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±2 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±2 model: [http://www.cs.umd.edu/~egolub/real.index.html](http://www.cs.umd.edu/~egolub/real.index.html)

Although this is not commonly done because there is not enough information being presented, you can still see the idea in places.

The CS dept main page and Undergraduate page each still make use of this idea in their navigation design.

Google’s “black bar” sticks close to this as well.

Maryland’s old student information web site was close in that it had 7±2 chunks of information, each of which being divided into 7±2 chunks of information. Google’s [news.google.com](http://news.google.com) and a number of other news sites take this approach.

In practice, many sites and pages have gone to far broader designs to make it easier to be found by searches and also to support on-page search by users.
**Breadth vs. Depth on the Web (II)**

If you look at desktop software, you'll also see the 7±2 model appear in things like menu design.

So, what is different on the web?

- Data -vs- Operation/Navigation Links
- Slow download (ie: exploration) times that installed software doesn’t have
  - this is a minor issue if you have broadband and “lightweight” pages
  - this is a more major issue if you have “heavy” pages
  - this is often a major issue on mobile devices working on EDGE/3G or even on 4G networks depending on a variety of factors
- A sense of more flexibility in layout
- Search tools for information within a page (if people know about them)
- The web has seen the growth of the concept of a “portal” in many ways

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**Breadth vs. Depth on the Web (III)**

The following study attempted to examine this question carefully:

Web Page Design: Implications of Memory, Structure and Scent for Information Retrieval

Web Page Design / Kevin Larson / Mary Czerwinski,

CHI 98, p.25-32.


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 “mobile web” in general right now.

- Short term memory is only one factor.
- Limiting depth is more important than increasing breadth.
- Chunking of information is a likely important factor.
Navigation -vs- Content -vs- Advertising

Nobody “wants” to navigate.

Navigation is a necessary evil.

Screen space taken up with explicit navigation typically takes away from actual content.

This early Mapquest example from the late 1990s shows how extreme the imbalance can be...

Let’s see how the 2005 Diamondback site or modern Facebook look...
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, advertising, 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.

However, consider the following question – how is Instagram with no profits and no profit model worth A BILLION DOLLARS to Facebook? Is the whole value in the users there?
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.

If you have many images, think about load time and whether the image will be understood at the display size.

A good way to do this is to use a machine with high resolution and test window sizes such as 800x600, 1024x768, 1152x864, 1400x1050 and even extremes such as small sizes like 240x320, 640x480 and larger sizes such as 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.

Not good…
Better but could be improved…
Good!

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 from the default 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).
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 versus when mobile.

Access rates are a moving target. As recently as 2007 you still had 20% of users who had Internet in the US still having “narrowband” access at home and around 10% of users had that at work.

Broadband has risen a great deal, but individual bandwidth might be throttled or congested. This is a major issue in the wireless world.

Keep these in mind as you place images, videos, applets, etc. on your Web page since the more you place there the longer it will take to load!

One study from 2011 said that the size of videos on web pages (on average) had tripled since 2003!

Stats are vastly improved since circa 1995-2001…

<table>
<thead>
<tr>
<th>Internet Use by Connection Speed in millions of people</th>
<th>2000</th>
<th>2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed</td>
<td>2000</td>
<td>2001</td>
</tr>
<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>
<tr>
<td>87.3</td>
<td>101.4</td>
<td></td>
</tr>
</tbody>
</table>

Stats are vastly improved since circa 1995-2001…
**Browser Version**

People historically had tended to upgrade browsers slower with each successive version, and it would often take an operating system upgrade to get a browser upgrade.

However, the current trend of supporting automatic upgrades and of sites restricting users of old browsers has changed that trend, but you can see how old versions stick around.

![Browser Version Chart](image)

**Dealing with Browser Versions**

Firefox saw high initial penetration, though it has leveled off somewhat. Usage appears to be higher in academic settings according to some reports.

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, consider that some devices 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**

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>

As of 2012 it’s at a point where 85% of screens of those visiting W3Schools are larger than 1024x768.

Google has an interesting tool [http://browsersize.googlelabs.com/](http://browsersize.googlelabs.com/)

We also need to consider widescreen monitors that do not have 4:3 aspect ratios as well as (again) smartphones and tablets that typically have smaller 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.

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**W3Schools History**

<table>
<thead>
<tr>
<th>Date</th>
<th>Higher</th>
<th>1024x768</th>
<th>800x600</th>
<th>640x480</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 2012</td>
<td>85%</td>
<td>13%</td>
<td>1%</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td>January 2011</td>
<td>85%</td>
<td>14%</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td>January 2010</td>
<td>76%</td>
<td>20%</td>
<td>1%</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td>January 2009</td>
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<td>36%</td>
<td>4%</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td>January 2008</td>
<td>38%</td>
<td>48%</td>
<td>8%</td>
<td>0%</td>
<td>6%</td>
</tr>
<tr>
<td>January 2007</td>
<td>26%</td>
<td>54%</td>
<td>14%</td>
<td>0%</td>
<td>6%</td>
</tr>
<tr>
<td>January 2006</td>
<td>17%</td>
<td>57%</td>
<td>20%</td>
<td>0%</td>
<td>6%</td>
</tr>
<tr>
<td>January 2005</td>
<td>12%</td>
<td>53%</td>
<td>30%</td>
<td>0%</td>
<td>5%</td>
</tr>
<tr>
<td>January 2004</td>
<td>10%</td>
<td>47%</td>
<td>37%</td>
<td>1%</td>
<td>5%</td>
</tr>
<tr>
<td>January 2003</td>
<td>6%</td>
<td>40%</td>
<td>47%</td>
<td>2%</td>
<td>5%</td>
</tr>
<tr>
<td>January 2002</td>
<td>6%</td>
<td>34%</td>
<td>53%</td>
<td>3%</td>
<td>5%</td>
</tr>
<tr>
<td>January 2001</td>
<td>5%</td>
<td>29%</td>
<td>55%</td>
<td>6%</td>
<td>5%</td>
</tr>
<tr>
<td>January 2000</td>
<td>4%</td>
<td>25%</td>
<td>56%</td>
<td>1%</td>
<td>4%</td>
</tr>
</tbody>
</table>
Content Formats (I)

• HTML
  – An ever-growing markup language (currently at HTML 5). 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.
  – Very tied into the HTML5 world.
  – Different styles for different readers possible (eg: “Standard” PC versus smartphone versus tablet, etc.).

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 but the lack of it on the iOS platform has shaken this up quite a bit. 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 due to their size and some of their uses.

• The other THOUSANDS of 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