Accessibility Needs Research Guide

What is accessibility and why is it important?

Accessibility refers to the practice of designing and developing digital content, products, and services so that people with disabilities can use them effectively. This includes **websites, apps, tools, and other technologies** that are usable by people with a wide range of abilities, for example people who may be visually impaired, hearing impaired, have mobility issues or cognitive differences. Accessibility follows globally recognized standards like the **Web Content Accessibility Guidelines (WCAG)**, which ensure content is **perceivable, operable, understandable, and robust (POUR)**. Rather than viewing disability solely as a personal medical issue, the social model of disability —now the preferred framework— emphasizes that **disability arises from barriers in the environment and society**. Accessibility work aims to remove those barriers so everyone, regardless of their physical, visual, hearing, or cognitive abilities, can engage fully with digital content.

Accessibility is important because it promotes **inclusion and equal access** for all. More than 1.3 billion people worldwide, according to the WHO, identify as having a disability, making this the largest minority group globally. Many disabilities are **invisible** and everyone may experience **temporary or situational impairments** at some point in life. Designing for accessibility improves the experience not just for people with disabilities but for everyone.

Beyond the moral responsibility, accessibility has **legal and commercial implications**. Laws like the UK Equality Act and the upcoming European Accessibility Act (EAA) encourage organizations to create accessible tools and continuously improve their offerings. Businesses also benefit from wider reach, increased customer loyalty, and enhanced search engine optimization (SEO) —all of which contribute to long-term success. Finally, they all recognize their duty to contribute positively to society.

How do you identify audiences who have accessibility issues?

Identifying audiences with accessibility needs requires a multifaceted and inclusive approach that acknowledges the wide range of disabilities:

- visual (e.g., blindness, color blindness),

- auditory (e.g., hearing loss),

- motor (e.g., limited mobility),

- cognitive (e.g., dyslexia, ADHD),

- neurological,

- speech-related,

- temporary or situational impairments

Image Source: https://uxdesign.cc/the-a-to-z-of-ux-a-is-for-accessibility-12-top-tips-for-designing-an-inclusive-user-experience-667eedaf5bca

It is also essential to consider older adults, non-native speakers, and people in environments that limit their ability to see, hear, or interact with digital content. These diverse user profiles all require thoughtful design to ensure they can access and use digital products effectively.

To identify these audiences, user research must go beyond basic demographics.

Inclusive methods include **interviews, surveys, and usability testing sessions** with participants who use assistive technologies such as **screen readers, magnifiers, speech input, adapted keyboards, or switch devices.** Feedback from these users reveals real-world challenges and barriers that may not be apparent through standard testing. Behavioral data like **bounce rates, session duration, and heat maps** can also highlight areas where users are struggling. Accessibility audit tools such as WAVE, axe, and Lighthouse, along with manual testing guided by the Web Content Accessibility Guidelines (WCAG), provide valuable insight into technical issues that need to be addressed.

Creating a truly inclusive product also depends on **ongoing communication and collaboration**. Encouraging users to report accessibility issues via feedback forms, offering accessible customer support, and consulting with disability advocacy groups can all contribute to a deeper understanding of user needs. According to the World Health Organization, **more than 1.3 billion people worldwide identify as having a disability**. Recognizing their needs —not just as a legal or ethical obligation, but as an opportunity to improve user experience for all— **drives innovation, expands market reach, and ensures meaningful digital inclusion.**

Why it is important to address the needs of these audiences?

People with disabilities represent nearly a quarter of the global population and have a combined annual disposable income of around $490 billion in the U.S. alone — comparable to other major market segments. This **economic influence** expands even further when considering their friends and families, reaching over half of all consumers worldwide. Businesses that neglect accessibility not only miss out on this significant market but also risk legal consequences, as digital accessibility lawsuits continue to rise, especially in e-commerce. Moreover, designing for accessibility

often drives **innovation**, leading to products and technologies that **benefit everyone**.

By June 2025, services should be designed to "*maximize their foreseeable use by persons with disabilities*" by implementing the **EAA** as part of the EU's broader strategy to build a more inclusive society and internal market. The EAA is a **landmark legal change** that will improve the lives of disabled people by ensuring **equal access** to digital products and services for EU consumers. This legislation applies to the majority of organizations that provide products and services to customers in the EU. It applies to a broad range of products and services, especially those with digital interfaces or used in daily life, such as **computers and operating systems, smart phones, banking, e-commerce, e-books, ATMs, ticketing and check-in machines,** etc.

As requirements, they wish products and services to be designed according to the underpinning principles of all digital accessibility known as **POUR** (mentioned above). In EU member states, it does not, however, replace the current national accessibility regulations. Rather, it is a supplement to them, therefore companies and organizations have to comply with both EAA and any applicable existing national accessibility laws.

It is crucial to attend to the requirements of various audiences, especially those with disabilities, for **practical, commercial, and legal reasons** in addition to **ethical** ones. Moreover, to improve user experience and customer loyalty, accessible digital goods and services can reach a wider audience and adhere to regulatory requirements like those set forth in the EEA. The EAA frequently requires that businesses employ navigational aids that make user interaction easier and offer content in alternate formats (such as text alternatives for visual media).

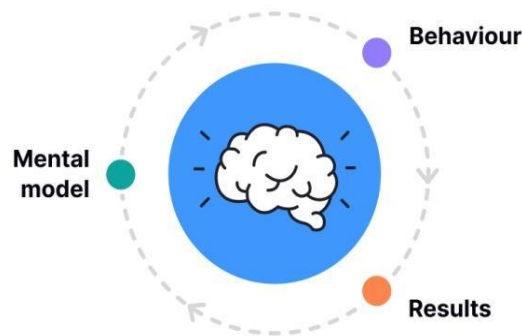# What are mental models and how do they affect communication processes?

A mental model is a **cognitive representation or framework** that individuals create based on their experiences, which helps them understand and interpret processes or concepts in the world around them. It is, basically, **a simplified explanation of how something works**. When someone encounters a particular task or situation, their mind constructs a mental model or **"cognitive script"** that includes details about the setting, the tools required, the people involved and the steps necessary to complete the task. Like a map, mental models focus on important information while ignoring irrelevant details.

Mental models are crucial in the communication process as they significantly affect communication by influencing how individuals interpret instructions and information. The success of communication relies on a mutual understanding of these mental models, which can vary widely based on **individual experiences, cultural backgrounds and accessibility challenges**. When designing information or instructions, it is essential to consider these differences to ensure clarity and effectiveness in communication. In other words, **mental models help us understand the world**. For example, game theory is an umbrella term for the science of logical decision- making in humans, animals, and computers. It is used in many fields in order to analyze various situations and predict their most likely outcomes.

How can diverging mental models create accessibility problems?

Factors like **language, culture, environmental exposure**, and most notably, **how individuals perceive and interact with information**, all shape our mental models. When digital products are designed under the assumption that all users think alike, the result is often confusion, inefficiency, and inaccessibility. For people with disabilities, these models may differ significantly. For instance, someone using a screen reader may depend on a hierarchical content structure, while an individual with cognitive disabilities may need clarity through consistency, simplicity, and predictability. If interfaces rely on ambiguous icons, inconsistent layouts, or interactions like dragging and dropping that assume precise motor skills or visual cues, users with differing expectations may struggle or be excluded entirely.

To address this, designers can map user workflows to **understand how different audiences approach and interpret tasks**. This can be done through collaborative methods such as **structured interviews and small group sessions**. By examining where users expect to find features, how they interact with systems, and what sensory cues they rely on, teams can craft more intuitive experiences. Integrating these insights early in the process, alongside accessibility standards and inclusive design principles, ensures **technology is easier to use for all.** Embracing the diversity of mental models is essential for building systems that reflect the real-world needs of a wide range of users.

How can you identify the mental models of individuals with accessibility issues?

Image Source: https://wdhb.com/blog/does-your-company-challenge-mental-models/

1. To **identify the mental models** accurately, researchers must begin by **selecting participants who represent a broad spectrum of accessibility challenges**, such as visual, auditory, motor, or cognitive impairments. It is essential to ensure diversity in experiences and to accommodate various modes of communication and participation. Inclusion is not just ethical —it is vital for obtaining accurate insights. Individuals with disabilities often rely on alternative sensory channels like touch or sound instead of sight, leading them to form fundamentally different cognitive scripts from those of non-disabled users.

2. **Analyzing mental models** in this context involves understanding four core script components: **(1) the location where a task occurs, (2) the tools or items used, (3) the individuals involved, and (4) the steps taken to complete the task**. Because cognitive scripts are shaped by personal experience and sensory access, people with disabilities may describe and conceptualize processes in distinct ways. For instance, a blind user might navigate a space using auditory cues or tactile feedback rather than visual indicators. When such user-generated mental models differ from those assumed by designers —who often prioritize visual cues— this misalignment can lead to communication breakdowns and accessibility barriers.

3. To **uncover these mental models**, researchers should employ both **individual interviews and focus groups**. Interviews allow for in-depth exploration of personal experiences, while focus groups reveal commonalities and can help participants remember overlooked details. A combination of open-ended and structured questions is recommended to elicit key components of users' cognitive scripts. Questions might include: "Where do you usually perform this task?", "What is that place like?", "What tools do you use?", and "Can you walk me through the steps you take?" Social dynamics should also be addressed with questions like "Do you do this alone or with assistance?" and "What role does the other person play?" This approach — known as script mapping— enables researchers to construct user-centered mental models that reflect real-world diversity in sensory and cognitive experience. By doing so, designers can create inclusive digital environments

that are perceivable, understandable, and usable for everyone, regardless of
ability.

What is usability testing and how is accessibility connected to usability?

Usability testing is the process of **evaluating** how effectively people can use a product or material to complete specific tasks. It's commonly done by **observing** members of the intended audience as they try to perform these tasks, often using a method called the *Talk-Aloud Protocol*, where users verbalize their thought process while interacting with the content.

When testing for accessibility, usability testing focuses specifically on **how people with disabilities experience the product** —identifying barriers they may face and how well the design accommodates their needs. The best practice consists of having **different groups according to different disabilities**, for example visually, hearing, cognitive impaired people and doing a usability test for each specific group. For

these groups it's important to create **specific tasks** depending on how their disability affects the usability of the product.

When conducting usability testing, a foundational principle is to start with a broader audience in mind rather than restricting the testing to a specific group of people. Just like a website is created for different languages simultaneously, it should be created, from the beginning, for all kinds of disabilities.

Conducting Usability Testing to Evaluate Accessibility

Image Source: https://www.freepik.com/

1. Completion metrics

Completion metrics track whether users are able to carry out specific tasks on a website. These metrics are central to **understanding the practical usability of a digital experience**, especially for users who interact with content in non-traditional ways. If people cannot, for instance, complete a checkout process, locate contact information, or successfully fill out a form, it could be **a sign of inaccessible design**. These outcomes are measured through **structured usability sessions** involving participants who use tools like screen readers, adaptive switches, or keyboard-only navigation. By evaluating which tasks are completed, where users abandon the process, and how long actions take, we can **identify friction points that hinder inclusivity**.

2. Talk-aloud protocols

Talk-aloud protocols involve **asking participants to vocalize their thoughts and decision-making** while navigating a website. This running commentary provides unique insights into what users notice, what they find unclear, and how they interpret elements on a page. For example, a user might say, "I don't understand this icon," or

"I can't find the next step." When working with individuals using assistive tech, such feedback is especially valuable —surfacing concerns like missing image descriptions or keyboard traps. These sessions allow designers to hear users' reasoning in real time, **offering a deeper understanding** of what works, what doesn't, and why.

3. Post-testing interviews

After usability testing concludes, **follow-up interviews** allow participants to reflect on their overall experience. These conversations often surface challenges that may not have been obvious during task execution. For example, a person with low vision might report that color contrast made reading difficult, or someone with physical impairments might explain how complex menus slowed them down. These **post-session discussions** provide **emotional and practical context** to the quantitative data gathered earlier. By combining success rates from task metrics, behavioral insights from think-aloud sessions, and the personal stories from interviews, teams gain a **well-rounded understanding of accessibility and clear guidance** for making improvements.

Applying Testing Results to Address Accessibility

Image Source: https://www.freepik.com/

A. Data Analysis

To effectively address accessibility through usability testing, it is essential to interpret the results in a systematic and meaningful way. The process begins with the analysis of the three core data sources mentioned above: completion metrics, talk-aloud protocol observations, and post-usability testing interviews. Completion metrics provide quantitative insight into how many participants were able to successfully

complete specific tasks using the product, and how long it took them to do so. As to completion metrics, high task completion rates and reasonable completion times typically indicate that users are able to interact with the system efficiently. Conversely, low success rates or excessively long completion times may signal barriers in design that hinder accessibility, particularly for users with cognitive, motor, or sensory challenges.

In addition to quantitative data, the talk-aloud protocol offers a rich layer of qualitative feedback. As users engage with the product, they are asked to verbalize their thoughts, expectations, and decision-making processes in real time. This method allows designers to gain insight into users' mental models—how they think the system should work—and to identify moments of confusion, frustration, or unmet expectations. When it comes to talk-aloud protocol, these spoken reflections often reveal design elements that conflict with the user's natural way of interacting with digital environments, especially when accessibility needs are involved.

Following the task, post-usability interviews are conducted to gather reflective feedback from users. Participants are asked what worked well, what didn't, and how they would improve the system. This post-testing interview stage is crucial for uncovering lingering frustrations, usability gaps, and suggested solutions directly from the target audience. Importantly, patterns that appear across multiple participants —such as recurring difficulties with navigation or unclear labeling— highlight critical areas for revision.

B. Revisions

Once the findings from the three core data sources —completion metrics, talk-aloud protocols, and post-usability testing interviews— are reviewed, they **guide specific revisions to the website or product**. Commonly identified issues are prioritized and addressed through **design changes** that better align with users' expectations and accessibility needs. For example, unclear links might be reworded, form fields made more screen-reader friendly, or layouts adjusted for easier keyboard navigation. These changes aim to **remove barriers** that previously prevented users from accessing or using the content effectively.

C. Second round of usability testing

To ensure that revisions have genuinely improved accessibility, **a second round of usability testing** is conducted. This testing must involve **new participants from the same target audience** to avoid bias from previous exposure. The same methodology is used: tracking completion rates and times, gathering real-time feedback through the think-aloud protocol, and conducting follow-up interviews. **The goal is to compare results with the initial round** to determine whether the revised version leads to **better task performance and fewer usability issues.**

If users complete tasks more efficiently, express fewer frustrations, and provide more positive feedback, this suggests the revised product is **more accessible**. However, if challenges persist, **additional changes are implemented**, and the testing cycle is repeated. This **iterative process of testing**, analysis, revision, and re-testing ensures that the final product not only functions effectively but is also truly accessible to its intended audience, regardless of their physical or cognitive abilities.

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