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Loos, E.; Mante-Meijer, E.

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USER-FRIENDLY WEBSITES IN THE EYES OF YOUNG AND OLD PEOPLE*

Eugène Loos and Enid Mante-Meijer
Utrecht School of Governance, Utrecht University, the Netherlands
Bijlhouwerstraat 6, 3511 ZC Utrecht, The Netherlands
e.f.loos@uu.nl and enidmante@hotmail.com

Abstract

Do elderly people really navigate websites in a different way than younger people do? Or are the differences within this group (such as those due to gender, education, computer experience and cultural background) bigger than differences between younger and older people? This paper first discusses usability studies (mainly, in this case, eye-tracking studies) on the user-friendliness of websites, focusing on older people. A social semiotic framework is then presented for future empirical research into specific enablers and constraints related to the user-friendliness of websites as an information source for the very diverse group that constitutes the elderly population.

Keywords

Inclusive design, broadband society, user-centred websites, age, older users, usability studies, eye-tracking, social semiotics

1 INTRODUCTION

The number of older people is increasing quickly. The use of new media is also on the rise in our broadband society. In the year 2000, the Council and the Commission [5] presented the eEurope Action Plan, entitled ‘An Information Society For All’, which set out three main objectives: 1. A cheaper, faster, secure Internet, 2. Investing in people and skills and 3. Stimulating the use of the Internet. Objective 2 specifically stated that ‘the Lisbon European Council recognised that special attention should be given to disabled people and fight against “info-exclusion”. (...) As government services and important public information become increasingly available on-line, ensuring access to government websites for all citizens becomes as important as ensuring access to public buildings.’

It is interesting that the Action Plan mentioned disabled people, but wholly failed to address the elderly age group. In the light of the growing number of older citizens in our broadband society, this group is one whose concerns also demand attention. The availability of a digital information supply like a website has to remain accessible to older citizens, so they will be able to gain access to digital information sources, allowing them to get the products and services they need.

Though user-centred websites are certainly useful for this group, and inclusive design should certainly be taken into account when developing such websites, the question is whether older people do indeed navigate websites differently from younger people. Or are the differences within this group (due to factors such as gender, education, computer experience and cultural background) bigger than differences between younger and older people?

This paper, therefore, first discusses studies examining the user-friendliness of websites (specifically, eye-tracking studies), with a focus on the elderly. Then, a framework is presented for future empirical research into specific enablers and constraints related to the user-friendliness of websites as an information source for the very diverse group that constitutes the elderly population.

* Eugène Loos presented this paper also at the Include 2009 *International conference on Inclusive Design*. It will be published as a research paper, entitled ‘User-centred websites: The (ir)relevance of age’, in the proceedings of that conference (Royal College of Art, London, 5-8 april 2009).

2 USER-FRIENDLY WEBSITES FOR SENIORS: A QUICK SCAN

Are there studies which give us insight into the way older people navigate websites and the factors which help or hinder their ability to gain access to such digital information?

Let us first have a look at the field of aging research. The Handbook of Communication and Aging Research, edited by Nussbaum & Coupland [11] in 2004, offers a compilation of the research carried out over the past three decades in this field. The Handbook is divided into sections, each dealing with a particular aspect of study: 1. the experience of aging, 2. language, culture and social aging, 3. the communicative construction of relationships in later life, 4. organisational communication, 5. political and mass communication, 6. health communication and 7. senior adult communication. In almost none of these sections is attention paid to the use of digital information sources by older people. The only exception is section 4, where, in chapter 13 under the title 'Marketing to Older Adults', Ann All Balazs [2] discusses communication with older people. She, however, directs her focus on selling products and services, not on empowering older people by making information accessible for them by user-friendly websites.

The proceedings of the 4th International Conference on Universal access in human computer interaction at Beijing in July 2007, edited by Constantine Stephanidis [13], perhaps offer more insight into the way older people looking for information use websites. Part IV of 'Understanding Diversity: Age' indeed presents several studies focusing on older people using new media and how this can make their lives more comfortable. One of the contributions entitled 'Older adults and the Web: Lessons learned from Eye-Tracking', by Thomas Tullis [14] put forward empirical research results about differences between younger and older U.S. users in the way they scan web pages:

'An eye-tracking study of a prototype website was conducted with 10 younger adults (ages 20-39) and 10 older adults (ages 50-69) to determine if there are differences in how they scan webpages. They performed the same task on the website. On the average, the older adults spent 42% more time looking at the content of the pages than did the younger adults. They also spent 51% more time looking at the navigation areas. The pattern of fixations on the youngest pages showed that the older adults looked at more parts of the page than did the younger adults. (...) One thing we did not see was any difference in the likelihood of older and younger users to view page content "below the fold" (i.e., that they had to scroll the view).'

 (Tullis 2007: 1030, 1038)

This study shows interesting patterns which may be validated by future comparable research. An example of such empirical research is that of Luuk Houtepen [7] who conducted in 2007 an explorative eye-tracking study in the Netherlands with 13 younger users (18-25 years) and 7 older users (older than 50). Like in Tullis' study, they were requested to perform a task (in this case, finding health care information). The results showed that:

- the older users needed more time to fulfil the task (almost 6 minutes compared to the 2.5 minutes the younger users spent to fulfil their task);
- older people read more and make less use of the website's search box facility.

The following eye-track gaze plots from Houtepen's study are illustrative for the differences in reading patterns between younger and older users.

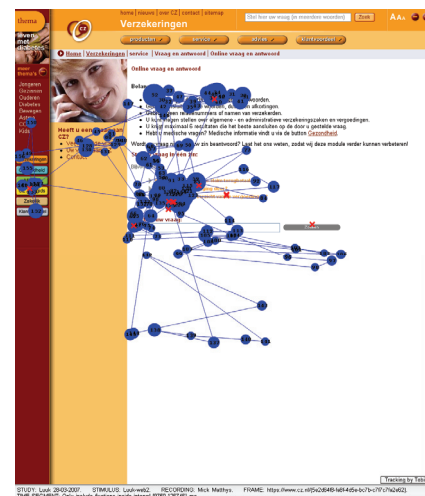
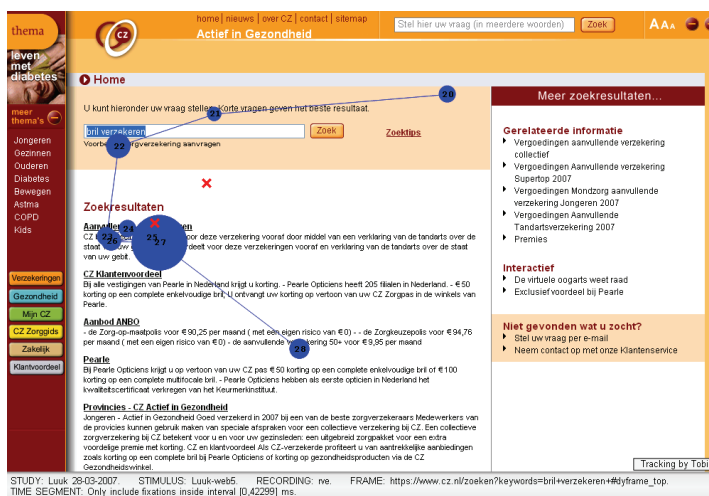


Figure 1: Gaze plot of a younger user

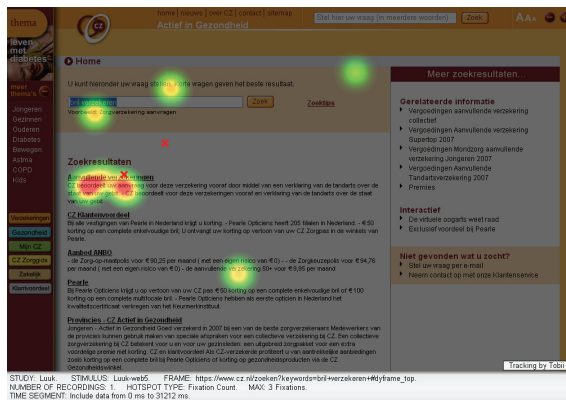


Figure 2: Gaze plot of an older user

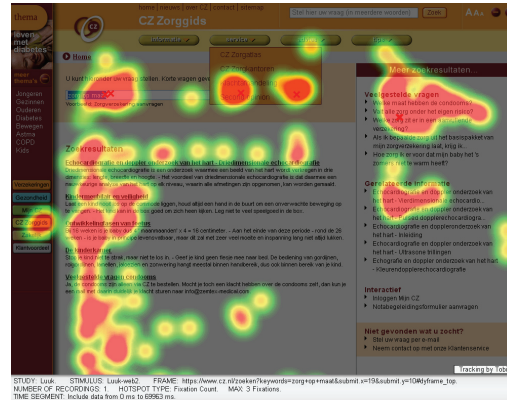


Figure 3: Heatmap of a younger user

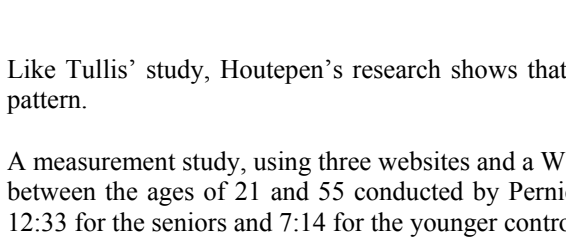
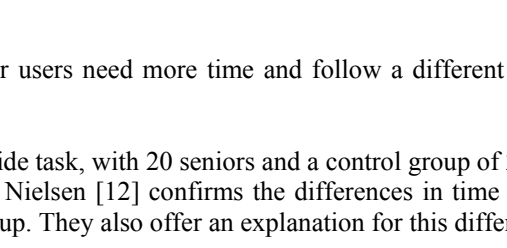


Figure 4: Heatmap of an older user



Like Tullis' study, Houtepen's research shows that older users need more time and follow a different reading pattern.

A measurement study, using three websites and a Web-wide task, with 20 seniors and a control group of 20 users between the ages of 21 and 55 conducted by Pernice & Nielsen [12] confirms the differences in time on task: 12:33 for the seniors and 7:14 for the younger control group. They also offer an explanation for this difference:

'Websites tend to be produced by young designers, who often assume that all users have perfect vision and motor control, and know everything about the Web. These assumptions are rarely upheld, even when the users are not seniors. However, as indicated by our usability metrics, seniors are hurt more by usability problems than younger users. Among the obvious physical attributes often affected by human aging process are eyesight, precision of movement, and memory.' Pernice & Nielsen (2002: 4)

Finally, we present the results of a recent study by Van Deursen & Van Dijk [6] testing 109 Dutch persons (between 18 - 64 years old), which focuses on differences in operational, formal, information and strategic Internet skills during the navigation of websites. All persons had to perform a number of tasks while making use of public websites. They conclude that:

'(...) on average 80.1% of the operational skill Internet tasks, 71.5% of formal Internet skills tasks, 62% of the information Internet skills tasks and 22% of strategic Internet skills tasks assigned have been successfully completed. Performances are significantly different for people with high, medium and low level of education attained and for people with different age, but not for people with different sex, not for weekly time spent on the Internet, and on most occasions not even for years of Internet experience. Seniors above 55 perform worst in all skills. Young people between 18 and 30 are superior in operational and formal skills but not in information and strategic skills.' Van Deursen & Van Dijk (2008: 1)

3 FUTURE RESEARCH

3.1 The usability of usability studies

The studies conducted by Tullis [14], Houtepen [7] and Pernice & Nielsen [12], see also the reviews offered by Loos [10], Andrew [1] and Chisnell & Redish [3] [4] offer insight into differences related to time on task and reading patterns between younger and older users. However, a few critical comments would seem in order:

- The number of participants in the studies was low, making quantitative research with more users necessary.
- It is a pity that these studies focused only on age, omitting to take into account the role of factors such as gender, education, computer experience and cultural background. It is therefore unclear whether differences within an age group are bigger than the differences between younger and older people.
- These studies offer no insight into the specific enablers and constraints which influence the user-friendliness of websites for the diverse group of older people.

In the future, what is needed is research based on empirical studies with larger groups of older and younger users, which take into account the role of gender, education, computer experience and cultural background and offer insight into the specific enablers and constraints which influence the user-friendliness of websites. Now the question is, of course, how to set up and conduct such research. If we conduct eye-tracking studies with larger groups and pay attention not only to age, but also to gender, education, computer experience and cultural background, we will gain insight into reading patterns and time on task. This will allow us to determine whether homogeneous age groups of people can be distinguished or not.

3.2 Using a social semiotic framework

In order to know which specific enablers and constraints influence the user-friendliness of websites, however, it is not enough to conduct traditional eye-tracking studies. We not only need to focus on the way users read text on a website, but also on the role visual aspects like images play while users are visiting a web page.

In my opinion, adopting a social semiotic perspective offers a promising approach. Social semiotics analyse how people make sense of signs, such as words, colour, lay-out and images. The way information is presented on websites can be analysed from a social semiotic perspective. Which signs enable or constrain younger and older people to find the information they are looking for at a website? The way they perceive such signs may help or hinder them in navigating a website. Using insights from social semiotics gives us insight into the signifying practices of people trying to make sense of information on websites.

Kress & Van Leeuwen [9] offer an analytical tool to make such an analysis. In chapter 6, 'The meaning of composition', of their book *Reading Images: The Grammar of Visual Design*, they explain how to use this tool to analyse images:

'Composition (...) relates the representational and interactive (...) meanings of the image to each other through three interrelated systems:

(1) **Information value.** The placement of elements (participants or syntagms that relate them to each other and to the viewer) endows them with the specific informational values attached to the various 'zones' of the image: left and right, top and bottom, centre and margin.

(2) **Saliency.** The elements (participants as well as representational and interactive syntagms) are made to attract the viewer's attention to different degrees, as realised by such factors as placement in the foreground or background, relative size, contrasts in tonal value (or colour), difference in sharpness, etc.

(3) **Framing.** The presence or absence of framing devices (realised by elements which create dividing lines, or by actual frame lines) disconnects or connects elements of the image, signifying that they belong or do not belong together in the same sense.' Kress & Van Leeuwen (2006: 177)

In the rest of the chapter, they illustrate the analytical use of information value, saliency and framing by analysing images of text books and websites (see also Harrison [8] who uses this analytical tool to understand how still images make meaning).

The data from eye-tracking studies (or studies using observations of navigational behaviour if an eye-tracking instrument is too expensive) can not only be used to obtain insight into reading patterns and time on task, but also to understand which signs on a web page enable or constrain its users to get access to the information they are looking for.

During Spring 2009, the Utrecht School of Governance at Utrecht University in the Netherlands will start a research project making use of the social semiotic concepts mentioned above in order to develop a new website for a seniors' association. Future users will be involved in its development and the role of factors, such as gender, education, computer experience and cultural background will be taken into account. In their view, which signs contribute to a user-centred website? This question will be addressed at the oral presentation of this paper by the authors.

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