyer (Designer vs. User)**

We’re talking about user’s needs, but designers don’t always have the user’s best interests in mind.

More true for web sites than other software where something is typically being sold (a product, a university, a brand, etc.)

Banner ads are the prototypical example. Users hate them, marketers require them. Designers often are on the user’s side.

The best thing you can do is probably to be aware of these tradeoffs, and be able to make informed decisions.

Evan Golub / Ben Bederson

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**Diamondback Online**

- **Kirwan: Keep tuition hike at 5.8%**
  - Several regents buy proposal to cap tuition hikes for 3 years
  - University System of Maryland Chancellor Dr. Kirwan will recommend an average tuition increase of 5.8 percent for fall 2005.
  - A recent funding boost was enough to keep a recommended increase in the single digits, some officials think it could be lower still.
  - Earlier this month, the General Assembly was unable to override Gov. Bob Ehrlich’s veto of a bill that would have required an increase of 5 percent.

- **Robbers in von ambush university students**
  - University Police: At least one assailant armed with handgun
  - Two students were knocked to the ground Friday night on College Avenue by four masked men who kept them a blue mini van and demanded property just before 10 p.m. according to police reports.
  - The suspects, described as being about 21 years old, wore bandanas covering their faces and at

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**Web Design**
Colors and Images

If you change background colors, make sure you change the link, vlink and alink attributes of your document to avoid “invisible” or annoying color combinations.

If you use a background image, make sure you can still read the text that is going to be on top of it. Test how that image will tile and how the text will move as the browser window is resized. A good way to do this is to use a machine with high resolution and test window sizes such as 640x480, 800x600, 1024x768 and even extremes such as small sizes such as 240x320 and large sizes such as 1152x864, 1400x1050, or even 1600x1200 to see how things appear. Also, consider that a 15” monitor at 1400x1050 is different than a 21” monitor at 1400x1050.

If you have images that look like they can be clicked make sure the user can click on them!

Don’t do this: http://www.cs.umd.edu/~egolub/butterfly.html
**Give the users some hints**

Describe your links well. People will very often just read the link text.

If you want more information, click here.  
Click here for more information.
More information.

Researchers call this “information scent” – users hunt for information based on the tiny fragments that they think will lead them in the right direction. This kind of “greedy” algorithm is known to be unreliable, but it’s how many users work. The third example above shows a good use of information scent.

Scent: “Conveys distal target information via category labeling”

Link coloration is a major tool that users take advantage of to help them understand their own history. Change colors with care. If you do change the colors, do not make them counter-intuitive.

Support search on your page and site. If you do use images that contain words, make sure you have text descriptions (possibly in the alt description).

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**Study Where People Look**
Technical Issues

- Download time
- Browser compatibility
- Screen size and resolution
- Separation of meaning from presentation

Download Time

People have different resources at home versus at work. As many as 20% of users still have modem access (even with a 56K modem, you get 53K max, often less due to line noise) at home. Broadband (such as Cable and DSL) have continued to rise, though as more people in a neighborhood begin to use it, congestion issues and capping issues can arise. Users might have a high bandwidth connection at work, but their individual bandwidth might be throttled/congested. Many questions arise when we consider the wireless world. Keep these in mind as you place images, Java, Flash, etc. on your Web page!
Stats are vastly improved since circa 1995-2001…

Internet Use by Connection Speed (millions of people)

<table>
<thead>
<tr>
<th>Speed</th>
<th>2000</th>
<th>2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>8 (10.9%)</td>
<td>17.7 (17.5%)</td>
</tr>
<tr>
<td>56K</td>
<td>49.7 (56.9%)</td>
<td>64.3 (63.4%)</td>
</tr>
<tr>
<td>28.8/33.6K</td>
<td>24.2 (27.7%)</td>
<td>15.5 (15.3%)</td>
</tr>
<tr>
<td>14.4K</td>
<td>5.3 (6%)</td>
<td>3.9 (3.8%)</td>
</tr>
</tbody>
</table>

87.3 101.4

Stats are vastly improved since circa 1995-2001…

Browser Version

People historically have tended to upgrade browsers slower with each successive version, but operating system upgrade often leads to browser upgrade.

Firefox has seen high initial penetration, though it has leveled off somewhat (estimates average out around 15% in the US, 20% in Europe). Usage appears to be higher in academic settings in the US (30% according to w3schools.com).

Ideally, you should collect browser versions and software platforms to test your site. While some software/platforms do not make this easy, if you design pages as a career, it is worth your time to set up a machine with multiple “virtual” machines, and have a different version of each browser on each “machine”.

Also, we need to also consider Web appliances, cell phones, and PDAs that might have non-standard, possibly custom-written, embedded, browsers.

Finally, different sites draw different browser audiences, so you should learn about your current audience.
Screen Resolution (I)
Some historic distribution of monitor resolutions:

**netmechanic.com:**

<table>
<thead>
<tr>
<th>Screen Resolution</th>
<th>1997</th>
<th>1999</th>
<th>2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 640x480</td>
<td>22%</td>
<td>13%</td>
<td>5%</td>
</tr>
<tr>
<td>800x600</td>
<td>47%</td>
<td>55%</td>
<td>53%</td>
</tr>
<tr>
<td>≥ 1024x768</td>
<td>31%</td>
<td>27%</td>
<td>41%</td>
</tr>
</tbody>
</table>

**statmarket.com:**

<table>
<thead>
<tr>
<th>Screen Resolution</th>
<th>2000</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 800x600</td>
<td>66%</td>
<td>42%</td>
</tr>
<tr>
<td>≥ 1024x768</td>
<td>34%</td>
<td>58%</td>
</tr>
</tbody>
</table>

We need to consider widescreen monitors that do not have 4:3 aspect ratios as well as (again) cell phones and PDAs that have non-standard (typically small) screen sizes. We might also consider who might be the “typical visitor” for a site and attempt to determine their stereotypical screen resolution. We should also consider whether or not users are using their full screen resolution for the browser.

Screen Resolution (II)

<table>
<thead>
<tr>
<th>Year</th>
<th>Higher</th>
<th>1024x768</th>
<th>800x600</th>
<th>640x480</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>January</td>
<td>26%</td>
<td>54%</td>
<td>14%</td>
<td>0%</td>
</tr>
<tr>
<td>2006</td>
<td>July</td>
<td>19%</td>
<td>55%</td>
<td>17%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>January</td>
<td>11%</td>
<td>57%</td>
<td>20%</td>
<td>0%</td>
</tr>
<tr>
<td>2005</td>
<td>July</td>
<td>14%</td>
<td>88%</td>
<td>23%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>January</td>
<td>12%</td>
<td>53%</td>
<td>30%</td>
<td>0%</td>
</tr>
<tr>
<td>2004</td>
<td>July</td>
<td>19%</td>
<td>50%</td>
<td>39%</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td>January</td>
<td>15%</td>
<td>47%</td>
<td>37%</td>
<td>1%</td>
</tr>
<tr>
<td>2003</td>
<td>July</td>
<td>8%</td>
<td>43%</td>
<td>44%</td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td>January</td>
<td>8%</td>
<td>45%</td>
<td>47%</td>
<td>2%</td>
</tr>
<tr>
<td>2002</td>
<td>October</td>
<td>6%</td>
<td>59%</td>
<td>49%</td>
<td>2%</td>
</tr>
</tbody>
</table>

http://www.w3schools.com/browsers/browsers_display.asp
Content Formats (I)

• HTML
  - An ever-growing markup language (currently at HTML 4.01). Go to www.w3c.org for current “official” specifications, but realize that browsers don’t always follow them…
  - As a designer, you can choose between general font specifications (H1) or possibly specific ones (Arial 16 point bold). Use general as much as possible.
    - Fonts might not be available.
    - Text browsers and reader programs and search engines use structural information.
    - Allows for users to be able to control their experience more.

• CSS
  - Offers possibility of centralized design styles and potential savings in bandwidth.
  - Different styles for different readers possible (eg: “Standard” PC versus PDA such as Palm or PocketPC versus cell phone with microbrowser).

Content Formats (II)

• Javascript, ActiveX
  - Widely supported, but some users still turn it off for security
  - Multiple versions (eg: Jscript -vs- Javascript -vs- ECMAscript)

• Java
  - 1.1 generally available for much older browsers.
  - Not available for pre-OS X Macs.
  - Newer versions are large downloads and keep getting larger…
  - Even when installed, there is a startup time for using it.
  - Again, users might turn it off for security or speed issues.

• Flash
  - Has become far more common. Small and easy to install and fast to startup.
    However, Flash applications themselves have gotten quite large. There is a Firefox plug-in (for example) to block Flash apps.

• The other 7,000 plug-ins 😐
  - Specialized users only
Frames

“Just Say No” - If you use them, have a very good reason!
- Navigation gets much harder
- Can’t track URLs as easily
- Gives user less control over resizing and scrolling
- Older browsers / custom browsers don’t support frames well

How to Build Web Prototypes?

Use a drawing program – not the web!

Build “wireframes” – the rest is the same as with other software

Example Layout Model
1. Logo
2. Local or Site Index w/Links
3. Search Dialog
4. Current date
5. Primary Content
6. Secondary links
7. Last update, copyright info, etc.

Each item should have more information for each item with explanations and justifications.
Universal Accessibility

It is very important to consider users with low connection speeds, small screens, different browsers and the like, but it is also important to consider different types of users such as:

- elderly users
- child users
- novice users
- visually impaired users
- hearing impaired users
- users with poor motor control / precision
- users with poor short-term memory