

Visualization (Vis)

Storytelling with
Interactive Data Visualizations



Lecture 12 — Design For All





Today's Learning Goals


1. Understand the principles of “Design for All” and “Inclusive Design” and their importance in creating equitable visualizations.
2. Learn about key legal frameworks and guidelines related to accessibility in digital design.
3. Explore practical strategies for making interactive data visualizations more inclusive and accessible.





Visualization

Design For All

1.  Motivation for Inclusive Design
2. Legal Aspects
3. Practical Strategies for Inclusive Data Visualizations



What is Design for All, Accessibility, Inclusive Design, Universal Design?

◆ Definitions

- **Design for All:** create products, services, and environments usable by everyone, regardless of ability or background
- **Accessibility:** ensuring that interfaces and technology can be used by people with disabilities
- **Inclusive Design:** design for a diverse range of users, accounting for varying abilities, cultural contexts, and experiences
- **Universal design:** create *one* experience that can be accessed and used to the greatest extent possible by all people

➔ Key Ideas

- go beyond meeting minimum accessibility standards
- create better experiences for all



Source: <https://www.nngroup.com/articles/inclusive-design/>



Why Does Inclusive Design Matter?

- ◆ Improves usability for all users
- ◆ Expands the audience for your visualizations
- ◆ Supports diversity and equity
- ◆ Enhances the storytelling impact by ensuring no one is left out





Principles of Inclusive Design

- ◆ **Perceivable**: Information must be presented in ways everyone can perceive.
- ◆ **Operable**: Users must be able to navigate and interact with the visualization.
- ◆ **Understandable**: Content and design must be clear and intuitive.
- ◆ **Robust**: Compatible with assistive technologies.




Source: <https://www.w3.org/WAI/WCAG21/Understanding/intro#understanding-the-four-principles-of-accessibility>



Visualization

Design For All

1. Motivation for Inclusive Design
2.  Legal Aspects
3. Practical Strategies for Inclusive Data Visualizations



Legal Frameworks for Accessibility

◆ Key Laws and Guidelines

- **EU Accessibility Act** (EU)
European Union directive for digital and physical accessibility
- **WCAG** (Web Content Accessibility Guidelines)
International standards for digital accessibility
- **ADA** (Americans with Disabilities Act)
U.S. law prohibiting discrimination, including in digital spaces
- **Equality Act** (UK)
Requires reasonable accommodations for accessibility

◆ Meeting these guidelines is (often) a legal requirement

Sources:

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019L0882>

https://employment-social-affairs.ec.europa.eu/policies-and-activities/social-protection-social-inclusion/persons-disabilities/union-equality-strategy-rights-persons-disabilities-2021-2030/european-accessibility-act_en

<https://www.w3.org/TR/WCAG21/>

<https://www.ada.gov/>

<https://www.legislation.gov.uk/ukpga/2010/15/contents>



The EU Accessibility Act: Key Details for Designers (I)

◆ What is the EU Accessibility Act?

- A directive aimed at ensuring accessibility in products and services for people with disabilities
- Applies to digital and physical environments across the European Union
- Focuses on removing barriers to access for all citizens, fostering inclusion

◆ What Does It Cover?

- Products
 - Computers and operating systems
 - Self-service terminals (e.g., ATMs, ticketing machines)
- Services
 - Websites, mobile applications, Online banking, e-commerce platforms
 - Transport services and ticketing systems, Audiovisual media services

◆ Who Must Comply?

- Businesses: Enterprises providing digital services (e.g., e-commerce, banking, travel)
- Public Sector Organizations: Government websites, digital platforms, and related services
- **Deadlines:** Businesses must comply by **June 28, 2025** for digital and physical accessibility

Source: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019L0882>



The EU Accessibility Act: Key Details for Designers (II)

◆ Key Requirements for Digital Accessibility

- ➔ Basically: Adherence to WCAG Standard 2.1, Level AA compliance
 - Text alternatives for non-text content
 - Keyboard accessibility for interactive elements
 - Sufficient contrast between text and background
 - Clear navigation and predictable interfaces
 - Captions and transcripts for multimedia content

◆ Penalties for Non-Compliance

- Non-compliance can result in fines, legal action, or removal of services from the market
- Strict enforcement by national regulators in EU member states

◆ Benefits Beyond Compliance


- Expanding reach to a broader audience
- Enhancing user satisfaction and brand reputation
- Supporting diversity and inclusion

Source: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019L0882>



Visualization

Design For All

1. Motivation for Inclusive Design
2. Legal Aspects
3.  Practical Strategies for Inclusive Data Visualizations



Challenges in Designing for All



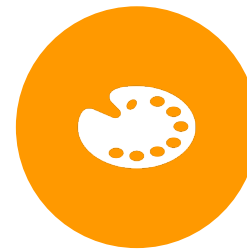
Lack of alternative formats: No text descriptions for visual content



Data density: Overwhelming or cluttered layouts



Complex interactivity: Features that are not keyboard- or screen-reader-friendly



Colour dependence: Using only colour to convey information



Making Data Visualizations Inclusive



Include alternative text for charts and descriptions for complex visualizations



Use clear, readable fonts and ensure adequate contrast



Use colour-blind-friendly palettes and add patterns or labels



Enable zoom and resize options for visual content



Accessibility in Interactivity



Ensure interactive elements are keyboard- and screen-reader-friendly



Provide clear instructions for navigating the visualization



Use hover states sparingly and provide alternative ways to display information



Test interactions across various assistive technologies



Key Takeaways

- ◆ Inclusive design **creates better experiences for everyone.**
- ◆ It's not just a **legal requirement** - it's **the right thing to do.**
- ◆ Make inclusivity **a central part of your design process.**
- ◆ **Test** your designs and **listen** to diverse user feedback.



Photo by Dragonfly Ave on Unsplash