# On the usefulness of Aaa-links for controlling text size on web pages: preliminary results

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*Abstract: Aaa-links, also known as triple-a links, have over the last few years become commonplace on the web. In a move to become more universally accessible organizations have introduced Aaa-links to help users with reduced vision. This study questions this practice. Three related research questions are posed. First, how is text enlargement functionality best represented visually? Second, are these Aaa-inks really making the web-browsing experience more comfortable for users? Third, is it better to use built-in browser text-enlargement functionality? A small user test involving 30 individuals was conducted. The preliminary results suggest that the effectiveness of Aaa-links is overrated.*

# 1. Introduction

Web-browsing has become one of the most important applications of computer use for the society at large. We depend on the web for everything from reading news to Internet banking and online shopping. For most users this is a predominantly a visual experience – even for users with reduced vision (Harper, 2001). Official statistics confirm that the proportion of users with visual correction is large, and the largest group is probably senior users as vision deteriorates with age. There is a significant body of documented studies into the readability of text (Granaas, 1984; Greco, 2008; Hall, 2004; Huang, 2008; Knoblauch, 1991; Lee, 2008). However, little is written about the control of text size.

## 1.1 Physical adaptations

Users employ several physical strategies to counterbalance reduced vision. In most cases it means increasing the observable text size. Physical strategies includes visual correction such as wearing eye-glasses or contact lenses suitable for screen reading, using a large display, reducing the distance between the reader

and the display. Although not always controllable by the user, the textual content also affects readability (Evett, 2005), as well as line spacing (Ling, 2007), polarity and colour (Buchner, 2007).

## 1.2 Operating system adaptations

The operating system settings can be altered to help counterbalance reduced vision. One common strategy is to reduce the resolution of the screen, thereby increasing the relative size of all displayed elements including text, images and icons. With modern operating systems such as Microsoft Windows 7 this is no longer necessary as the relative size of displayed components can be adjusted independently of the display resolution. These strategies have the advantage that they work with all applications – not only web browsers. However, they depend on the user's knowhow or ability to acquire sufficient help to alter the system settings.

## 1.3 Software adaptations

Another universal strategy is to use software screen magnifiers (Blenkhorn, 2003) where one part of the display is dedicated to showing an enlarged version of other parts of the display. Most operating systems come bundled with some elementary screen magnifiers and more complete third party products can be purchased commercially. However, screen magnifiers require some insight and motivation to be used and depend on the users being aware of their own needs.

## 1.4 Brower adaptations

There are also several web-specific strategies for adjusting the text size. First, the text size can be set in the browser. Either the text is controlled explicitly or the entire screen is magnified. There are several problems with browser controlled text size. First, different browser behaves differently and there is a definite need for standardized browser behaviour in this regard. Second, this functionality is usually hidden and only available through various menus that require the users to actively discover this functionality through exploration. Third, browser based text-size alterations may not work for web-sites that are hardcoded with a given text size. Fourth, browser based text-size alteration may break the design of a web-site not intended for different text sizes. Fifth, text enlargement based on simple page-zoom means that the page width will extend outside the borders, horizontally. Users therefore have to scroll horizontally in order to read. The user may have to simultaneously control both horizontal and vertical scrolling. Scrolling is a papyrus metaphor and was never intended to be horizontal and does not work well in practice. Horizontal scrolling should be avoided at all cost.

Browser support has proven valuable in many other contexts. For instance, most users would rather use the back button in the browser than follow a

back-link on a web page. This is because users very well know how to go back using the browser (learn once) while on the web-site they will have to search for the back link (learn every time).

## 1.5 Content-integrated adaptations

In an attempt to make text size alterations more easily accessible to ordinary computer users content –based controls can be used where the text size is controlled by the means of a text-size control built into the web-page design. These are often realized as Aaa-links where the As represent letters in different sizes to symbolize different text sizes. Occasionally additional symbols are used such as +/- to more strongly communicate the idea of larger or smaller text size.

There are several problems with this strategy. First, there is no standard visual appearance and there is no standard behavior. The most common behavior is to have three static text sizes that are selected by the three buttons (absolute text size). However, other alternatives include relative incremental text increases and text decreases (relative text size).

Next, the visual appearance of text-size controls varies. Some implement Aaa-links using the letter a, other use the letter u, underlined u, the letter a with plus or minus symbol and also full text alternatives such as “larger text” or “smaller text”.

Often, the text alterations are very small. The largest text size may be too small compared to the needs of the user. Someone typically reliant of a screen reader uses a magnification rate of eight or more, while Aaa-links often only allows a doubling in text size.

Finally, there are no standards regarding where such controls should be located on a web page. Many, web sites place this at the top of the page so that it is easy to notice. However, often it is located on the right hand side and the left hand side is usually reserved for strategically more important content such as logos. There are also tragic examples, such as regjeringen.no (the official government web-site in Norway), where these controls are so tiny that they are nearly impossible to spot for someone with reduced vision.

# 2. Visual text size representation preferences

## 2.1 Research question

In the first part of this study we wished to determine what visual representation of text size modification users prefer. The following categories where identified.

- Aaa links using the uppercase letter A.
- Uuu links using the lowercase letter u.
- Magnifying glasses with plus or minus

- A+/A- uppercase letters with plus and minus
- Textual explanation “click her for larger text”
- Textual explanation combined with AAA-links
- Textual explanation combined with magnifying glass with plus minus signs

## 2.2. Participants

The test included 30 participants of which 50% were male and 50% female. Two of the participants were in their 80s, eight participants were in their 70s, three were in their 60s, two were in their 50s and the remaining participants were in their 40s, or younger. Approximately half of the participants were retired. Older participants were chosen as the occurrence of reduced vision should be higher in this group than for a panel comprising younger users (Gregor, 2003). Two participants reported being color blind. Only three participants reported having uncorrected vision, nine subjects reported being slightly longsighted, 12 participants reported being slightly shortsighted, three participants reported being strongly longsighted and two participants reported being strongly shortsighted. All participants apart from four reported using eye-glasses or lenses while using a computer.

## 2.3 Apparatus

A questionnaire was devised to identify a ranking list of these categories. This questionnaire employed a pair-wise assessment strategy usually used for textual questionnaires. In this strategy all possible combination pairs of the above seven categories were presented giving a total of 21 pairs. Each pair is presented on a separate line. For each pair the participant had to indicate by ticking their preferred symbol. Say, if presented with “Do you prefer Aaa or “larger text”” the user selects the first or the second alternative.

One advantage of this strategy is that the respondents only had to compare two items at a time. Other strategies such as Likert-based questionnaires can be more demanding to use and may introduce more noise.

## 2.4 Procedure

The participants responded to the paper-based questionnaire individually and in presence of the investigators.

The results were manually entered into a computer and analyzed using a custom designed Excel spreadsheet. A detailed description of the analysis technique can be found in (Jian, 2008).

## 2.5 Results

The obtained results are presented in Table 1. The results reveal that the most preferred alternative is the magnifying glass symbol combined with a textual explanation, followed by the aaa-links with the textual explanation. The widely used Aaa-link comes in third place only, and the textual version comes in fourth place. Surprisingly, the relative version A+/- comes in second last place, and the magnifying glass symbol only in third last place. The results have a strong agreement of 0.75.

**Table 1. Results of the larger text representation preference study**

| Rank | Normalised score | Strategy |
|---|---|---|
| 3 | 0,15 | Aaa |
| 7 | 0,04 | Uuu |
| 5 | 0,13 | Magnifying glass |
| 6 | 0,09 | A+/A- |
| 4 | 0,14 | ”larger text” |
| 2 | 0,20 | Aaa ”larger text” |
| 1 | 0,25 | Magnifying glass ”larger text” |

## 2.6 Discussion

The results suggest that the best practice of using Aaa-links is not consistent with user preferences which tend towards a combined textual explanation and symbolic representation. This result is also supported by the HCI literature which recommends that information is communicated on multiple channels – not only one channel alone. In fact this is also a universal design principle, that is, to communicate on multiple channels, or modalities.

It is, however, surprising to observe that when combined with text the magnifying glass I preferred over the Aaa-link while when presented in isolation the Aaa-link is preferred over the magnifying glass. One reason may be that the magnifying glass is modally different to the text as it is purely symbolic, while the Aaa-link also is textual.

In conclusion, when providing a content based text-size selection mechanism the results support a combined textual and symbolic text size representation. The second part of this study addresses to the degree in which content based text-controls are utilized by users.

# 3. Text size alteration usage

## 3.1 Research question

The purpose of this experiment was to shed light on which strategies users adopt when facing text that is too small and to what degree Aaa-links are part of this strategy.

## 3.2 Participants

The same participants as described in section 2.2 were used in the user study, namely a panel of 30, mostly, senior users.

## 3.3 Apparatus

A set of web-pages was designed to support the experiment. These web-pages were designed as a series of sequential tests. Each test comprised instructions, a text to be read, a question from the text to be read and three answer alternatives implemented as hyperlinks. The user then had to select the right alternative beneath the question. Two parameters were altered for each test, namely the text size for the text to be read and the text-size alteration controls. The test parameters are outlined in Table 2. The instructions, questions and answer alternatives had a constant and relatively large text size. Screenshots from the tests are shown in Figure 1. Internet Explorer was used to present the text and a browser control for text size alteration was activated (next to the home-button in Figure 1).

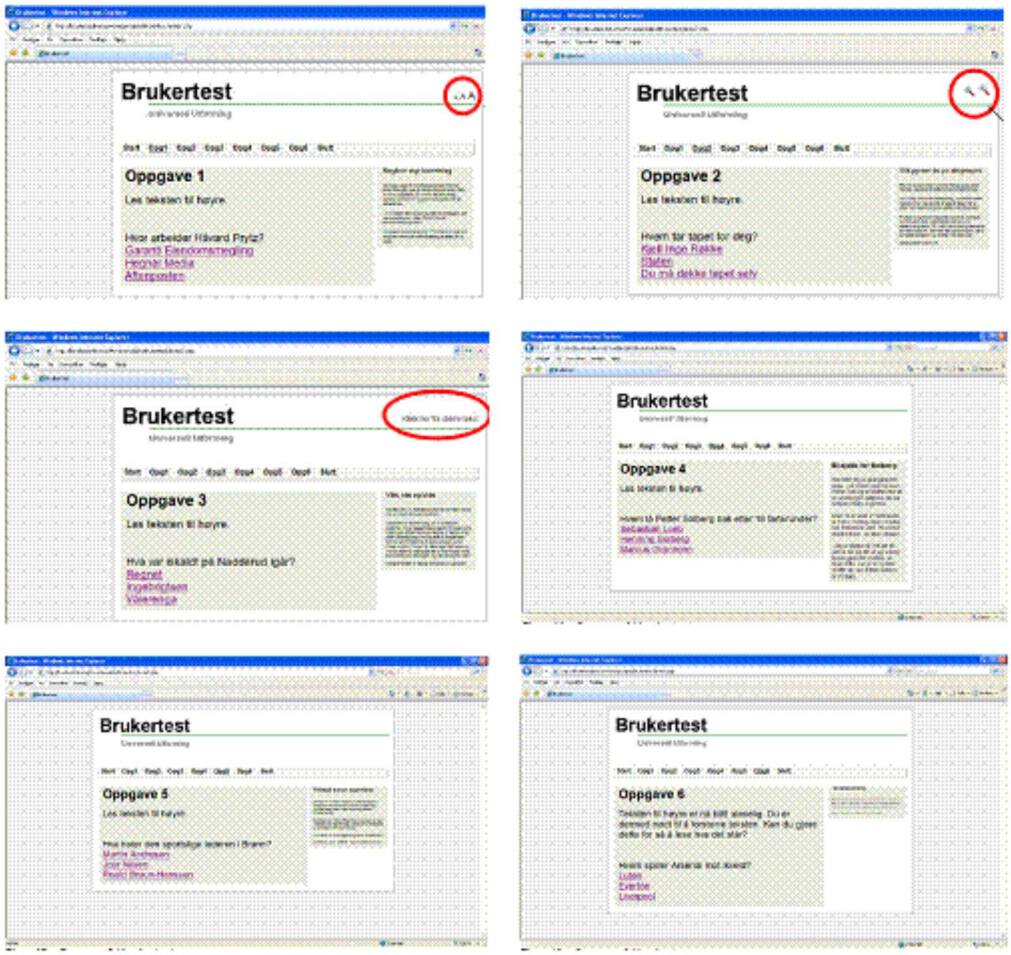


**Figure 1. Screenshots from the tests used in this study.**

**Table 2. The test conditions.**

| Test | Text size | Content-based text-size control |
|---|---|---|
| 1 | Small (uncomfortable but readable) | Aaa-links |
| 2 | Small (uncomfortable but readable) | Magnifying glass with +/-. |
| 3 | Small (uncomfortable but readable) | Textual explanation - “larger text” |
| 4 | Normal (readable) | None |
| 5 | Small (uncomfortable but readable) | None |
| 6 | Tiny (unreadable) | None |

## 3.4 Procedure

The tests were conducted in the users’ home environment. The investigators used a laptop computer for all the tests to minimize variations in test conditions, that

is, to ensure that the browser had the desired setup, that the screen size and characteristics were constant, etc. The participants were given instructions and two investigators were present to make observations during the tests. The test order was constant and in increasing levels of difficulty. The observed parameters were if the participant leaned forward to read (physical compensation), adjusted the browser setting (browser compensation) or used the text-alteration controls embedded into the design. Moreover, the answer chosen by the participants were also recorded.

For test 6 with the totally unreadable text the participants were told that the browser had functionality to make the text larger, but they were not told how to alter the text size. The users therefore had to explore how to alter the text size, or rely on their prior knowledge.

## 3.5 Results

Test 1, 2 and 3 had all integrated text size alteration functionality. For all these tests just one of the 30 participants used this facility. However, more than 50% of the participants leaned forward, which means that the text was too small to read naturally. None of the subjects adjusted the text size using the browser functionality. Surprisingly, the error rate for the three task ranged between 20 % to 30 %.

Test 4, 5 and 6 did not contain the integrated text size alteration functionality. Here the only possible solutions was to lean forward or to adjust the text-size using the browser. The text in test 4 was not too challenging and nobody attempted to adjust the text size in the browser, but 5 out of the 30 participants leaned forward to read the text. In test 4, which was harder to read, 2 of the participant took initiative to alter and successfully altered the text size using the browser. In test 6 all participants were told that they could enlarge the text using the browser. Here, only 40% successfully managed to enlarge the text.

## 3.6 Discussion

The results suggest that ordinary users have limited knowledge about the potential built in text-alteration functionality in the browser and when instructed less than half of the participants managed to actually find and use it. Moreover, the results suggest that the text-size alteration functionality built into the design may not be as effective as one may suspect. When browsing a web-page one has a particular goal in mind, and one may simply overlook text alteration controls even if one finds the text too small to read.

Implications of these results are as follows. Currently, ordinary computer users do not have sufficient knowledge or awareness toward browser built in text size alterations, nor content based alterations. It does not help that both browser providers and web-designers take a non-standardized approach. Should one

educate the users, or should one work towards a more standardized approach to text size alteration? Or, should one strive for automatic text-size adjustments based on automatically sensing the users' needs (Hagen, 2010)?

# 4. Conclusions

This study addressed text size alterations on web-sites. The results confirm practices that information is best communicated on multiple channels, that is, one should signal text size changes both symbolically and textually. Moreover, the results indicate that most users have little knowledge about how to alter the text in the browser. Next, the results suggest that most users do not notice Aaa-links and that these may not be as effective as designers and web-site managers may believe. However, it will be exciting in the years to come to see if users' basic text changing competence will change and if browser and web technology will develop to make text alterations more flexible for users with reduced vision.

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