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[AP2-E2-2-02] A Test Production of Medical Institution Webpage Available for an Extremely Large-Size Font

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Keywords: Web Accessibility, Visually-Impaired Person, WCAG

To provide visually-impaired persons information of low-vision care from a website of medical institution without assistive technologies for disabilities, the authors developed a test production of Medical Institution Webpage with a responsive web design (flexbox). In browsing both by a smartphone and PC, it is possible to see extremely expanded characters such as 50pt or 100pt, which many medical institutions website cannot be shown by usual settings of web browser. Such a design is more than satisfied with level AA requirements of Web Accessibility Contents Guidelines by W3C, but can easily be made with reasonable cost.

A Test Production of Medical Institution Webpage Available for an Extremely Large-Size Font

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Abstract

To provide visually-impaired persons who lost central vision information of low-vision care without assistive technologies for disabilities, the authors developed a test production of Medical Institution Webpage with a responsive web design to show extremely expanded characters. In browsing both by a smartphone and PC, it is possible to see large size characters such as 50pt or 100pt, which cannot be shown by usual settings of standard web browsers. Such a design is more than satisfied with level AA requirements of Web Accessibility Contents Guidelines by W3C, but can easily be made with reasonable cost.

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Introduction

For historical reasons, the most standard font size printed on a paper is about 12pt [1]. As the World Wide Web Consortium (W3C) defines the standard relation between a font size on a paper and that on a display is .75pt = 1px [2], the de-facto-standard font size on the computer devices is 16 px: It is adopted by many major web browsers.

The level AA of the Web Contents Accessibility Guideline (WCAG) is the standard requirements of Web accessibility for the official websites in USA [3], EU [4], Japan [5] and other countries. As a size of text, it requires "Except for captions and images of text, text can be resized without assistive technology up to 200 percent without loss of content or functionality, [6]" which means the "font-size" value 24 pt (i.e. 32px) is almost enough in many cases. However, visually-impaired persons who lost central vision in reading by peripheral vision need larger font sizes [7]. In cases of reading Japanese text (including Japanese and Chinese characters which are more complex than alphabetic characters) they need large-size fonts such as, 30pt, 50pt or 100pt, to read smoothly [8]. As medical institution webpages are now important sources of medical information for visually-impaired persons, they have to be designed in view of reasonable accommodation for them. Many screen readers (recitation software) are provided for visually-impaired persons who cannot read text on a display. However, it is not so easy to learn how to use it. In addition, many Japanese words have homonyms. It is thus necessary to provide more reasonable accommodation on medical institution webpage than the level AA of WCAG for a person of severe low-vision having less computer skills.

To define the requirements of the medical institution webpage accessible for visually-impaired persons who require extremely expanded characters in web browsing, we designed a test production webpage at low cost by applying a standard responsible web design for mobile devices, and checked its availability with devices (a smartphone, tablet devices and a personal computer), before the evaluation by visually-impaired persons.

Method

Design and Validation of the Test Production Page

Using (the sectioning content model of) HTML5, CSS3, and a responsible web design (Flexbox), we made a typical top-page of Japanese university hospital website with two layouts (CSS files) a) of two-column ('main' and 'aside') and b) of one-column for small LCD devices whose widths are less than 800px. Then we also made c) the third CSS file of simple one-column style for an extremely large-size font with the following requirements; 1) all items are aligned in the left side of the page from top to bottom with least commands of layout design to minimize horizontal scrolling, 2) images remain as landmarks on the webpage due to CSS3 specifications (alt-comments for images can be recited), 3) the font-size is not fixed (the default size is 48px), 4) the background color is dark for photophobic patients. No other programs or scripts than that changing CSS files were used.

The HTML file of the test page was validated by the W3C related website [9]. Web accessibility of the test page (including three CSS files) was checked by the web accessibility checking tool [5].

Figure 1- Japanese Characters printed on a paper and a tablet device of 9.7" LCD in 100pt Sans-Serif font.

Definition of the Maximum Font-Size Needed

To keep a reading speed of Japanese text on a display, five or more Japanese characters have to be shown [10]. Using a 9.7" LCD, which is one of the most popular size tablet devices in Japan, maximally five characters in 100 pt UD Digi Kyokasho NK-R font (universal design fonts of MS-Windows 10) can be

shown in a line. Thus the authors defined the maximum font-size at 100pt in which the characters should be shown.

Checking the Availability of Webpage in Large-Size Fonts

Availabilities of the test page with three CSS files in 50pt and 100pt UD Digi Kyokasho NK-R (MS-Windows) and Sans-Serif (other OSs) fonts were checked with devices in Table 1. The expansion of normal text on a web browser is done by normal operations (unpinch on mobile devices, and CTRL & "+" keys on PC; a default font-size setting of web browser) without assistive technologies for disabilities.

Table 1- Devices used in checking the availability

Terminal Device (Hardware; OS&Version)	Web Browser (Version)	Resolution
PC (Microsoft Windows 10 Education 1903) +27" Display (iiyama ProLife B2712HDS)	Mozilla Firefox （68.0.2）	1920×1080px
	Google Chrome (76.0.3809.100)	
	Microsoft Edge (17.1734)	
Tablet Device (Apple iPad (5th); iOS 12.4.1)	Apple Safari (12.1.2 (604.1))	1536×2048px 768×1024pt
Smart Phone (Apple iPhone SE; iOS 12.4.1)	Apple Safari (12.1.2 (604.1))	640×1136px 320×568pt
Tablet Device (HTC Nexus 9; Android 7.1.1)	Google Chrome (76.0.3809.132)	1536×2048px

Results

Validation of HTML and Checking Web Accessibility

The test page has no errors of HTML and satisfies the level AA of WCAG.

Checking the Availability of Webpage in Large-Size Fonts

Normal text in the 50pt font was shown by all devices with all CSS files. Normal text in the 100pt font with CSS files a) and b) could not be shown by all devices due to definitions of size for their layout designs. Normal text in 100pt with the third CSS file c) was however shown on all devices. In all cases of PC, few horizontal scrolling was needed in browsing.

Discussion

We have also done experiments to show the influence by complex Chinese characters on reading with peripheral vision, and think that it needs larger size characters to read them than alphabetic characters.

Although some web browser (e.g. a recent version of Apple Safari) has a function to change a style of webpage like this test production, such a function is not always available and cannot show extremely large size fonts as same as this production. If a medical institution webpage is made with a responsible web design for browsing by mobile devices, thus, we think that it is reasonable for a medical institution to add a CSS file for such an extremely large size font to provide medical information to a severe low-vision person who can hardly use assistive technologies. We obtained a comment from a visually impaired person that supports our opinion.

For the evaluation of this production, we have been doing a questionnaire survey of visually-impaired persons browsing it.

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