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UX Accessibility:

An introduction to the topic

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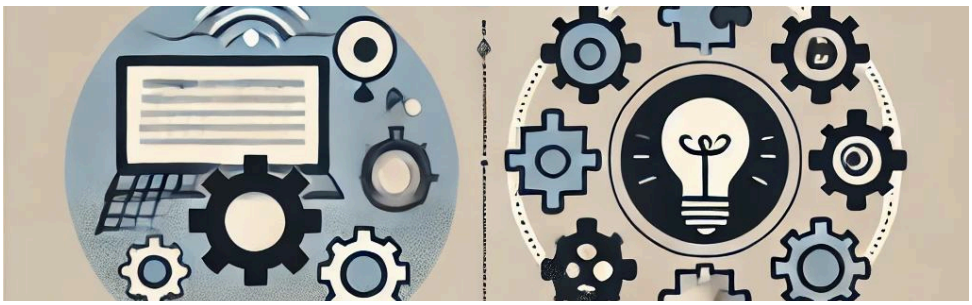
In an increasingly digital world, accessibility is not just an option; it's a necessity. Web accessibility refers to the design and development of websites, tools, and technologies that make them usable by individuals with disabilities. To be more specific, users are able to view, understand, navigate, interact with, and contribute to the Web (World Wide Web Consortium [W3C], 2024).

Accessibility and usability are closely intertwined. According to the ISO 9241-11, usability is defined as "the extent to which a system, product, or service can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use" (ISO, 1998).



When digital products are accessible, they are naturally more usable because they cater to a broader audience, including those with temporary or situational limitations. Thus, accessibility is a fundamental component of usability, ensuring that all users can achieve their goals effectively, efficiently, and with satisfaction.

But why is accessibility so important for UX design?

According to the World Health Organization (WHO) an estimated 1.3 billion people, 16% of the global population, experience a significant disability today. People with disabilities are a diverse group, and various factors affect their experiences and health needs (WHO, 2023). Disabilities, and difficulties, are an inherent part of the human experience. Therefore, UX designers must integrate considerations for them into their designs. A product that can be used by a wider range of people is inherently more meaningful and valuable.

For these reasons, the W3C has promoted accessible design through the Web Accessibility Initiative (WAI), resulting in the publication of the Web Content Accessibility Guidelines (WCAG) (Chisholm et al., 1999; Caldwell et al., 2008), with the current version known as WCAG 2.1. These guidelines provide businesses with a baseline for incorporating accessibility, enabling them to reap numerous benefits. These include a broader user base, enhanced innovation, differentiation from competitors, cost reductions by considering accessibility from the beginning, improved company image, and easier compliance with standard regulations (Arenghi et al., 2021).

Accessibility has become such a paramount goal that several acts have been established to make websites and applications more accessible. For example, in the United States, the Rehabilitation Act section 508 requires that all e-government web sites must be accessible to people with disabilities. In Europe, the European Accessibility Act has been created and taken as the global standard for accessibility compliance. Notably, these acts draw heavily from WCAG 2.1 for their standards and harmonization practices.

Why web content accessibility guidelines matter

The principles of the WCAG 2.1 provide the foundation of web accessibility on which accessibility legal acts rely upon. This is because, the WCAG 2.1 include foundational principles, general guidelines, testable success criteria, a collection of techniques, advisory techniques, and documented common failures (W3C, 2023).

Within each principle, a specific set of guidelines are presented which are the goal towards which designers should work on to make the content more accessible. Each individual guideline's success criteria is determined by its unique framework and objectives. However, all of them follow these principles:

- **Perceivable**: The information and UI elements must be presented to users in ways they can perceive. This includes guidelines for text alternatives, time-based media, different ways to present content, and ways to make it easier for users to see and hear content.
- **Operable:** UI elements and objects must be operable. Guidelines include keyboard accessibility, providing user with enough time to see the content, navigation, and modalities of input.
- **Understandable:** Information and the operation of UI elements must be understandable. This principle involves guidelines to make the content comprehensible, readable, predictable, and to help users avoid or correct mistakes.
- **Robust:** The content provided needs to be robust enough so that different agents can interpret the content. In short, this principle's guidelines are about the ways to ensure compatibility with different software responsible for retrieving and facilitating the interaction between the user and the content, such as, for example, assistive technology.

The success criteria for each guideline can be defined in three levels of conformance: A (lowest), AA (medium), and AAA (highest). This a testable success criteria provided by WCAG 2.1 and meant to be used where requirements and conformance testing is necessary. Most guidelines only have one level of conformance. (W3C, 2023). What this means is that the higher level of compliance your product has, the more accessible it is. That being said, following the conformance level and guidelines is only the beginning, since we must also consider the challenges that designing for accessibility comes with. Nevertheless, if you want your product to be accessible to all, meeting the AA conformance level is the acceptable standard (Gokulnath B., 2023).

Considerations to integrate accessibility into our designs:

Following the WCAG guidelines is the first step to designing for accessibility. As you may have noticed by now, designing with accessibility in mind can be a laboursome task. We need to account for things such as assistive technology, layout and typography, writing, colour and contrast, text size, etc., UX and UI elements that clearly affect the user's experience with a product. Not to mention the distinctions between web requirements and mobile requirements.

For these considerations Material Design's accessible design foundations overview (Material Design, 2023) provides a reliable resource that integrates WCAG to meet essential accessibility standards. Another valuable resource is the Neuro Diversity Design System 1.0, which establishes standards and principles merging neurodiversity insights with user experience design for Learning Management Systems (Soward, 2023).

The most common recommendation is to leverage such sources to compile a comprehensive document outlining key considerations when designing products. Said document can cover critical aspects such as:

A) Assistive technology

This technology which helps improve, increase, or maintain the functional capabilities of individuals with disabilities. These include interaction with keyboard, screen readers, braille displays, input tracking, magnifiers, and voice input (Material Design, 2023).

B) Layout

This considers the positioning of important elements that need to be consistent throughout the layout. Things such as navigation menus, content areas or footers, need to be taken account of properly in order to reduce choice paralysis and cognitive load. Additionally, elements considered 'nice to have' should be omitted or concealed (Soward, 2023).

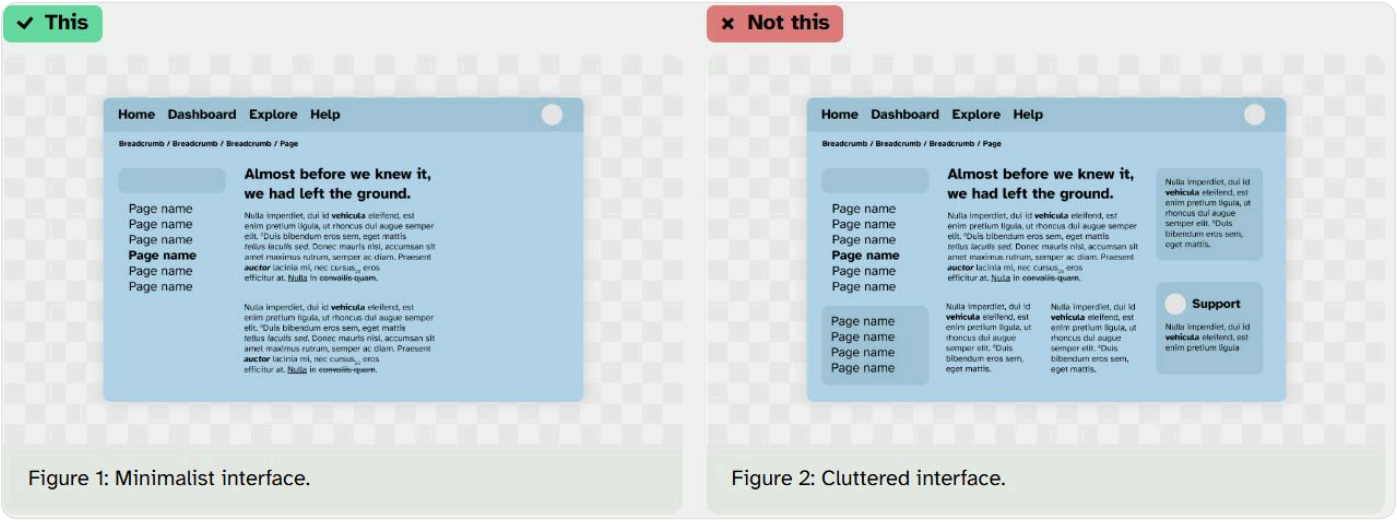


Figure 1: Minimalist interface.

Figure 2: Cluttered interface.

An example of a good layout by Soward. On the left we see a minimalistic interface with clear hierarchy. On the right, we see a cluttered screen with too much information present.

C) Writing

Consider the use of plain English, making the message or content with the right tone of voice, clear and concise, written with the reader in mind (Plain English Campaign, 2023). This type of writing makes it simple for the user to understand quickly what the element is about. This of course depends on the skill level of the users or the specifics of an application that might have a complex jargon. Nevertheless, the aim is to simplify the wording so that users don't have to spend time trying to understand the meaning. It is important to note that all these considerations should also be taken into account irrespective of whether the application is specifically in English or not, the goal is to make things easier for our users in any language.

D) Colour and contrast

Colour has many applications, such as helping users to understand the product's content, communicate mood, tone, and degrees of information, determine primary or secondary elements, etc. (Material Design, 2023). It is also fundamental to enhance visual information, such as a state change or hierarchy of buttons (for example, submit, cancel, delete, upload, etc.). However, it is also important to consider the contrast of colours. Some users have low contrast sensitivity, others cannot distinguish certain colours (this is known as 'colour blindness'), but there are also users who benefit from higher contrast rates, such as those who have Dyslexia or Dyscalculia. Contrast can also be used to reduce cognitive fatigue or to consider other scenarios such as working under the sunlight (Soward, 2023).

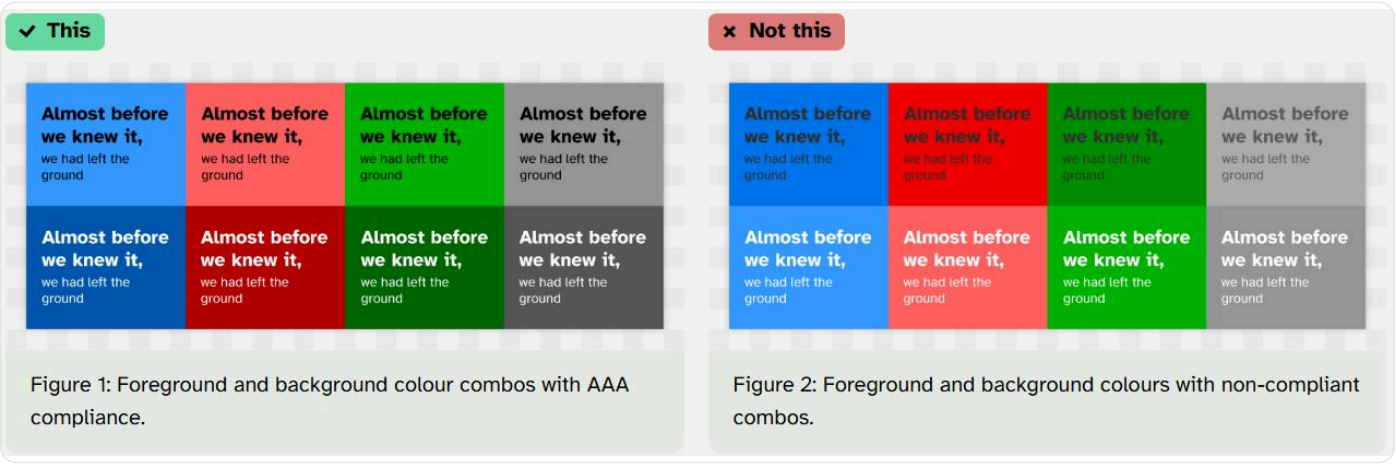


Figure 1: Foreground and background colour combos with AAA compliance.

Figure 2: Foreground and background colours with non-compliant combos.

An example of Color Contrast given by Soward. On the left, we can see the proper use of color contrast. On the right, an incorrect use of contrast

E) Typography and font

Typography plays a crucial role in brand recognition, aesthetics, and legibility. An incorrect font can completely deter a user. Overall, Sans-serif fonts are generally preferred for body copy due to their enhanced readability on lower-end devices. In addition to font style, it is also important to consider the size of the font. These considerations are to avoid confusion with letters such as imposter letter shapes where the upper-case letter 'I', the lower-case 'l' and '1' can look the same (Soward, 2023). On the other hand, text reseizing is also an important thing to keep in mind. We must consider those cases in which users visualize the content in different devices or require to zoom in on the information (Material Design, 2023).

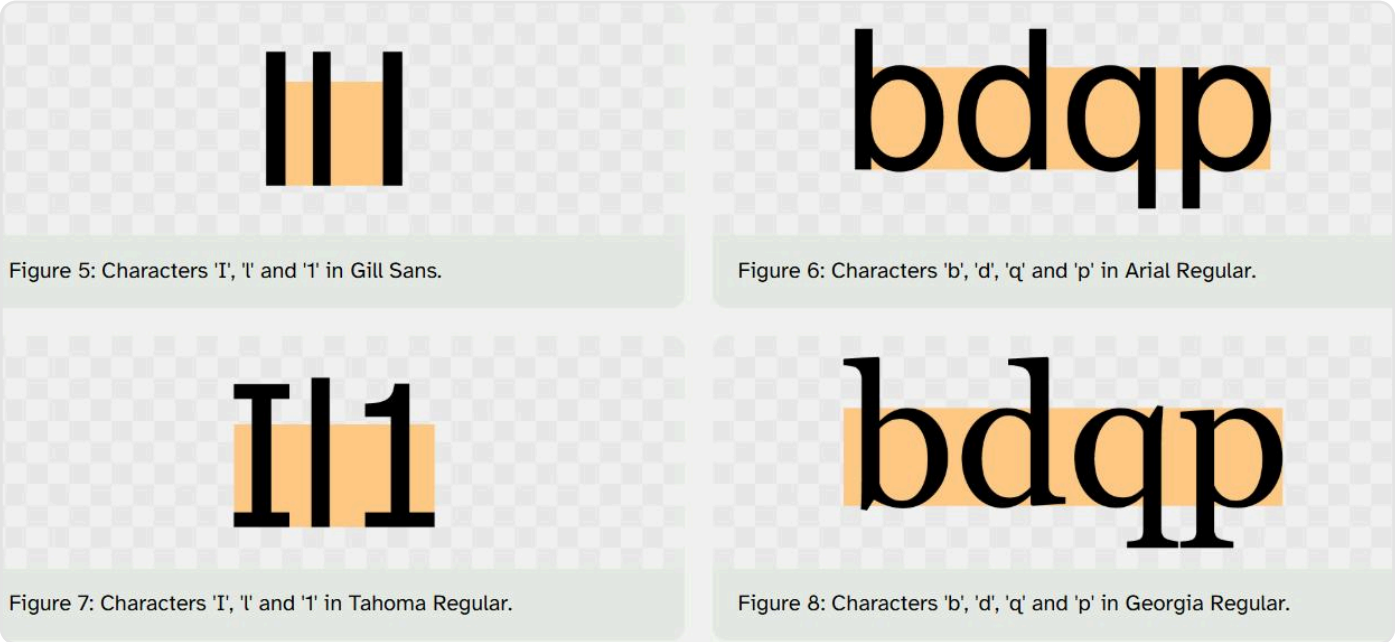


Figure 5: Characters 'I', 'l' and '1' in Gill Sans.

Figure 6: Characters 'b', 'd', 'q' and 'p' in Arial Regular.

Figure 7: Characters 'I', 'l' and '1' in Tahoma Regular.

Figure 8: Characters 'b', 'd', 'q' and 'p' in Georgia Regular.

An example of Imposter Letter Shapes given by Soward. We can see four different ways in which different letters are represented according to their font type, making users often confused about which is which.

Typography and font sizes are quite important in numerical writing as well. Numbers can be challenging, in particular for users with dyscalculia. The imposter shape can occur with alphanumeric inputs such as the number '0' being confused for the upper-case letter 'O'. Some goals to have in mind could consider for things such as form fields that require number inputs to display them clearly and simply. Some inputs can even be divided into sequential parts, for example phone numbers, credit cards numbers, passport number, etc. In this sense, it's important to add additional references when displaying numerical information (Soward, 2023).

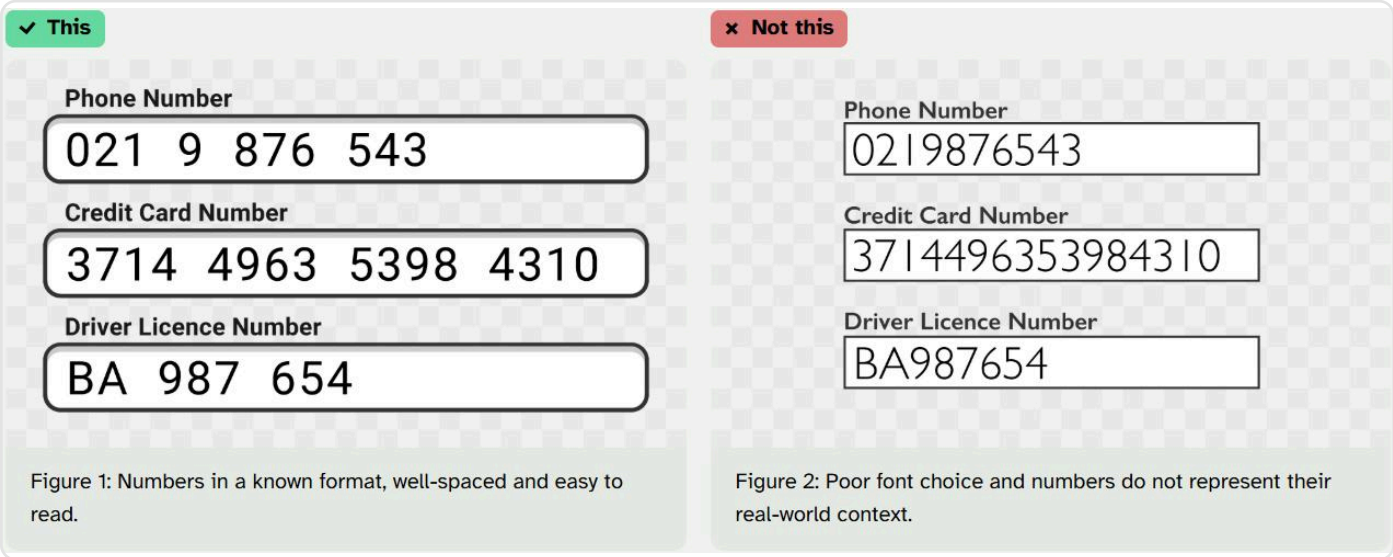


Figure 1: Numbers in a known format, well-spaced and easy to read.

Figure 2: Poor font choice and numbers do not represent their real-world context.

An Example of sequential numbers being divided into parts by Soward. On the left, we can see a group of different collected numbers and how they are in a known format, well-spaced and easy to read. On the right, we see a poor font choice and numbers that do not represent their real-world context.

F) Communications

When it comes to system communications like indicators, validations, notifications, emails, and messages; their clarity, brevity, and coherence are essential for effective retention. However, challenges such as broken processes, conflicting naming conventions, and inconsistent styling can lead to confusion and disengagement. The system should be intuitive enough so that the user can understand its elements without interacting with them (Soward, 2023). Additionally, users should easily know where they are in the system and what actions are being performed, minimizing the need to search through quick messages, other tabs, or emails. These issues, known as fractured processes, can lead users to abandon tasks if not guided properly (Soward, 2023).

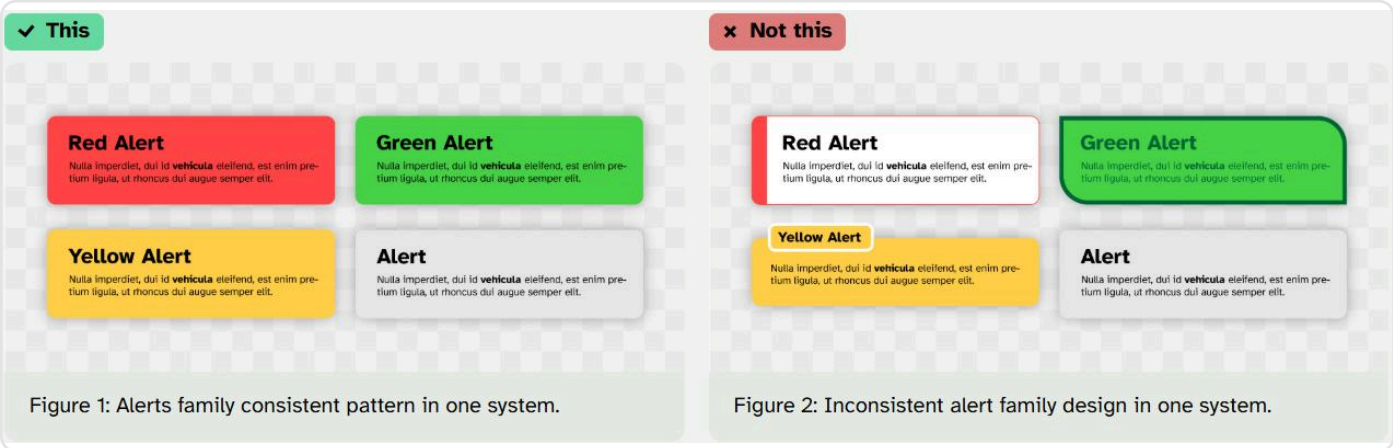


Figure 1: Alerts family consistent pattern in one system.

Figure 2: Inconsistent alert family design in one system.

An example of consistent alerts vs inconsistent alerts given by Soward. On the left, we can see an alerts family consistent pattern of one system. On the right, we can see an inconsistent design.

G) Animations

These could be used to draw attention to an element to indicate the continuation of process or to alert users of a required action. They can help to orient users position when moving forward or backwards in a task, but they should also be used carefully considering the users with vestibular dysfunction. Some unexpected animations like sudden full screen, auto-looping and fast flashing can cause vertigo and dizziness in some users, that is why it is advised to give them the option to turn off animations and to keep animations small (Soward, 2023).

To wrap it up — accessibility is a secret weapon in designing for everyone!

Accessibility transforms products into inclusive experiences that empower every user, regardless of ability or circumstance. Ensuring accessibility is not just a matter of compliance; it's about fostering equity and maximizing the reach and impact of digital products and services. It's a moral imperative that also provides a strategic advantage. By following principles like those in WCAG 2.1, designers can ensure their products are usable by a diverse audience, boosting innovation, compliance, and overall user satisfaction.

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