Senior Surfers 2.0: A Re-examination of the Older Web User and the Dynamic Web

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Abstract. Though the Web and those who use it have changed considerably in the last decade, a digital divide between older and younger users persists. Older users still use the Web less than younger users, and more commonly experience significant usability issues when they do. With the emergence of Web 2.0 technologies, we have the ability to close that divide and ensure the Web is universally usable for people of all ages. It requires taking what we know of "senior surfer" requirements and applying them to Web 2.0 interfaces. This paper examines the changing nature of the Web, the Senior Web user, and assesses how Web 2.0 technologies can – but do not yet - improve universal access for everyone. Pilot studies support these hypotheses; future studies are planned to further examine these issues.

Keywords: Older users, seniors, Web 2.0, Rich Internet Applications, usability, accessibility, AJAX, Flex, Flash, DHTML, Web design.

1   Introduction

The Web is becoming both increasingly ubiquitous and dynamic. Web 2.0 offers more interactivity, faster feedback, pageless designs, in-context controls, personalization, and access to social networks. While these new aspects could help narrow the digital divide between younger and older Web users, they have not yet done so. Younger generations have integrated the Web into the fabric of every day life, but older generations are not leveraging the Web's full potential as often or as easily.

According to a Pew Internet and Family Life project report [5], 28% of Americans age 70 and older go online – essentially unchanged from the previous year. Yet access to the internet is commonplace for most other age groups; 89% of 18-28 year-olds, 86% of 29-40 year-olds, 78% of 41-50 year-olds, and 72% of 51-59 year-olds going online. Even 54% of users 60-69 year olds go online.

Though many companies are considering giving their sites a Web 2.0 makeover, older users are far less likely than their younger counterparts to engage in the types of activities typically associated with Web 2.0 in interfaces, including blogs, videos, and

music downloads [6]. Furthermore, they are much less likely to have high-speed connections [5], which are often required to optimally run rich internet applications. For this reason, companies need to strongly consider how Web 2.0 designs will work for older users. Additionally, as the baby boomers begin joining this "older demographic," companies should begin re-examining their ideas of the older user to better understand the growing diversity within this demographic.

2   The Web - 1.0 to 2.0

The Internet started as four interconnected computers in 1969 as a means to allow researchers to share information [11]. It has transformed into a universal information-sharing medium that allows people to share and access information world wide. As it becomes more pervasive, questions regarding universal access and issues related to digital divides arise.

While some argue the validity of the term "Web 2.0," for purposes of this paper we use it to describe the changes that have occurred in Web design in the last decade, which are manifest in the comparison between Yahoo! in 1997 and 2007.

Table 1. A Comparison of Yahoo! In 1997 and 2007

Web 1.0 – Yahoo! in 1997 [10]

Web 2.0 - Yahoo! in 2007
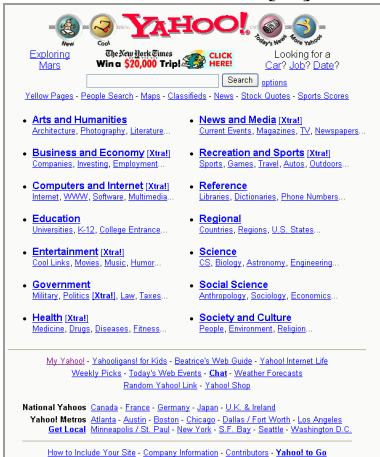
Web 1.0 – Yahoo! in 1997	Web 2.0 - Yahoo! in 2007
• Static links	• Fewer links, more actionable elements (sliders, tabs, menus)
• Paging as a means of navigation (backward and forward)	• Pageless navigation (including tabs, expand/collapse, drop-down, widgets)
• Users passively consuming content	• Users creating, refining, sharing and consuming content
• Users customize interface	• Interface dynamically responds to user actions
• Fixed-width designs	• Fluid designs

Table 1. (*Continued*)

Web 1.0 – Yahoo! in 1997 [10]	Web 2.0 - Yahoo! in 2007
• Multimedia as "add on" versus integrated into interface	• Multimedia is inherent in the interface
• Information is buried deep into Information Architecture (IA) – requires drill down into site for real content.	• More content is on the home page and exposed by a variety of user actions and settings
• Mainly HTML	• Hybridization of technologies (AJAX, Flex, Flash, etc.)
• Is primarily a solitary experience	• Is a community experience

Web 1.0 provides more linear, paging through related content: link to link and page to page. Though several paths to any destination may exist, those paths are hard-coded requiring users to "guess" the paths provided by the information architect. However, as with many innovations, the Web's original purpose evolved into something else entirely. It became a virtual place of communication, business, expression, information sharing, and social networking.

Web 2.0 is a user experience driven mainly by an "anytime, anywhere" user interaction model where the user dictates how and when he or she can perform actions. Most actions can be done from any page on a site. Paths are dynamically defined by users. The concept of paging is minimized. The interface is inherently multimedia, proactively adapts to the user's actions and preferences, and has become a space defined by community.

In 1997 Yahoo's home page consisted most of links to other pages and minimal customization, even though it was an industry leader in supporting user customization. In 2007, much more content can be displayed selectively as users interact with the screen (mouseover, click, expand, etc.). The page opens with animation and multimedia and enables users to build content and choose UI preferences.

Just as the Web has evolved in the last 10 years, so should the persona/s designed to capture the requirements of the senior surfer.

3   Senior Surfers

The term "senior surfer" has been associated with various age groups including 60+, 65+, and 70+. Ultimately, the term is meant to define how those with physical and cognitive limitations associated with aging fare on the Web. But it's not just age that shapes their requirements and expectations; it's their experiences with technology and the world in general that factor into the design considerations for this demographic.

The first version of the senior surfer concept revolved around older adults with very little exposure to the Web in the workplace. Most had retired before the Web became commonplace, and though often well-educated, lacked computer literacy (e.g. metaphor of desktop, window, file attachment, recognizing and clicking on links, mouse cursor/pointer movement, etc). In focus groups conducted with senior

customers, they reported being motivated to use the Web by a need to keep up (with family, hobbies, finances, adult education courses) and/or that their children encouraged them. However, our studies also show that what this group lacked in technical expertise, they often made up for in terms of financial expertise.

We can characterize the Web navigation style of this group as "Deferential." They dutifully read content provided on pages, exhibited cautiousness when clicking buttons or links, and lacked confidence in their ability to recover from navigating down the wrong path. Overall, they lacked a basic framework in which to fit new lessons about the Web and how best to navigate it, and tended to blame themselves for any issues they experienced online. This made achieving Web literacy difficult.

The baby boomers, however, pride themselves on rejecting these (and other) trends [8]. As they begin to join the retired "senior surfers," they are redefining this term. At minimum, their sheer numbers will make this group more diverse. They also have different outlooks on aging, technology, and life in general. They do not see themselves as "old", they love technology, and are happy to try (and demand) new things [9]. The Pew Internet and Family Life group first termed this group as the "silver tsunami" who are more wired and technologically savvy than their older predecessors [7]. This group could be broadly categorized as "Adventurous". They are more willing to experiment, have a high threshold for frustration, tend to not blame themselves for any gaps in their knowledge, and are motivated by the potential the Web represents and see its exploration as an opportunity to try something new.

With age-related visual, auditory, motor, and cognitive decline remaining constant but the Web and the experience of the older user changing over time, can we apply the heuristics we developed for the first wave of senior surfers on Web 1.0 to improve the experience of the second wave of senior surfers in Web 2.0 designs?

4   Web 1.0 for Senior Surfers

In the last 5 years, we have had over 200 older (65+) adults visit our User Experience labs to participate in a variety of research studies related to web design, usability, and accessibility. Based on these research studies [1] [2] [3], we have defined a set of empirically-based Web design guidelines for older users that we use internally to help shape designs targeted for the older demographic.

1. **Make Text Scalable** –
   - Let users increase text size using the browser's "text size" controls for a page and/or on-screen controls.
   - If the site is targeted *primarily* for seniors, use a larger default font size (e.g., 14 pt).
   - Minimize the use of graphics for text since they will not scale
2. **Use High Contrast Text** –
   - Contrast between text and background color is a key determinant in legibility.
   - Strive to keep the difference in "gray values" between the text and background greater than 66%; do not allow the difference below 33%.
   - Consider providing a high-contrast option for page designs.

3. **Make Links Visually Obvious** –
   - Older adults have a hard time determining what is a link and what isn't.
   - Be consistent in visual treatment of text links throughout the site.
   - Text links should dynamically change in appearance on mouseover (e.g., turn red).
4. **Make It Clear What Links Do** –
   - Older adults are reluctant to click unless they are very confident about what will happen.
   - Use clear descriptors for links. Include action words (e.g., "View Accounts" instead of "Accounts").
   - Consider including a tool-tip-style pop-up (title attribute on a text link) with a longer description of what the link does if the user pauses over the link.
5. **Simplify Terminology** –
   - Many older adults do not understand web "jargon".
   - Avoid the use of technical terms or other jargon (e.g., Login, Home, URL, etc).
   - When such terms are necessary, define them with an easily accessible glossary
6. **Streamline Pages** –
   - Older adults are more easily overwhelmed by large amounts of content on a page; they read more.
   - Streamline pages, being clear and concise in all writing. Limit the number of points or topics/page.
7. **Make Click Targets Larger** –
   - Arthritis and other conditions can make clicking on small links, buttons, or graphics difficult.
   - Make all "click targets" relatively large and separate from each other. Remember that text links will scale with the text size, but graphical links and buttons will not.
   - When using a graphic as a link, provide a nearby text link to the same place when possible.
8. **Consider Providing Audio** –
   - Many older adults, particularly those with significant vision problems, find it easier to listen to audio versions of pages.
   - Consider providing an option for listening to a spoken version of a page or key page components. This might be done via pre-recorded speech or high-quality text-to-speech.
9. **Provide Memory Aids** –
   - Short-term memory capabilities tend to decline with age.
   - Consider providing "memory aids" in the site that help the user get to the pages they need.
   - Amazon's list of products a user has recently viewed is a good example.
   - Make sure a site map and a good site search is provided (with good recognition of synonyms and common misspellings).

10. **Provide Clear Instructions** –
- Older users read and benefit from clear instructions, unlike many younger users who tend to skip right over instructional text.
- Provide clear, step-by-step instructions, especially for complex or multi-step processes.
- Break multi-step processes into smaller logical chunks.

We are now trying to determine how applicable these heuristics are to the Web as it evolves.

5   Web 2.0 Design for Senior Surfers

The baby boom represents over $8.5 trillion in investable assets [4]. Unsurprisingly, in the last 5 years, many companies have spent considerable time and money attempting to understand their requirements. Accordingly, we have gained good understanding of their requirements of traditional Web 1.0 interfaces. But how adequate are these heuristics when applied to Web 2.0 designs?

Table 2. Our Web 1.0 Design Requirements for Seniors and Web 2.0 Feasibility and Challenges

Web 1.0 Guideline	Web 2.0 Feasibility	Web 2.0 Challenges/Issues
1. Make Text Scalable	• Is richly supported in vector-based development platforms, like Flash/Flex. It can also be supported through CSS and user customization.	• While easy to support, this is seldom done. How such features can be used and supporting large font sizes while keeping the UI intact remains a challenge.
2. Use High Contrast Text	• Color/Style manipulation is easy to support using either via CSS (AJAX) or Flash/Flex.	• While easy to support – at least for some aspects of the UI - communicating how such features can be used can be challenging. Also, it is labor-intensive to "reverse contrast" image-based components.
3. Make Links Visually Obvious	• Easy to ensure that links and other actionable elements have consistent UI.	• While links exist, they are not standardized in their appearance or behaviors. Additional challenges include the variety of user interaction options (onmouseover, onclick, dragging) and widgets (tabs, menus, expand/collapse) that are non-standard across sites (and sometimes within sites).

Table 2. (*Continued*)

Web 1.0 Guideline	Web 2.0 Feasibility	Web 2.0 Challenges/Issues
4. Make It Clear What Links Do	• Easy to accomplish but seldom done.	• There is much inconsistency in how links and other elements look and act. Older users often have no idea what is actionable on a page.
5. Simplify Terminology	• Easy to support but often overlooked.	• New functionality (tagging, dragging, zooming, etc.) introduces more technical terminology that is often not understood (or explained).
6. Streamline Pages	• Pageless design is a primary feature of rich internet applications.	• Offers real advantage potentially but non-standard widgets and interaction still present challenges.
7. Make Click Targets Larger	• Easy to support, particularly when targets are image-based rather than text-based.	• Many widgets have small controls (arrows, +/-, etc.) that are often very difficult to see and with which to interact.
8. Consider Providing Audio	• Flash and Flex offer easy integration of audio components.	• Alerting users that audio is available and how to use it can be challenging. Supporting those who cannot hear either through disability or technology limitations (no speakers) is an issue.
9. Provide Memory Aids	• The dynamic nature of the page supports inherent history tracking (i.e. recently viewed items) and memory aids.	• Providing aids that do not add to the cognitive overload issues on the page.
10. Provide Clear Instructions	• Could easily support layering of interfaces and various complexity levels (i.e. help mode).	• Supporting both the novice and expert user without overloading content on the page.

While Web 2.0 technologies have potential advantages built-in to support flexible, adaptable interfaces, few Web designers and developers create designs that incorporate these features while supporting the requirements of older users. More consideration must be given to design for users of all abilities, embracing the concept of universal usability.

6   Pilot Study and Future Work

To understand more about how senior surfers interact with Web 2.0 designs, we have conducted pilot sessions with 5 older users (age 65+). Participants were asked to perform tasks on interfaces built with Flash, Flex, and AJAX and provide feedback.

Preliminary results indicate that while Web 2.0 designs *could* easily offer usable, interactive experiences for senior surfers, they seldom do. Today's senior surfers often are unaware of which elements on a screen are interactive and miss dynamic changes to the screen. When prompted on how to use various elements, users often do see their value. In general, most report that they would not easily recognize or explore such features on their own. Other issues include:

- Web 2.0 applications are not so dynamic over dial-up. One maps site took 3 minutes to load, and each time users tried to map a new area, the screen lagged significantly before repainting causing users frustration.
- The indicators shadowing the mouse cursor indicating that data was loading signaling were overlooked or misunderstood by users.
- Some users were concerned upon seeing the initial "Loading indicator" that visiting the 2.0 application was downloading software to their hard drive.
- Users often overlooked areas of the page that were interactive. They had trouble grasping what and how to interact with UI elements (determining what was clickable, draggable, or what got revealed onmouseover).
- Terminology specific to the type of data 2.0 applications provide was often unfamiliar. Examples included "zoom bar", "live traffic", "tagging" or rating something.
- Users wanted Help and tutorial content but had difficulty finding them. Once they did find this content, it was helpful and engaging. Demos were sometimes too fast-paced and difficult to follow. One user said he wanted to be able to control the pace.

We are planning a study to learn how Web 2.0 interfaces impact the experience of older users. We will collect both subjective and performance data. The goal will be to understand how effective our Web 1.0 guidelines are in accommodating the needs of older users in Web 2.0 interfaces, and the extent to which additional guidelines are required to address specific nature of user interface issues in 2.0. This new group of guidelines we hope will better enable us to leverage the potential of Web 2.0 and begin closing the digital divide between younger and older Web users.

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