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E-Accessibility Analysis in User Experience for People with Disabilities

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Abstract The purpose of writing this article is to know e-accessibility for users with disabilities. This study uses a descriptive research methodology with a qualitative approach. The subjects involved in this study were people with disabilities. Data obtained by conducting a literature study. The results of this study are the principle of e-accessibility in designing the User Interface (UI) must be considered because it will affect the User Experience (UX), so that internet users, especially users with disabilities have good accessibility so that it can be more easily to obtain information.

Keywords: Accessibility, e-Accessibility, User Experience, Disability, Human Computer Interaction.

1. Research Background

Accessibility is one of the 8 main principles in the United Nations Convention on the Rights of Person with Disabilities (CRPD), the CRPD is an international instrument for persons with disabilities established by member states of the United Nations on December 13th, 2006. In Indonesia, accessibility for persons with disabilities is also considered, in Bill No. 4 of 1997 concerning Disabled People in which they are entitled to get accessibility for independence, and require the government and / or the community to provide this. Further, the government issued Act No. 8 of 2016 concerning Persons with Disabilities.

Accessibility is one of the 5 elements in the user experience, namely (Soegaard, 2019): 1) usability, 2) useful content, 3) desired/enjoyable content, 4) accessibility, and 5) credibility.

Accessibility for persons with disabilities is important, given the amount is not small. World Health Organization (WHO) reports that 15% of the world's population has some disabilities (WHO, 2018).

In this technological era, information is very easy to obtain using technology, but not for people with disabilities because of their limitations. Therefore, there are some things that must be understood so that information can be received by people with disabilities properly.

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2. Research Methodology

This research uses descriptive research method with a qualitative approach. Qualitative approach is a method in examining the status of a group of people, an object, a set of conditions, a system of thought or a class of events in the present. The purpose of this descriptive study is to make a systematic, factual and accurate description, illustration, or depiction systematically, factual and accurate regarding the facts, properties and relationship between the phenomena investigated (Nazir, 1988).

3. Results and Discussion

A good user experience is concerned with usability, graphic design, and accessibility. Accessibility is the ability of users to use products/services (Soegaard, 2019).

According to Act No.8 of 2016 Article 1 Section 8 explains that accessibility is a facility provided for persons with disabilities to realize equality and opportunity.

3.1 E-Accessibility

E-accessibility refers to the ease of use of Information and Communication Technology (ICT) such as the internet by people with disabilities (WHO, 2013). Internationally, accessibility guidelines have been prepared by the World Wide Web Consortium (W3C) which

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provides a standard for web accessibility, Web Accessibility Initiative (WAI) (Laabidi et al, 2014).

WAI developed strategies, guidelines, and resources for making websites accessible to people with disabilities (W3C, 2019). WAI recommends 3 sets of guidelines for making websites accessible (Isaila & Nicolau, 2010):

1. WCAG (Web Content Accessibility Guidelines).
2. UAAG (User Agent Accessibility Guidelines).
3. ATAG (Authoring Tools Accessibility Guidelines).

The use of the internet is an important part for many people's economic, educational and social lives today. Therefore, it is very important that the website can be used by everyone, so that persons with disabilities have equal access to information.

Designing accessibility for all users is also called as Universal Design. Principles of Universal Design (Soegaard, 2019):

1. Equitable Use – fair use that accommodates all users including users with disabilities.
2. Flexible Use – flexible design, for example can be used for left hand or right-hand users.
3. Simple, Intuitive Use – simplifying complex information and optimizing information readability, for example the use of image illustrations to represent text.
4. Tolerance for Error – set elements to minimize unintentional actions, for example the existence of validation data to ensure that the action taken is correct.
5. Low Physical Effort – minimize physical effort, for example avoiding repetitive actions.
6. Size and Space for Approach and Use – for example, accommodating target touch areas for average sized fingertips.

3.2 Various Disabilities

Disabilities are grouped into 4 groups based on their inability (Software Accessibility: Recommendations and Guidelines, 2005):

1. Visual Disabilities, inability to see the display, mostly, total color and total.
2. Auditory Disabilities, inability to detect sound or distinguish sound information from background noise such as deafness and hearing loss.
3. Motor / Mobility Disabilities, physical limitations that affect the ability to move and operate objects such as limited movement or control of the arms, hands, and fingers.
4. Learning / Cognitive Disabilities, limitations in thinking, memory, language, learning and perception such as dyslexia, dementia, etc.

3.2 E-accessibility Practical Guidelines for Persons with Disabilities

3.2.1. Visual Disabilities

The use of **screen readers** by changing text into speech (text-to-speech). Long pages create problems because it is more difficult for blind users to choose the interesting part. Therefore, ***tag heading*** **HTML** can be used, these tags consist of 6 levels <H1>, <H2>, <H3>, <H4>, <H5> and <H6>. <H1> defines the most important and highest heading, <H2> for the main partition of information from information in <H1>, <H3> and lower levels for better information partition. So blind users can get a general description of the page by asking <H1> and <H2> to read out loud and quickly bypassing the unattractive part by instructing the screen reader to jump to the lower headings (Nielsen, 1996).

The use of **ALT attribute** is also important for blind users. The ALT attribute is used to display alternative text from an image, so the image can be expressed in words by the screen reader (Nielsen, 1996).

Font size also needs to be considered for people who can see but have poor eyesight. Therefore, it's better to set the font-size attribute to **percent** compared to pixel units. So, the text can be enlarged and narrowed in accordance with the user wishes (Nielsen, 1996).

Increasing contrast between colors and paying attention to color selection is also important in increasing visibility, especially for users with visual disabilities such as users with color blindness (Nielsen, 1996). Color blindness is basically divided into 3 types, namely red-green, blue-yellow, and total. Therefore, use

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monochrome and minimalist colors, avoid the following color combinations: green and red, green and brown, green and blue, green and gray, green and black, light green and yellow, blue and purple, blue and gray. In designing maps or infographics you can use structured pattern.

3.2.2. Auditory Disabilities

For users who are deaf or hearing impaired. Audio clips must have **transcripts** and videos must be available with **translation** (also benefit users who are not native speakers of the language used in the video) (Nielsen, 1996).

3.3. Motor Disabilities

Many users have difficulty using the mouse or have problems pressing several keyboard keys simultaneously. **Client-side imagemaps** is useful even if the user can't use the mouse at all, the browser must be able to run using the link connected to the keyboard [(Nielsen, 1996).

Users with motor disabilities can also be helped by using **eye movements** to communicate (Vazquez et al, 2011).
Multimodal interface allows one to use a computer without input devices, such as a keyboard, mouse or touchpad, simply by using **head tracking** as an input to control mouse pointer (cursor) in monitor screen and **speech recognition** as an input to operate device which requires mouse click or keyboard button actions. This Interface allows one to operate a Graphical User Interface (GUI) from an operation system and peripheral devices hands-free (Karpov & Ronzhin, 2007).

3.4.Cognitive Disabilities

The use of **spelling checker**, **query-by-example,** and **related searches** are also noteworthy matters. Because, users with spelling impairments (foreign-language users) often fail to search. The use of **heading** is also a concern, because users with dyslexia will find problems when reading long pages and will be helped by these facilities, just like blind users (Nielsen, 1996).

4. Conclusion

Based on the results of the study it can be concluded that the use of e-accessibility needs to be considered in designing the user interface (UI) because it will affect the user experience (UX) for users, especially for users with disabilities because it will facilitate users with disabilities to obtain information.

Recommendations for further research are:

4.2. Create a system by applying the practical principle of e-accessibility. Use these principles for instance in making websites, programs, and etc.

4.3. UI/UX designers are expected to implement the practical principles of e-accessibility.

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