**ALL-IN Training fiche**

|  |  |  |
| --- | --- | --- |
| **Title** |  | Accessibility in Digital Communication |
| **Keywords** |  | Web accessibility, multimedia content, assistive tools, inclusive web design, digital communication |
| **Provided by** |  | IT Solutions for All |
| **Language** |  | English |
| **Objectives / Learning outcomes** |  | In this module, you will learn:   * How to understand and apply the principles of web accessibility to create inclusive digital content. * The use of assistive tools and adaptive technologies to enhance accessibility for diverse users. * Inclusive web design techniques and best practices to ensure web content is accessible and usable by everyone. |
| **Description** |  | This module provides a comprehensive overview of accessibility in digital communication, emphasizing the importance of making web content accessible to all users, including those with disabilities. Through this module, learners will gain the knowledge and skills necessary to create and evaluate accessible digital content, ensuring an inclusive experience for all users. |
| **Content index** |  | **Module: Accessibility in Digital Communication**  **Unit 1: Principles of Web Accessibility**  Section 1.1. Understanding Accessibility  Section 1.2. Legal Framework and Standards  Section 1.3. Web Content Accessibility Guidelines (WCAG)  **Unit 2: Assistive Tools and Adaptive Technologies**  Section 2.1. Overview of Assistive Tools  Section 2.2. Adaptive Technologies  Section 2.3. Emerging Technologies  **Unit 3: Inclusive Web Design**  Section 3.1. Principles of Universal Design  Section 3.2. Design Techniques and Practices  Section 3.3. Accessibility Testing and Evaluation |
| **Content developed** |  | **Module: Accessibility in Digital Communication**  **Unit 1: Principles of Web Accessibility**  **Section 1.1. Understanding Accessibility**  According to the Pan-Hispanic dictionary of legal Spanish, universal accessibility is *“the condition that environments, processes, goods, products and services, as well as objects, instruments, tools and devices, must meet in order to be understandable, usable and practicable by all people in conditions of safety and comfort and in the most autonomous and natural way possible”.*  Universal accessibility includes 3 types of accessibility:   * **Cognitive accessibility**: a characteristic that makes something easy to understand and communicate. * **Physical accessibility**: characteristic that indicates that something can be used easily, or that a space can be accessed easily, without relying on physical limitations. * **Sensory accessibility**: characteristic that indicates that something can be used easily, or that a space can be accessed easily, without relying on sensory limitations.   Examples:   * **Cognitive accessibility**: be able to understand a text because it is written in a simpler wording, be able to understand a legal article because it is adapted to an easier reading style. * **Physical accessibility**: to be able to enter a building with a wheelchair, to be able to open a door even if you have little strength. * **Sensory accessibility**: being able to understand a video because it has captions or sign language, being able to read a document because it has large print or is written in braille.   Knowing this, when we talk about web accessibility, we can understand it as the fact that web pages are usable by the largest possible number of people, regardless of their knowledge or personal skills, as well as the technical characteristics of their devices.  In the 21st century, web accessibility is fundamental to many aspects of life, such as education, employment, government, commerce, healthcare and entertainment. Providing equitable access and equal opportunities for all people is of vital importance.  **Section 1.2. Legal Framework and Standards**  In the European Union, digital accessibility is legislated through Directive (EU) 2016/2102 on the accessibility of websites and mobile applications of public sector bodies, referred to as [WAD](https://eur-lex.europa.eu/eli/dir/2016/2102/oj) for Web Accessibility Directive. This directive obliges all public sector bodies in the EU to make their websites and mobile applications accessible.  To achieve this, the European Union, together with the main European standardization organizations, developed a standard called [EN 301 549](https://www.etsi.org/deliver/etsi_en/301500_301599/301549/03.02.01_60/en_301549v030201p.pdf), which establishes accessibility requirements for ICT products and services. These standards are largely based on the Web Content Accessibility Guidelines (WCAG).  **Section 1.3. Web Content Accessibility Guidelines (WCAG)**  The Web Content Accessibility Guidelines (WCAG) provide a single, shared standard that meets the needs of individuals, organizations and governments internationally for accessible web content.  Developed by the World Wide Web Consortium (W3C), they are intended for developers and creators of Web content and Web accessibility evaluation tools.  The most up-to-date version is WCAG 2.2, which [includes 13 guidelines](https://www.w3.org/TR/WCAG22/) and, like the previous versions, includes four fundamental principles:   * **Perceivable**: users must be able to perceive the information presented (it cannot be invisible to all their senses). * **Operable**: users must be able to operate the interface (the interface cannot require an interaction that a user cannot perform). * **Understandable**: users must be able to understand both the information and the operation of the user interface (the content or operation cannot be out of their reach). * **Robust**: users must be able to access content as technologies advance (as technologies and user agents evolve, content must remain accessible).   Compliance with the WCAG guidelines is evaluated through compliance criteria, classified as follows:   * **Level A**: minimum accessibility requirements. * **Level AA**: elimination of major accessibility barriers. * **Level AAA**: the highest and most stringent level of accessibility.   Each level implies compliance with the previous levels. In Spain, it is mandatory for Public Administrations to comply with level AA as a minimum.  **Unit 2: Assistive Tools and Adaptive Technologies**  **Section 2.1. Overview of Assistive Tools**  Assistive Technologies (AT) applied to web accessibility are those that provide technical assistance to people with difficulties in using the web and digital devices, interacting with interfaces or accessing content.  These technologies may include tools of different typologies, designed to meet a wide range of needs. In this case, we will focus on accessibility software tools such as those described below.  **Screen readers**  Software used by visually impaired people to read screen content. A voice synthesizer reads and explains what appears on the screen. Examples:   * [**NonVisual Desktop Access (NVDA)**](https://www.nvaccess.org/):free, portable, open source screen reader developed by Microsoft. Supports 54 languages and numerous applications. * [**Job Access With Speech (JAWS)**](https://www.freedomscientific.com/products/software/jaws/):widely used screen reader in Windows offering numerous features and customization. * [**VoiceOver**](https://www.apple.com/es/accessibility/vision/): integrated screen reader for macOS and iOS devices, offering robust compatibility and integration with Apple products.   **Screen magnifiers**  Magnifiers or screen magnifiers enlarge text and/or images and graphics on the computer screen, making them easier to see. Examples:   * [**ZoomText**](https://www.freedomscientific.com/products/software/zoomtext/): fully integrated magnification and reading tool adapted for users with low vision. Offers customizable magnification levels and color enhancements. * [**MAGic**](https://support.freedomscientific.com/Products/Blindness/MAGic): provides magnification and screen reading, designed for users with low vision. Maintains letter sharpness even at high magnification levels.   **Speech recognition software**  These tools allow users to control devices and enter text using voice commands. They support people with mobility problems or difficulties using peripherals. Examples:   * [**Dragon**](https://www.nuance.com/es-es/dragon.html):powerful and accurate speech recognition software for Windows, developed by Nuance. * [**Apple Dictation**](https://support.apple.com/es-es/guide/mac-help/mh40584/mac): integrated speech recognition tool for iOS and macOS users. * [**Gboard**](https://play.google.com/store/apps/details?id=com.google.android.inputmethod.latin&hl=en&pli=1): the Google keyboard, available for both Android and iOS phones. It features voice recognition and allows you to search the Internet and even translate text. * [**Otter**](https://otter.ai/): collaborative tool and meeting assistant that allows to transcribe the text of a conversation, among other functionalities. * [**Windows Speech Recognition**](https://support.microsoft.com/en-us/windows/use-voice-recognition-in-windows-83ff75bd-63eb-0b6c-18d4-6fae94050571): integrated function in Windows that allows voice control and voice dictation.   **Section 2.2. Adaptive Technologies**  Adaptive technologies are those that help people with functional disabilities to make use of computers and their peripherals despite the difficulties they may have with their abilities.  From alternative input devices to adapted keyboards and mice, and even alternative video game controllers, there is a wide variety of technologies adapted to the various abilities of individuals.  Accompanied by the aforementioned assistive tools, these technologies can mean a before and after in the experience of many people during the use of digital devices, and it is important to make them known to promote accessibility in different contexts. Here are some examples.  **Mouse alternatives**   * **Joystick**: similar in appearance to a console controller, provides an alternative method of control in which the joystick determines the direction and speed of the pointer. * **Mouth mouse**: allows you to control the cursor with mouth movements, such as puffs or aspirations. * **Mouse with sensors**: allows to make use with the movement of the head. * **Foot mouse**: pushbuttons operated by foot movement and foot pressure.   **Adapted keyboards**   * **Large type keyboards**: larger letters and high-contrast colors for people with low vision. Some even include larger keys. * **Ergonomic keyboards**: designed to reduce strain and provide a more comfortable typing experience. Some are designed to be used with one hand. * **Adaptive keyboard cover**: a rigid cover that is placed over the keyboard and forms a barrier to prevent unwanted keystrokes, useful for people with motor disabilities or poor dexterity. * **Braille keyboards**: designed for Braille writing.   **Switches**  Devices that replace traditional keyboard and mouse functions, allowing users to control computers with simple keystrokes.  **Eye tracking devices**  Webcams and/or software with eye-tracking technology that allows users to control their computer and interact with digital content by eye movement, suitable for people with limited or no hand movement.  **Videogames**  Today, adapted technologies are not only limited to the use of computers, but devices are also being developed so that people with disabilities can enjoy activities such as video games, eliminating barriers in leisure time as well.  Major brands in the video game industry, such as PlayStation and Xbox, already have accessible controllers that contribute to the physical accessibility of video games.  **Section 2.3. Emerging Technologies**  New emerging technologies play an important role in the field of accessibility, as they enable advances that improve the lives of people with disabilities at levels that have not yet been fully explored.  Artificial Intelligence, Machine Learning or Augmented Reality are just some of the technologies of the future that are being successfully integrated into accessibility.  **AI and Machine Learning**   * **AI-based screen readers**: Improving the accuracy and context awareness of screen readers through Artificial Intelligence. Some screen readers that already integrate this technology are [Typeahead AI](https://typeahead.ai/) or [accessiBe](https://accessibe.com/accesswidget/artificial-intelligence). * **Automatic captioning and transcription**: AI-based tools to generate subtitles and transcripts in real time or for pre-recorded content. Platforms such as [YouTube](https://www.youtube.com/) already integrate this technology, video editors such as [Clipchamp](https://clipchamp.com/), and dedicated tools such as [happyscribe](https://www.happyscribe.com/).   **Virtual and Augmented Reality**   * **VR for training that addresses disability**: the use of VR simulators can be used to train people on how to interact with people with disabilities and create accessible environments. Similarly, people with disabilities can be trained in controlled environments to help them deal with real-life situations. * **AR for real-time assistance**: Augmented Reality applications can provide real-time data and assistance, helping experts make informed decisions or contribute to remote assistance, improving safety and efficiency.   **Unit 3: Inclusive Web Design**  **Section 3.1. Principles of Universal Design**  When we talk about universal web design, we refer to an approach to user experience (UX) in which websites and web applications should be accessible and usable by as many people as possible, regardless of their abilities, disabilities or circumstances. Inclusive web design principles and practices should aim to ensure that a wide variety of users can access, understand and interact with content.  The [7 Principles of Universal Design](https://www.udinstitute.org/_files/ugd/634d48_7a1b48c7879247a59ba059fa0c38dc14.pdf) were developed in 1997 by a group of architects, designers, engineers and researchers at North Carolina State University.   1. **Equitable use**: the design is useful and marketable for people with diverse abilities. 2. **Flexibility in Use**: design accommodates a wide range of individual preferences and capabilities. 3. **Simple and Intuitive**: the use of the design is easy to understand, regardless of the user's experience, knowledge, language skills or level of concentration. 4. **Perceptible Information**: the design effectively communicates the necessary information to the user, regardless of environmental conditions or the user's sensory capabilities. 5. **Tolerance for Error**: design minimizes hazards and adverse consequences of accidental or unintended actions. 6. **Low Physical Effort**: the design can be used efficiently and comfortably with a minimum of fatigue. 7. **Size and Space for Approach and Use**: adequate size and space is provided for approach, reach, manipulation and use, regardless of body size, posture or mobility of the user.   **Section 3.2. Design Techniques and Practices**  **Color contrast**   * Make sure that text and other critical elements are distinguishable from the background for visually impaired users. There are tools to check the contrast ratio between background color and text, such as [WebAIM](https://webaim.org/resources/contrastchecker/) or [AccessibleWeb](https://accessibleweb.com/color-contrast-checker/). * According to WCAG **level AA**, the contrast ratio should be at least 4.5:1 for normal text and 3:1 for large text. * For **level AAA**, the contrast ratio should be at least 7:1 for normal text and 4.5:1 for large text.   **Text readability**   * Use clear and legible fonts. For example, sans serif fonts such as Arial or Verdana are a good choice. * Make sure the size is large enough for comfortable reading, and maintain proper line spacing. * Do not place text over images or motifs that reduce readability.   **Multimedia accessibility**   * Ensure that audio and video content is accessible to users with hearing, visual and cognitive impairments. * Provide captions, transcripts and audio descriptions on multimedia content. * Images should also have alternative descriptions.   **Design adaptable to different devices**   * Make sure websites and other design elements are accessible and usable on a wide range of devices, from computers to smartphones. * First, make sure content and functionalities are accessible on small screens, and then enhance them for larger screens.   **Section 3.3. Accessibility Testing and Evaluation**  Finally, you should check the accessibility of the design. The most important thing is always human supervision: check that you comply with WCAG guidelines and universal design principles, get other people to use the site and collect their feedback. In addition, you can use automated tools to check web accessibility, such as:   * [WAVE (Web Accessibility Evaluation Tool)](https://wave.webaim.org/): provides visual feedback on the accessibility of web content. * [Axe DevTools](https://www.deque.com/axe/devtools/): a browser extension that detects accessibility issues and suggests solutions. * [Lighthouse](https://developer.chrome.com/docs/lighthouse/overview?hl=es-419): an open source tool from Google that audits web pages for performance, accessibility and best practice. |
| **Summing up** |  | * Now you know what accessibility is and why it is essential for digital communication. * You have learned what WCAG is, the principles of universal design, and how to measure the accessibility of a website. * You have explored different assistive tools and adaptive technologies that help users with disabilities to access digital content. * You have gained practical skills to design and test web content to ensure that it meets accessibility standards. |
| **Glossary entries** |  | **Web Accessibility:** To make web pages usable by as many people as possible, regardless of their knowledge or personal abilities, as well as the technical characteristics of their devices.  **WCAG:** Acronym for Web Content Accessibility Guidelines, developed by the World Wide Web Consortium (W3C). They provide a single, shared standard that meets the needs of individuals, organisations and governments internationally for accessible web content, and they are intended for developers and creators of web content and web accessibility evaluation tools.  **Assistive Technologies:** Applied to web accessibility, they are those technologies that provide technical assistance to people with difficulties in using the web and digital devices, interacting with interfaces or accessing content.  **Universal Web Design:** An approach to user experience (UX) in which websites and web applications should be accessible and usable by as many people as possible, regardless of their abilities, disabilities or circumstances.  **Adaptive Technologies:** Those that help people with functional disabilities to make use of computers and their peripherals despite the difficulties they may have with their abilities. |
| **Multiple-choice questions** |  | **Question 1. Which of the following best describes the main goal of web accessibility?**  Option a: Enhancing website aesthetics  Option b: Ensuring websites are usable by all people, including those with disabilities  Option c: Increasing website traffic  Option d: Reducing server load  **Correct option: b**  **Question 2. What is the purpose of the Web Content Accessibility Guidelines (WCAG)?**  Option a: To provide aesthetic design principles for websites  Option b: To set technical standards for web performance  Option c: To offer guidelines for making web content more accessible to people with disabilities  Option d: To create marketing strategies for web content  **Correct option: c**  **Question 3. Which of the following is an example of an assistive tool for web accessibility?**  Option a: High-resolution display  Option b: Screen reader software  Option c: Video compression software  Option d: Image editing software  **Correct option: b**  **Question 4. Which principle of universal web design focuses on making the design adaptable to a wide range of individual preferences and capabilities?**  Option a: Principle two: Flexibility in Use  Option b: Principle three: Simple and Intuitive  Option c: Principle four: Perceptible Information  Option d: Principle five: Tolerance for Error  **Correct option: a**  **Question 5. Which automated tool can be used for accessibility testing of web content?**  Option a: Photoshop  Option b: Dreamweaver  Option c: WAVE  Option d: Excel  **Correct option: c** |
| **Bibliography and further references** |  | De Accesibilidad Digital Universidad de Alicante, U. (n. d.). *Unidad de accesibilidad digital*. Unidad de Accesibilidad Digital. <https://web.ua.es/es/accesibilidad/tecnologias-accesibles/dispositivos-de-entrada-alternativos.html>  De la Torre, E. (2024, 8 Feb.). ¿Qué es la accesibilidad y por qué es importante? *BBVA NOTICIAS*. <https://www.bbva.com/es/sostenibilidad/que-es-la-accesibilidad-y-por-que-es-importante/>  Diccionario Panhispánico. (2023). *Accesibilidad universal*. Real Academia Española. <https://dpej.rae.es/lema/accesibilidad-universal>  Initiative, W. W. A. (n. d.). *Sumario de WCAG 2*. Web Accessibility Initiative (WAI). <https://www.w3.org/WAI/standards-guidelines/wcag/es>  Menchén, P. G. (2022, 29 May). *¿Qué es la accesibilidad universal? - Diversidad e inclusión*. Diversidad E Inclusión. <https://fundacionadecco.org/azimut/que-es-la-accesibilidad-universal/>  Montero, A. M. (2024, 18 Mar.). *Cómo aplicar los 7 principios del diseño universal*. Discapnet. <https://www.discapnet.es/accesibilidad/marketing-inclusivo/como-aplicar-los-7-principios-del-diseno-universal>  Mora, S. L. (n. d.). *Accesibilidad Web: ¿Qué es?* <https://accesibilidadweb.dlsi.ua.es/>  Mora, S. L. (n. d.-a). *Accesibilidad web - Accesibilidad Web*. <http://accesibilidadweb.es/accesibilidad-web>  Mora, S. L. (n. d.-b). *Accesibilidad Web: Lectores de pantalla*. <https://accesibilidadweb.dlsi.ua.es/?menu=lectores>  Plena inclusión España. (2021, 10 June). *Accesibilidad universal - Plena inclusión*. Plena Inclusión. <https://www.plenainclusion.org/discapacidad-intelectual/recurso/accesibilidad-universal/>  *The 7 Principles - Centre for Excellence in Universal Design*. (n. d.). Centre For Excellence In Universal Design. <https://universaldesign.ie/about-universal-design/the-7-principles>  *Types of assistive technology | Digital Accessibility*. (n. d.). <https://dap.berkeley.edu/types-assistive-technology>  *WCAG - Guía de referencia rápida.* (n. d.). WCAG - Guía de Referencia Rápida. <https://guia-wcag.com/es/>  *Web Accessibility Directive — Standards and harmonisation*. (n. d.). Shaping Europe’s Digital Future. <https://digital-strategy.ec.europa.eu/en/policies/web-accessibility-directive-standards-and-harmonisation>  *What are adaptive technologies?* (n. d.). Accessibility @ UW-Madison. <https://accessible.wisc.edu/guides/what-are-adaptive-technologies/> |