Jobjo

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Web Usability and Accessibility

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Usability

- **What is usability?**

  - The usability refers to the ease of access or use of a website or product.

  - ISO defines usability as the "*extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use*".

Usability

- Usability inspection methods (UIMs) are applied to evaluate usability (desktop applications/websites/mobile apps) in the field of Human-Computer Interaction (HCI).

- This is achieved by identifying usability problems or violations using an interface.

- A usability problem is defined as "*any aspect of a user interface that is expected (or observed) to cause users problems with respect to some salient usability measure and that can be attributed to a single design aspect*" [7].
  - Learnability
  - Performance
  - Error rate
  - Subjective satisfaction

Usability

- Usability evaluation methods/techniques
  - Based on expert evaluation or require user involvement.
  - Conducted in field studies or in laboratory settings.

- Usability Inspection Methods (without user participation)
  - Cognitive walkthrough
  - Task analysis
  - Claims analysis
  - Heuristic evaluation (expert review)

Usability

- **How to achieve the usability in a product?**
  - Achieving the delight for the users when interacting with the application is not simple.
  - The ten usability heuristics of Jakob Nielsen [7] will help the designers to make the application intuitive.

10 Usability Heuristics

- Visibility of system status
- Match between system and the real world
- User control and freedom
- Consistency and standards
- Error prevention
- Recognition rather than recall
- Flexibility and efficiency of use
- Aesthetic and minimalist design
- Helps users recognise, diagnose, and recover from errors
- Help and documentation

Ten Usability Heuristics

1. **Visibility of system status**
    - The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.

    - <u>Examples</u>:
        - Twitter making a swoosh sound when a tweet is being posted.
        - Google Drive showing the status of a document upload.

[6]

2. **Match between system and the real world**
    - The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.

    - Example:
        - Airbnb uses familiar language and terminology, which is synonymous with more traditional travel booking ("guides"), but also adds its unique language to the immersive experience they provide ("experiences"). They make use of common Things to Do filters like "sightseeing" and "drinks & nightlife".

Ten Usability Heuristics

2. Match between system and the real world

[3]

3. **User control and freedom**
   - Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.

   - Example:
     - Correcting your immediate mistakes in Microsoft Office software.
     - Gmail's flash message with undo action when we accidentally delete an email.
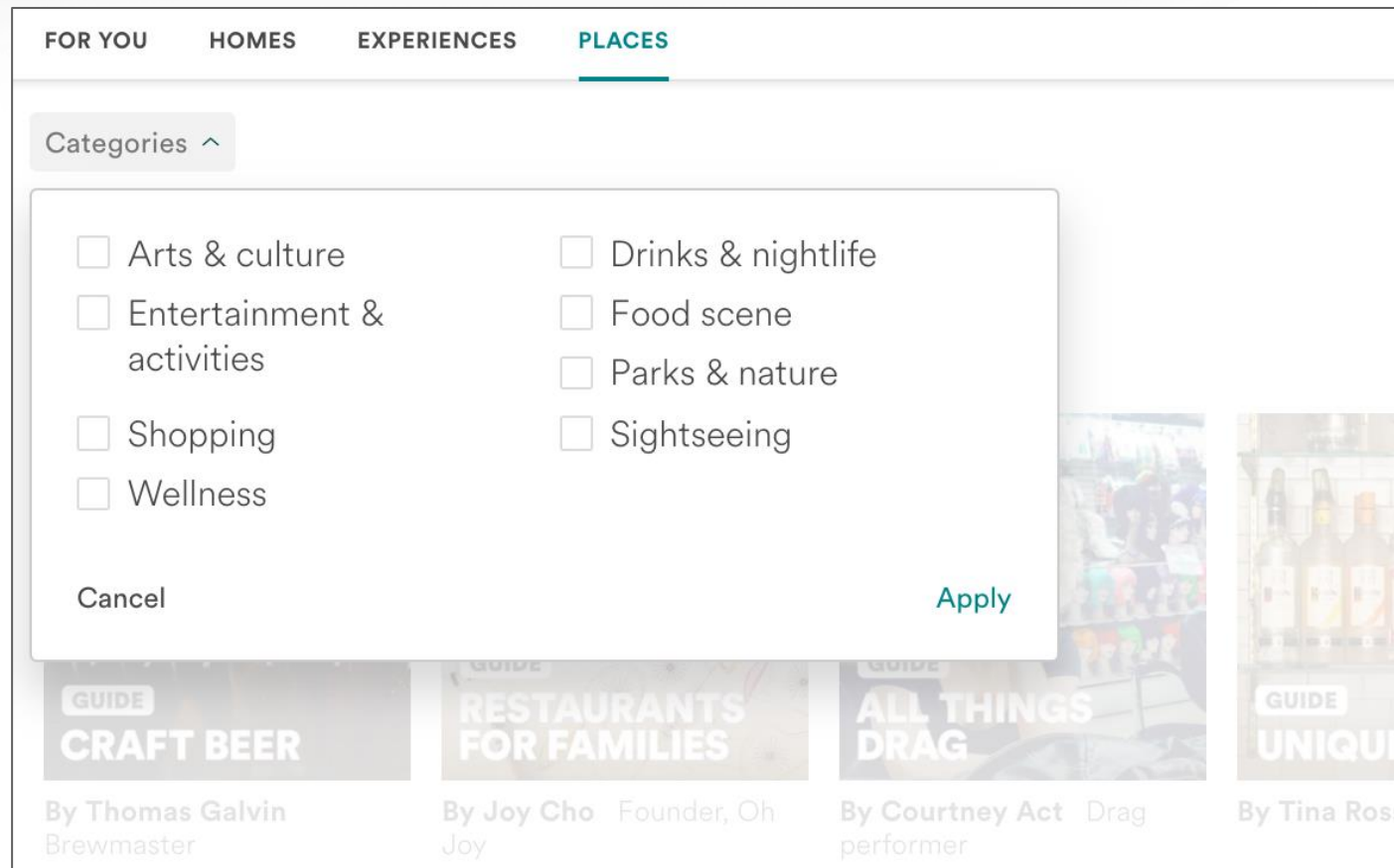
Ten Usability Heuristics

3. **User control and freedom**
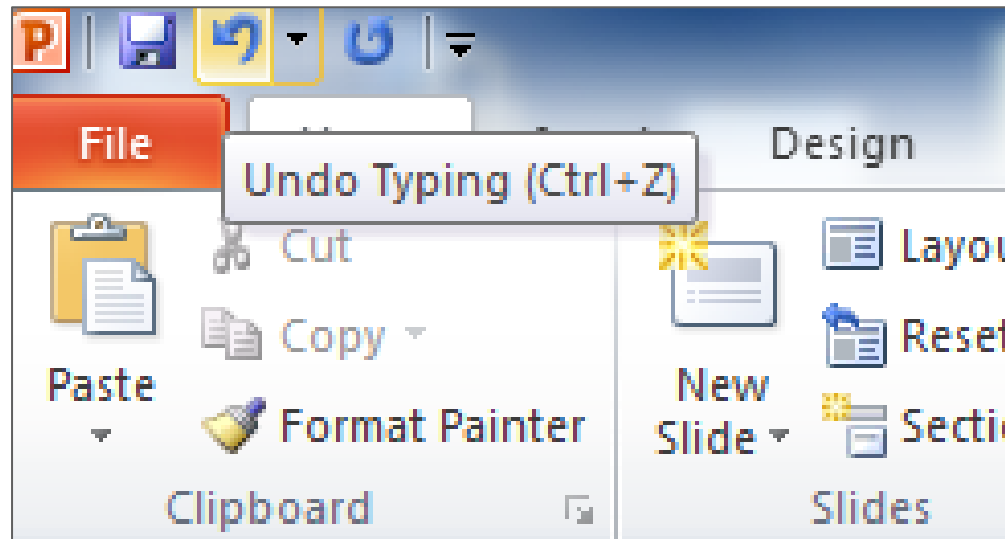
Ten Usability Heuristics

4. **Consistency and standards**
   - Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.

   - Examples:
     - A Submit button should look the same across the site on any page.

Ten Usability Heuristics

4. **Consistency and standards**

- Examples:
    - If the header is displayed in a certain way on the public pages, it should be the same when he/she logs in.
    - Google Plus ambitiously launched "+1" to counter Facebook's "Like" without much success. Facebook's "Like" already became a standard and sites like LinkedIn adopted it without contesting.

[6]
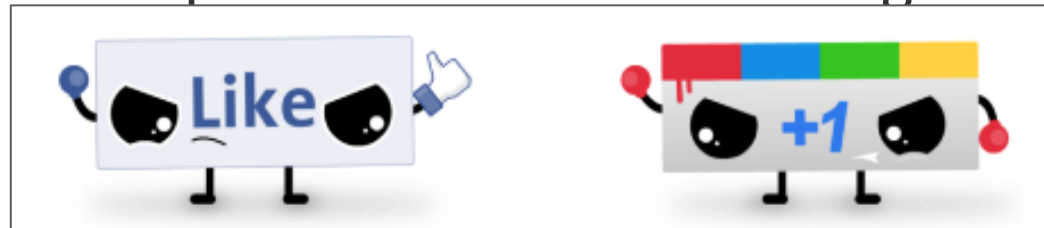
Ten Usability Heuristics

5. **Error prevention**
   - Even better than good error messages is a careful design which prevents a problem from occurring in the first place.

   - Examples:
      - Being reminded by your email client/service that there is no attachment in the email while you mentioned that something is attached.
      - Google Search correcting the spelling of your search.

5. Error prevention

Please find the document attached.

--
Thank you.
Best regards.

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Attachment Reminder

Did you forget to add an attachment?

No, Send Now   Oh, I did!

Google   olyimpic

- olympic   Remove
- olympic rings
- olympic 2020
- olympics
- olympic ship
- olympic games 2020
- olympic holidays
- olympic airlines
- olympic games 2024
- olympic lagoon resort

Report inappropriate predictions

6. **Recognition rather than recall**
   - Make objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.
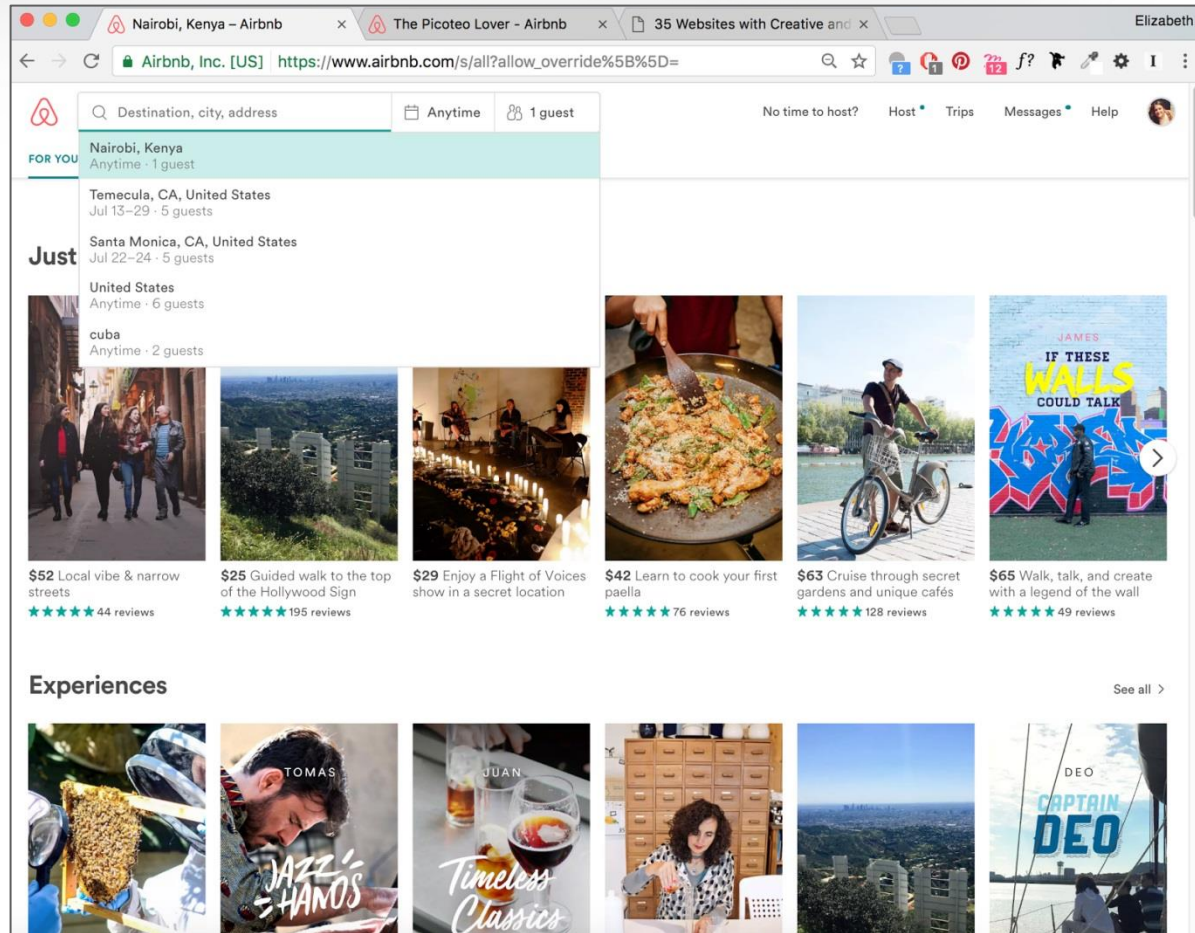
   - Example:
      - On Airbnb, often, a user might look at several destinations in a single session, with various date ranges. To make it easier for the user o toggle between potential itineraries all searches are saved in the search bar, along with the number of guests and selected dates, decreasing the memory load on the user, especially if they're navigating back to the page after a few days or weeks.

Ten Usability Heuristics

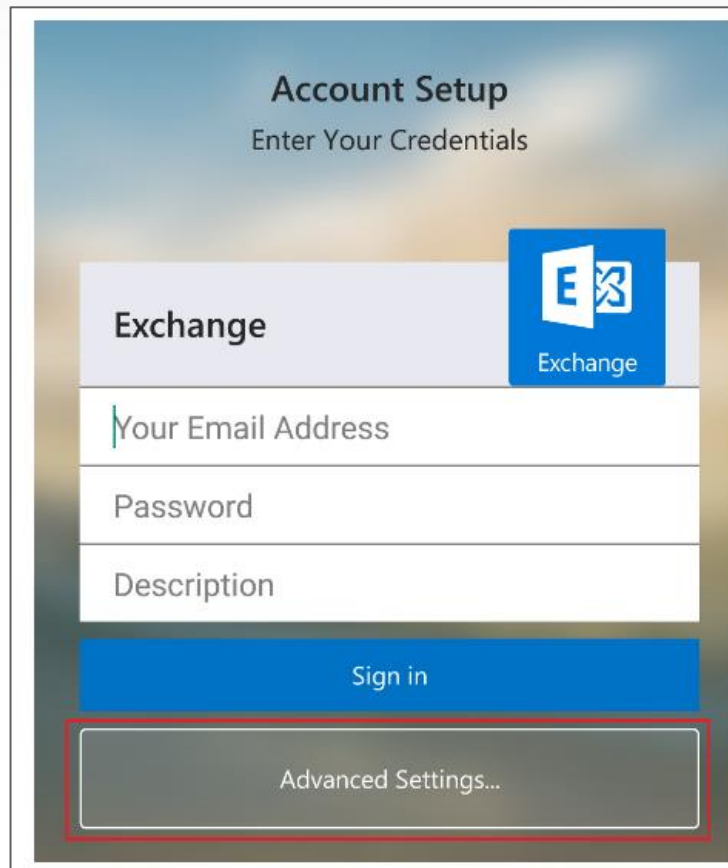**6.** **Recognition rather than recall**

[3]

7. **Flexibility and efficiency of use**
    - Accelerators - unseen by the novice user - may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.

    - <u>Example</u>:
        - When installing a new software, the user is asked whether to go ahead with a default installation or a custom installation. An advanced user could choose the custom option to cut out unnecessary services.

Ten Usability Heuristics

7. **Flexibility and efficiency of use**

[6]

8.   **Aesthetic and minimalist design**
   ▪   Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.

   ▪   Example:
      ▪   Google only shows information needed on their search page. A good example of minimalist design.
      ▪   Apple provides some basic information of feature/product while hiding additional information under "Learn More".

Ten Usability Heuristics

8. **Aesthetic and minimalist design**
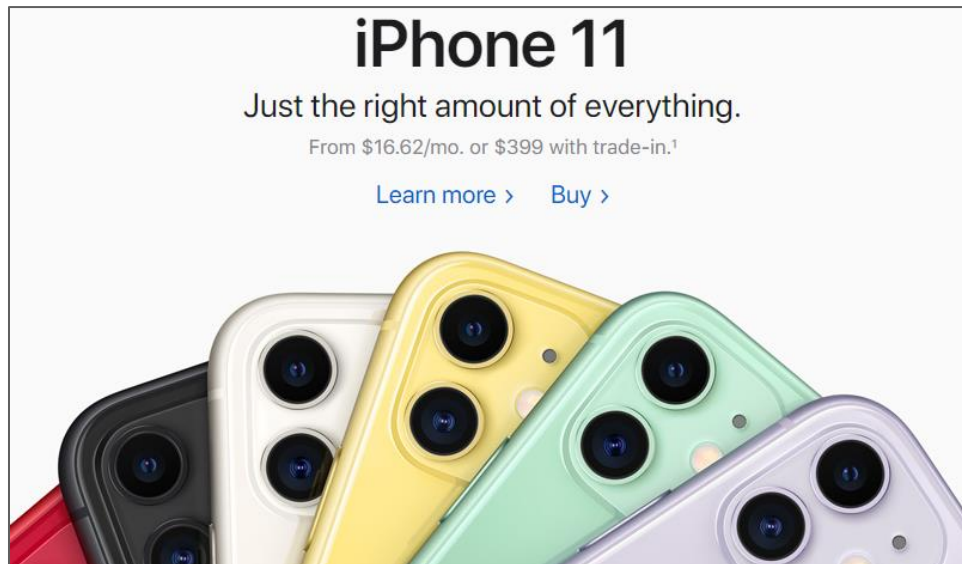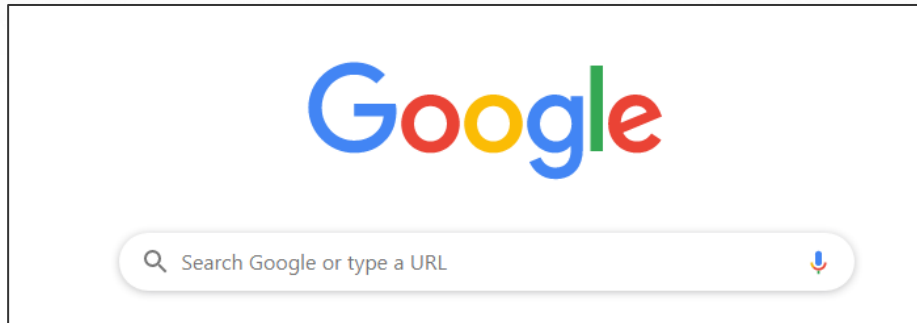
Ten Usability Heuristics

9. **Help users recognize, diagnose, and recover from errors**
   - Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.

   - Example:
     - Receiving an error message that either the username or the password is incorrect when entering your credentials. The user is not being informed whether the username is invalid or if the password is incorrect.

Ten Usability Heuristics

9. **Help users recognize, diagnose, and recover from errors**

[6]

10. Help and documentation

- Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

- Example:
  - GoDaddy's Help page. While there is a search field, there are main categories and frequently asked queries on the same page.

Ten Usability Heuristics

10. Help and documentation
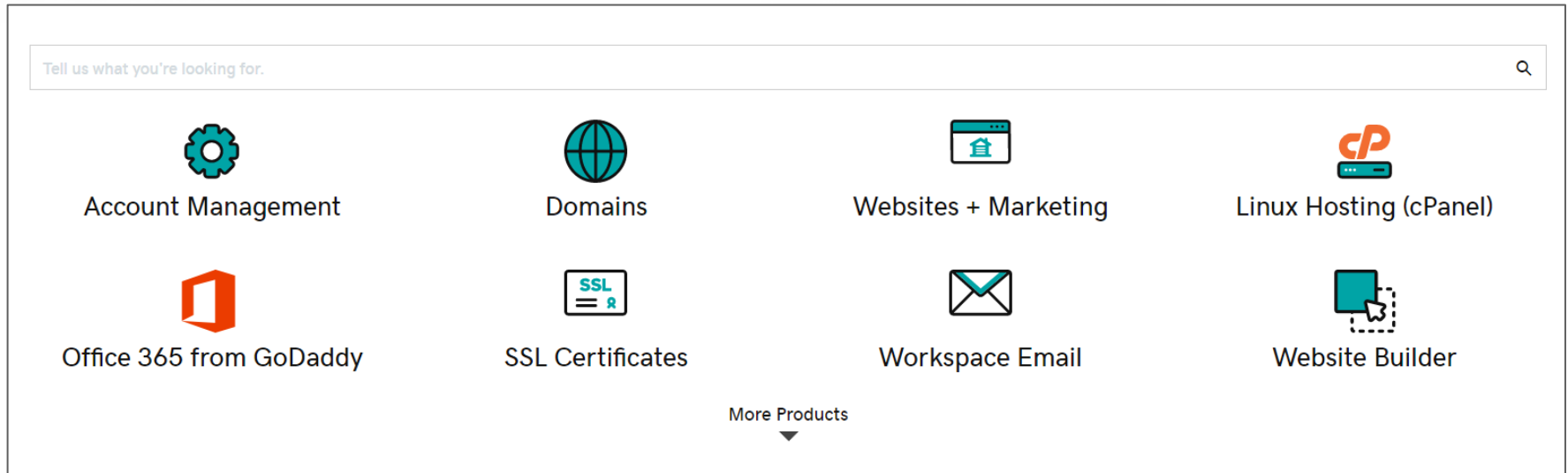
Ten Usability Heuristics

The system should always keep user informed about what is going on, through appropriate feedback within reasonable time.

#	Review Checklist	Yes	No	N/A	Comments
1.1	Does every display begin with a title or header that describes screen contents?	O	O	●	No meaningful page headings.
1.2	Is there a consistent icon design scheme and stylistic treatment across the system?	●	O	O	
1.3	Is a single, selected icon clearly visible when surrounded by unselected icons?	O	●	O	
1.4	Do menu instructions, prompts, and error messages appear in the same place(s) on each menu?	O	O	●	Embedded error messages appear in different locations on the page
1.5	In multipage data entry screens, is each page labeled to show its relation to others?	●	O	O	
1.6	If overtype and insert mode are both available, is there a visible indication of which one the user is in?	O	●	O	
1.7	If pop-up windows are used to display error messages, do they allow the user to see the field in error?	O	●	O	
1.8	Is there some form of system feedback for every operator action?	O	O	●	Some feedback is too subtle
1.9	After the user completes an action (or group of actions), does the feedback indicate that the next group of actions can be started?	●	O	O	
1.10	Is there visual feedback in menus or dialog boxes about which choices are selectable?	●	O	O	
1.11	Is there visual feedback in menus or dialog boxes about which choice the cursor is on now?	●	O	O	
1.12	If multiple options can be selected in a menu or dialog box, is there visual feedback about which options are already selected?	●	O	O	
1.13	Is there visual feedback when objects are selected or moved?	O	●	O	
1.14	Is the current status of an icon clearly indicated?	O	●	O	
1.15	Is there feedback when function keys are pressed?	O	●	O	

Usability vs Accessibility

- **Accessibility**, **usability**, and **inclusion** are closely related aspects in creating a web that works for everyone. Their goals, approaches, and guidelines overlap significantly. It is most effective to address them together when designing and developing websites and applications.

- There are a few situations when it's important to focus specifically on one aspect. E.g. when developing standards and policies. Researching the accessibility needs of people with disabilities helps with developing those.

Usability vs Accessibility

- Accessibility primarily focuses on people with disabilities. Many accessibility requirements improve usability for everyone, especially in limiting situations.
    - Providing sufficient contrast benefits people using the web on a mobile device in bright sunlight or in a dark room.
    - Captions benefit people in noisy and in quiet environments.
    - Some people have age-related functional limitations, and may not identify these as "disability". Accessibility addresses these situations too.

Inclusive Design

*"**Look at the opportunity of design to empower everyone**."*

Dan Formosa – Smart Design and consultant in design and design research

Inclusive Design

- "*Inclusive Design* focuses on the design of mainstream products and/or services that are accessible to, and usable by, as many people as reasonably possible ... without the need for special adaptation or specialised design" [1].

- "*Universal Design* focuses on the design of products, environments, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design. "Universal design" shall not exclude assistive devices for particular groups of persons with disabilities where this is needed" [2].

Inclusive Design
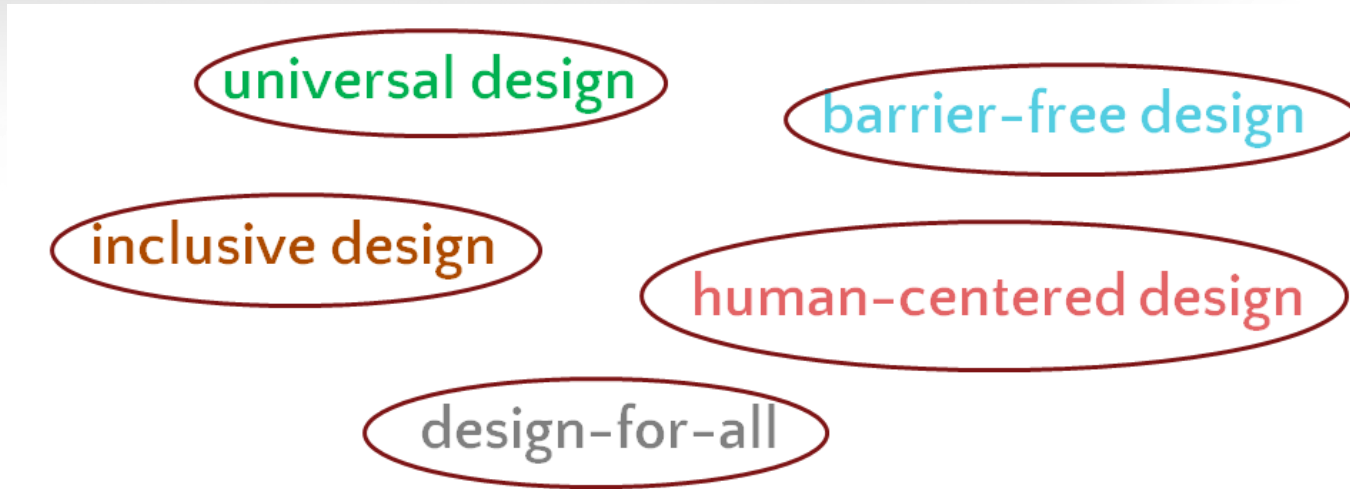
- All these terms represent similar concepts that strive toward a common goal: to make the user experience the first concern in making design decisions and to expand the description of users to include a wide range of human ability [4].

Web Accessibility

"The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect."

Tim Berners-Lee - Director of W3C and inventor of the World Wide Web

Web Accessibility

- "**Web accessibility** means that people with disabilities can use the Web. More specifically, Web accessibility means that people with disabilities can perceive, understand, navigate, and interact with the Web, and that they can contribute to the Web. Web accessibility also benefits others, including older people with changing abilities due to aging" [4].

User who is blind [4]

Web Accessibility

- Web accessibility means that people with auditory, cognitive, neurological, physical, speech, and visual impairments can use the Web.

- Web accessibility does not only benefit people with disabilities. Others will also benefit:
  - **Older people** with changing abilities due to aging.
  - People with **low literacy** or who are not fluent in the language used on the website.
  - People with **low bandwidth** connections or using older technology.
  - People accessing the Web from a **mobile phone**.

Web Accessibility

- Why should we care about Web accessibility?
  - Large percentage of people worldwide living with disabilities.
  - Equality in employment and education.
  - Social responsibility.
  - Laws and regulations.
  - Organisations can benefit from SEO, reduced legal risk, demonstration of corporate social responsibility (CSR), and increased customer loyalty.

Web Accessibility

- Accessibility is a quality, just like usability [4].
  - How easily and effectively a product or service can be accessed and used.

- Physical and cognitive ability occur along a spectrum [4].
  - Physical and intellectual limitations for each person is different. Impacts on what each person can physically accomplish and intellectually comprehend.
  - Considering the full range of capabilities, context of use or environmental constraints translates to good accessibility design.

Web Accessibility

"Technology must be designed to include people with new or old computers, fast or slow network connections, and small or large screens, ... young and old, novice and expert, able and disabled, ... those yearning for literacy, overcoming insecurities, and coping with varied limitations."

Ben Shneiderman - professor in the Department of Computer Science and Founding Director (1983-2000) of the HCI Lab at the University of Maryland

Web Accessibility

- Badly designed websites and applications create barriers that exclude users from using the web as intended [4].
    - Results in a disabling environment where the design does not consider the wide variation in human ability and experience.
    - Disability is seen as a conflict between someone's functional capability and the world we have constructed.
    - Social view of disability: The barrier is created by the product not the person. Similar to design being at fault when a site has poor usability.

Ability + Barrier = Disability

Web Accessibility

- How to avoid creating barriers to maximise the product or service accessibility [4].
  - Adopting a practice of accessibility.

- Think about people not the technology.
  - When people come first, designers think about real people with real needs.
  - Creating personas of people who use the web and who also happen to have disabilities helps with empathising.
  - Helps make sure to design in the necessary features so that everyone has what they need to be successful with using websites and applications.

Web Accessibility
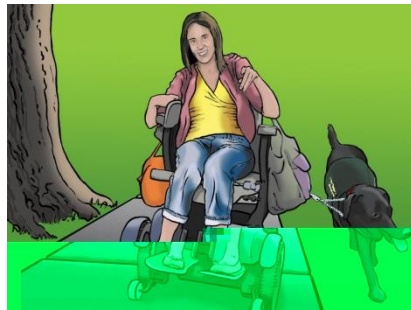
All images are reproduced from [4]

Web Accessibility

- Let's think more generally about this [4].
  - E.g. Public buildings do not generally provide wheelchairs for users with limited mobility.
  - Visitors who do use wheelchairs however will be able to get around because of the buildings construction.
  - Similarly, designers need to be aware of their visitors (websites and web applications) needs and make sure that all necessary features are available to those who need them.

- What does it takes to design a great user experience for everyone?

Ability + Barrier = Disability

Design + Accessibility = Inclusive Design

Creating an Accessible Website

Choose the right path to
WEB ACCESSIBILITY

What is Web accessibility? It's the inclusive practice of removing barriers that prevent interaction with, or access to, websites by people with disabilities.

When websites are correctly designed and developed with accessibility in mind, all users have equal access to information and functionality.

Just like we are taught that each person is unique, so too is each person's interaction with a website.

Here are some common problems encountered by users with disabilities — and how to fix them.

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Creating an Accessible Website

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Creating an Accessible Website

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WCAG 2.1

- The W3C Web Accessibility Initiative (WAI) develops web accessibility standards and guidelines for web and software developers [6].
  1. Web Content Accessibility Guidelines (WCAG 2.1)
  2. Accessible Rich Internet Applications (WAI-ARIA) standard (dynamic content and advanced user interface controls developed with Ajax, HTML, JavaScript, and related technologies).

- The WAI also provides guidelines for developing web authoring tools (ATAG) and software, like browsers and media players (UAAG) (readers and other applications that render web content) [6].

WCAG 2.1

- The WCAG documents explain how to make web content more accessible to people with disabilities. Web "content" generally refers to the information in a web page or web application, including [6]:
  - natural information such as text, images, and sounds
  - code or markup that defines structure, presentation, etc.

WCAG 2.1

- WCAG 2.1 are organized under 4 foundational principles, which conveniently form the acronym POUR [4]:
  - **Perceivable**: Information and user interface components must be presented to users in ways they can see or hear.
  - **Operable**: User interface components and navigation must be designed so that users can interact with them and they can support assistive technologies such as screen readers.
  - **Understandable**: Information and the operation of user interface must communicate clearly and consistently so that the content is readable.
  - **Robust**: Content must be written so that it can be interpreted reliably by a wide variety of user agents, including assistive technologies.

WCAG 2.1

- Under each principle there is a list of guidelines that address the principle [6].
    - One of the key objectives of the guidelines is to ensure that content is directly accessible to as many people as possible, and capable of being re-presented in different forms to match different peoples' sensory, physical and cognitive abilities.

- Under each guideline, there are Success Criteria that describe specifically what must be achieved in order to conform to this standard [6].
    - All Success Criteria are written as testable criteria for objectively determining if content satisfies the Success Criteria.
    - Testing can be automated using software evaluation programs, others require human testers for part or all of the test.

WCAG 2.1

- The internationally accepted standard – World Wide Web Consortium Web Content Accessibility Guidelines (WCAG) 2.1 - has three levels of accessibility: A, AA and AAA [4].
  - **Level A**: For Level A conformance (the minimum level of conformance), the Web page satisfies all the Level A Success Criteria.
  - **Level AA**: For Level AA conformance, the Web page satisfies all the Level A and Level AA Success Criteria.
  - **Level AAA**: For Level AAA conformance, the Web page satisfies all the Level A, Level AA and Level AAA Success Criteria.

WCAG 2.1

- Supporting documents include [6]:
    - **How to Meet WCAG 2.1** - A customizable quick reference to WCAG 2.1 that includes all of the guidelines, success criteria, and techniques for authors to use as they are developing and evaluating Web content.
    - **Understanding WCAG 2.1** - A guide to understanding and implementing WCAG 2.1. There is a short "Understanding" document for each guideline and success criterion in WCAG 2.1 as well as key topics.
    - **Techniques for WCAG 2.1** - A collection of techniques and common failures, each in a separate document that includes a description, examples, code and tests.
    - **The WCAG 2.1 Documents** - A diagram and description of how the technical documents are related and linked.

WCAG 2.1

- Guidelines and standards
    - WCAG 2.1: https://www.w3.org/TR/WCAG21/
    - Section 508: https://www.section508.gov/

- Web accessibility checkers and tools
    - Achecker: https://achecker.ca/checker/index.php
    - Wave: http://wave.webaim.org/

- Assistive technologies
    - Screen readers and magnifiers: http://www.freedomscientific.com/Products/Blindness/JAWS

WAVE Tool

- WAVE Web Accessibility Evaluation Tool: https://wave.webaim.org/

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