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Computer Science

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Analysis and Design of Human Computer Interaction (2018)

PROJECT 1 – DESIGNING FOR VISUAL IMPAIRMENT:

WHAT TO CONSIDER WHEN DESIGNING FOR VISUAL IMPAIRMENT

VAASA, 2017

Visual Impairment

Visual impairment is a term used to refer to a very serious poor vision condition. This problems with seeing cannot be solved by standard optic lenses solution, and severely hampers the sufferers' performance. It can also be referred to as low vision.

According to the World Health Organization (WHO), there are five categories of visual impairment. These categories are classified according to visual acuity levels.

Category 1 described as Low Vision with a visual acuity of 20/70. Category 2 is also called Low vision 2 with a visual acuity that begins at 20/200. Category 3 is referred to as Blindness 3 with a visual acuity below 20/400. Category 4 is referred to as Blindness 4 with visual acuity worse than 5/300, while Category 5 is called Blindness 5, a situation where light cannot be perceived at all (The World Health Organization, 2018).

Eye defects such as colour blindness, and diseases such as Retinitis Pigmentosa, Glaucoma, Retinopathy and cataracts leads to lower visual acuity and affects the user of technological systems. It is there for important that these users be considered when designing human computer interactive systems.

To further buttress on this topic, we would divide visual impairment into two groups:
a. Sighted Users.

b. Blind Users.

For Sighted Users the focus is Usability / User Experience with some Accessibility. While for Blind Users the focus is primarily Usability / User Experience and full Accessibility, when considering development cost and deployment time.

Designing Human Computer Interaction interfaces/devices for the Visually Impaired

When designing layouts, it is best to avoid too much colour as it could lead to over simulation of the optic nerve. A white background remains a good choice for interface design. A feature that allows white text on black background should be available to enable the user reduce background

illumination. This can help to immediately create contrast without implementing a complex design.

For those whose primary problem is colour and brightness differentiation, one way to assist is to be carefully in the choice of colours for action items. Buttons which require some sort of interaction with the user must be carefully selected. It would be self-defeating to place a "red" play button close to a "green" pause button as it would lead to optical conflict for a user who has a problem of knowing the difference between red and green. The text should be clear without much colours. It is preferable to use a coloured text on a white background than a white text in a red background for example.

Contrast is the key. Therefore, features that allow a user to highlight text should be incorporated into the system to increase visual focus. Such users may prefer sharp contrast over subtle gradients. In addition, the designer should allow for text enlargement. Zoom functionality should be added without affecting the general overall page scale. This is called text-only zoom. The rationale behind this is to avoid overall page distortion and scrolling problems.

Furthermore, when keyboard shortcuts can be used to assist in page or content navigation. A User should be allowed to jump to a part of the text of his or her choosing without having to follow the cursor. Incorporating this feature would help diminish straining the eyes and overall visual frustration. Moreover, the use of larger screens can help and further improve neck ergonomics. Besides, for web interfaces, the layouts should be designed in such a way that it can be easily used on a mobile device. Mobile Web interfaces are by default designed to be visually oriented. Therefore, choosing to use a mobile - compactible web interface can help solve some problems such as small text and poor layouts. The media used should have brightness control features.

For Users with severe visual problems such as Blindness, screen reading technology should be used to covert text to audio or sound. Audible and vibrating sounds should be allowed for alerts and settings control. A friendly speech-guide should be made available to assist the user using the system. It is paramount that Voice accessibility be central in the design. To aid development

focus, it is preferable if a service or system is designed specifically for the blind. The reason for this is that their primary concern or need differs significantly from those with some form of vision.

For example, daily productivity tools such as phone, contacts, calendars, alarm, SMS, emails and GPS location should take the centre stage and priority over features such as games. The system should meet the basic needs of the user. (Sierra et al, 2012).

The overall aim is to improve user accessibility and improve user experience. (B. Buxton, 1997), (Hassenzahl et al, 2006).

References

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