Easy-to-read language in disability-friendly web sites: Effects on nondisabled users

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A B S T R A C T

This article examines the influence of using easy-to-read language (as an important web accessibility criterion to support users with disabilities) on nondisabled users. A web site usability test was conducted with 128 nondisabled participants. Each participant evaluated one of two web site versions: conventional language vs. easy-to-read language. Measures of performance (e.g., recognition of content and reading time) and subjective user reactions (e.g., perceived usability and text liking) were taken. The results showed that easy-to-read language (compared to conventional language) led to improvements for some performance measures (e.g., recognition of content) but also to increased reading time, decreased text liking and reduced intention to revisit the web site. This article concludes that when implementing easy-to-read language in web sites, adverse as well as beneficial effects on nondisabled users need to be considered.

1. Introduction

1.1. Web accessibility

The accessibility of web sites for people with disabilities is an issue of growing importance in the field of human computer interaction (Jacko, 2012; Vu and Proctor, 2011). In many cases, people with impairments (e.g., visual, motor, hearing or cognitive) face barriers when using web sites because the design does not consider their needs (Henry, 2006; Thatcher et al., 2006). This is of concern because a considerable proportion of the population has some kind of impairment (i.e., about 15%; WHO, 2011). In a society heavily relying on web technologies, restricted accessibility to web-based information may cause major disadvantages. This may include fewer opportunities in education or the labour market, which, in turn, may cause costs because the people concerned are less independent and have to be financially supported by society. Therefore, the approach of making the 'web accessible' aims to reduce barriers on web sites for people with disabilities (e.g., Henry, 2006; Thatcher et al., 2006). For example, this refers to recommendations such as having a minimum contrast between font and background to consider users with visual impairments; using captions for audio content to consider people who are deaf; or using easy-to-read language (hereafter "ETRL"), which may support users with cognitive, hearing or visual impairments (e.g. Caldwell et al., 2008; Ruth-Janneck, 2011).

1.2. Web accessibility and nondisabled users

Despite the importance of web accessibility, research revealed that, at least, 95% of web sites have not followed recommendations on accessible web site design (Gonçalves et al., 2013; Nurmela et al., 2013). An important reason for the low implementation in practice may be that practitioners are concerned about negative consequences of making web sites accessible. Such negative beliefs are very common among practitioners, such as making a web site accessible results in a boring, dull or aesthetically unappealing design for nondisabled users (e.g., Ellcessor, 2014; Thatcher et al., 2006). Obviously, any possible side effects of accessible web site design for nondisabled users are of great importance for practitioners because most users are nondisabled. Although this is a well-known issue (e.g., Ellcessor, 2014; Henry, 2006; Petrie et al., 2004; Thatcher et al., 2006), only little research has begun to investigate possible effects of accessible web site design for people who are nondisabled (e.g., Pascual et al., 2014; Schmutz et al., 2016; Schmutz et al., 2017a,b). The few studies available focused on various accessible design criteria (e.g., high contrast, text alignment, tab order or heading structure) and their consequences for nondisabled users in terms of performance and subjective user reactions. The results of these studies typically indicated positive effects of accessible web site design for nondisabled users (e.g., higher task completion rates, shorter task completion times and higher ratings in perceived usability), which do not support the concerns of practitioners. While previous work already

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examined the consequences for nondisabled users of certain accessible design criteria (e.g., contrast, visible focus and tabbing), very little is known about the effects of simplified language, which may be one of the most important accessibility characteristics (Ruth-Janneck, 2011).

1.3. Language complexity as accessibility criterion

A previous study (Ruth-Janneck, 2011) examined characteristics and importance of accessibility problems for users with various types of impairments (e.g., visual, hearing and cognitive impairments). The result showed overall, language complexity is the most critical barrier to access information on web sites for users with different types of impairments, such as people with visual, hearing and cognitive ones. The author concluded that simplifying text (e.g., avoiding or explaining foreign words) is an adequate intervention to tackle this issue. This finding illustrates the relevance of language complexity as accessibility criterion. While there is little research on language complexity as a web accessibility criterion, there are some practitioner guidelines with recommendations to reduce language complexity.

1.4. Language complexity in accessibility standards and guidelines

The web content accessibility guidelines 2.0 (WCAG 2.0) (Caldwell et al., 2008), as the most commonly used guidelines for web accessibility, give some recommendations for reducing language complexity. For example, the guidelines recommend providing text that does not require a reading ability that exceeds lower secondary education level (criterion 3.1.5). Furthermore, the WCAG 2.0 suggests that explanations for idioms or jargon should be provided (criterion 3.1.3) and the meaning of abbreviations should be explained (criterion 3.1.4). Although the WCAG 2.0 provides these recommendations, they are not very specific and practitioners may have problems in interpreting and implementing them adequately. There are more specific guidelines, such as the "European standard for easy-to-read" (see http://easy-to-read.eu/?page_id=17) or the "guidelines to write clearly and simply" of WebAim (one of the leading providers of web accessibility expertise, see http://webaim.org/). Typical recommendations include: Do not use difficult words, avoid pronouns and use short sentences.

In German language, there is one particular set of guidelines for ETRL that is well established: "Regeln für Leichte Sprache des Netzwerks Leichte Sprache" (Rules for ETRL provided by the network for ETRL) (see http://www.leichtesprache.org/images/Regeln_Leichte_Sprache.pdf). The rules are similar to the European standard of easy to read but provide more specific rules on how to write easy texts. These rules comprise a total of 22 recommendations (see Appendix 1 for a complete list of the recommendations). Although there are standards providing some recommendations on how to implement ETRL, there is a lack of research investigating consequences of implementing ETRL on web sites.

1.5. Research on ETRL in web sites

While there is some basic research on effectiveness of certain ETRL recommendations (e.g., Fajardo et al., 2014; Fajardo et al., 2013; Saggion et al., 2015), there is to our knowledge only one study that empirically examined ETRL in the context of web site design (Karreman et al., 2007). In the one study investigating ETRL in the context of web site design (Karreman et al., 2007), 40 users (20 with cognitive impairments, 20 without impairments) tested two versions of a web site containing information about health services. While on one web site the information was presented in non-adapted conventional language (hereafter "ConvL"), the other web site contained text that corresponded to ETRL guidelines. These ETRL guidelines comprised recommendations on the verbal content (e.g., use short words, use words consistently, cover only one idea per sentence) and on the layout (e.g., put one sentence in one line, use a large type face, use headings and

other navigational aids). Each participant completed five search tasks on one of the two web sites. The results indicated that people with cognitive disabilities understood the text better when using the ETRL-version but there was no difference in reading time for the two versions. Furthermore, the users with cognitive impairments were more satisfied when using the easy version than when using the conventional one. This suggests that the easy-to-read adaptations were supportive to their targeted user group. Regarding nondisabled users the results showed better text understanding for the ETRL version but a clear user preference for the ConvL version. This indicates that for nondisabled users, ETRL entails a trade-off between increased understanding and lower text liking. Therefore, depending on the main goal of a web site (e.g., marketing vs. information transfer), it is advisable or not to implement ETRL in web sites. This suggests that practitioners should apply ETRL with caution because it may have negative effects on nondisabled users.

The results of Karreman et al.'s (2007) study suggest that there is a difficult trade-off between making web sites more accessible to users with disabilities and meeting the needs of nondisabled people. Such conflicts are extensively discussed in the field of accessibility (e.g., Boldyreff et al., 2001; Ellcessor, 2014; Farrelly, 2011; Schmutz et al., 2016; Thatcher et al., 2006) because practitioners will not implement criteria which they believe may have adverse effects on nondisabled users, who typically represent the main user group. In line with this argument, some authors emphasise the investigation of effects of ETRL on nondisabled users (e.g., Boldyreff, et al., 2001; Karreman et al., 2007) because making a web site more accessible through ETRL should not reduce the usability for nondisabled users.

Although Karreman et al.'s study provides important first insights, some methodological issues are to be considered. Since they manipulated verbal content as well as the layout of the web sites, it is difficult to pinpoint the cause of the effect (i.e., language or layout). Furthermore, even though their study provided interesting findings in regard to text understanding and text liking, other important variables for web site design were not measured (e.g., perceived aesthetics, perceived task load, intention to revisit the web site and affect). Investigating such factors is of relevance for practitioners because knowing about possible effects of ETRL on a wide range of variables would help them to form a well-founded opinion about whether ETRL should be implemented or not.

1.6. The present study

The experiment aimed to examine the consequences of ETRL as a web accessibility criterion for nondisabled users. As independent variable, the language complexity of a web site was manipulated, which resulted in two web site versions: ConvL and ETRL. A usability test was conducted to evaluate the two web sites. Dependent variables comprised performance (e.g., detection time and free recall of content) and subjective user reactions (e.g., perceived usability and text liking). This work builds on previous research by applying a manipulation focusing only on ETRL (rather than ETRL and layout) and by investigating a wide range of dependent variables, which are relevant for the field of web site design. According to the literature review, we predicted beneficial effects of ETRL on performance but negative effects on subjective user reactions.

2. Method

2.1. Design and participants

The present experiment employed a one-factorial between-subjects design, manipulating the variable language complexity (ConvL vs. ETRL) as a fixed factor. A total of 128 participants took part in the study. The participants were mainly psychology students and randomly assigned to one of the two conditions. Table 1 provides an overview of the sample characteristics. To control for differences regarding reading