servicenow

Accessibility Cards

Welcome to our second release of Accessibility cards! We use these cards at ServiceNow to inform our product design and thought you might find them useful, too. We hope they inspire us all to make accessible digital experiences!

We developed the following 12 cards through a combination of primary and secondary research. The cards highlight major differences and challenges people with disabilities may encounter when interacting with software, like ServiceNow. Though the listed solutions span different disabilities and severities, we categorized them by whom would be impacted the most.

Anyone could experience various combinations of disabilities, which could materialize at any time. As such, this pack focuses more on primary work activities and less on individual personal experiences. The pack also includes an anatomy of the cards and a quick reference guide. Thank you for considering all users in all you do!

ServiceNow's UX Research & Insights Team
UXRI

How to use

When looking at your organization's digital products, please choose the appropriate existing personas (or target users) already developed by your team/company. For each identified persona, use all 12 accessibility cards side-by-side. These cards are not distinctive personas themselves but should be seen as overlays that emphasize additional experiences people may encounter. Use this combination to inspire designing, coding, testing, writing, marketing, and researching.

Since W3C WCAG encompasses all categories and severity levels of disabilities, please reference all cards in this pack to help create actionable results for customers. The goal of these cards is less about building empathy and more about what factors to keep in mind.

Card anatomy - front

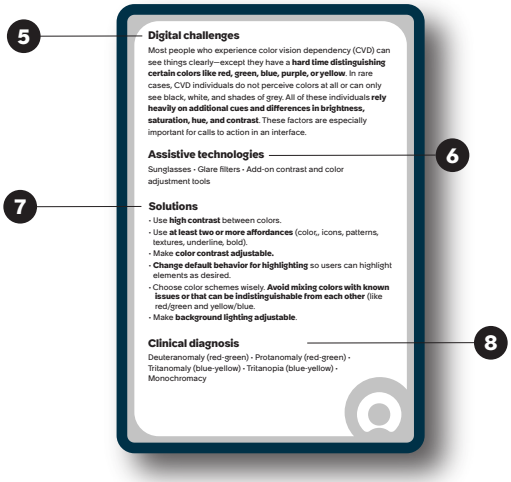
1 **Disability icon**: Gives a visual indication of the disability category associated with a card.

2 **Disability category**: Names the overarching category in which a card resides.

3 **Functional limitation**: Names the mental and/or physical limitation on which a card focuses.

4 **Card number**: Denotes the number of the card in this deck, matching the number on the reference card.

Card anatomy - back



5 Digital challenges: Articulates potential technology-related challenges people may face with the functional limitation.

6 Assistive technologies: Lists typical types of technology used to aid the functional limitation.

7 Solutions: Proposes ways to address or consider the functional limitation in software and design.

8 Clinical diagnosis examples: Lists common health conditions sometimes associated with the functional limitation.

DISABILITY

Visual

FUNCTIONAL LIMITATION

Color vision deficiency

Digital challenges

Most people who experience color vision deficiency (CVD) can see things clearly—except they have a **hard time distinguishing certain colors like red, green, blue, purple, or yellow**. In rare cases, CVD individuals do not perceive colors at all or can only see black, white, and shades of grey. All of these individuals **rely heavily on additional cues and differences in brightness, saturation, hue, and contrast**. These factors are especially important for calls to action in an interface.

Assistive technologies

Sunglasses • Glare filters • Add-on contrast and color adjustment tools

Solutions

- Use **high contrast** between colors.
- Use **at least two or more affordances** (color, icons, patterns, textures, underline, bold).
- Make **color contrast adjustable**.
- **Change default behavior for highlighting** so users can highlight elements as desired.
- Choose color schemes wisely. **Avoid mixing colors with known issues or that can be indistinguishable from each other** (like red/green and yellow/blue).
- Make **background lighting adjustable**.

Clinical diagnosis examples

Deuteranomaly (red-green) • Protanomaly (red-green) • Tritanomaly (blue-yellow) • Tritanopia (blue-yellow) • Monochromacy

DISABILITY

Visual

FUNCTIONAL LIMITATION

Partially sighted/ low vision

Digital challenges

People with low vision can **see in blurs or varying degrees of distortion**, including blind spots in certain areas. Though they can navigate the world, they have a **difficult time reading and seeing small-sized content like fonts and icons**. In most instances, one or more tools like magnification, resizing fonts, increasing contrast levels, using keyboard tabbing, and increasing lighting can be used to accommodate for this limitation.

Assistive technologies

Tactile keyboards • Magnifying glasses • Browser or application magnifiers • Monitor resolution adjustments

Solutions

- Consider **responsive design**.
- Optimize for **resizing and zooming**.
- **Minimize scrolling and hidden content**.
- Make **font sizes adjustable**.
- Make **white space adjustable**.
- Allow for **keyboard focus**.
- Use **high contrast** between colors.
- Make **background lighting adjustable**.

Clinical diagnosis examples

Cataracts • Refractive Errors • Glaucoma • Age-Related Macular Degeneration • Diabetes • Corneal Opacification • Trachoma • Stroke • Premature Birth • Cortical Visual Impairment • Down Syndrome • Autism Spectrum Disorder • Multiple Sclerosis • Alzheimer's Disease • Dementia • Prader Willi Syndrome • Ocular Trauma

DISABILITY

Visual

FUNCTIONAL LIMITATION

Legally/ totally blind

Digital challenges

Individuals who are blind rely heavily on touch and hearing. They develop their own sense of the world inside their head. Depending on severity, they **can experience flashes of colors and shapes** due to the brain trying to make up for the lack of vision. Assistive technologies help them navigate the world and may convert content that is being presented to them. **For people using screen readers, they rely solely on what they hear to guide them and help complete tasks**.

Assistive technologies

Braille • Braille embossers • Refreshable braille displays • Screen readers • Canes • Service dogs • Ray electronic mobility aids • Tactile keyboards • Headphones

Solutions

- Use **proper semantic markup**.
- Use **clear heading hierarchy and structure**.
- Optimize for **keyboard shortcuts**.
- Ensure **logicial order of reading and navigation**.
- Provide **short and concise descriptions**.
- Provide **descriptions for non-text content**.
- **Eliminate any unnecessary text or images**.
- Write **content that works for assistive technologies**.

Clinical diagnosis examples

Blind • Cataracts • Refractive Errors • Glaucoma • Age-Related Macular Degeneration • Diabetes • Corneal Opacification • Trachoma • Childhood Blindness • Stroke • Premature Birth • Cortical Visual Impairment • Down Syndrome • Autism Spectrum Disorder • Multiple Sclerosis • Alzheimer's Disease • Dementia • Prader Willi Syndrome • Ocular Trauma

DISABILITY

Auditory

FUNCTIONAL LIMITATION

Low auditory loss

Digital challenges

Low auditory loss can occur in one or both ears, with sounds being muffled, distorted, whistled, or crackled. All these sounds differences can vary in intensity. **Noticing, comparing, and distinguishing between sounds—especially when there is background noise—can be extremely difficult to achieve**. Though hearing aids are available, not everyone with auditory loss has access to them.

Assistive technologies

Hearing aids • Frequency modulated (FM) systems • Infrared and audio induction loop systems • Assistive listening devices (ALDs)

Solutions

- Provide **adjustable sound volume** control.
- Make all **audio controls available (stop, pause, and play)**.
- **Avoid automatically playing** videos or music.
- Ensure there is no or very **little background noise while recording**.
- Ensure **foreground audio is clearly distinguishable** from any other noise.

Clinical diagnosis examples

Otitis Media • Cytomegalovirus • Syphilis • Rubella • Presbycusis • Chronic Ear Infections • Meningitis • Lead Poisoning • Multiple Sclerosis • Premature Birth • Autism Spectrum Disorder • Head Injuries • Down Syndrome • Alzheimer's Disease • Dementia • Diabetes • Stroke • Meniere's Disease

DISABILITY

Auditory

FUNCTIONAL LIMITATION

Nearly complete/ complete auditory loss

Digital challenges

People experiencing nearly-to-complete auditory loss have extreme difficulty or complete inability to hear sounds. In some cases, folks understand sign language better than written language. With more multimedia available today, **interacting with non-optimized content such as recordings, live or pre-recorded presentations, video conferences, voice activated services, and phone-only customer support** prevents them from experiencing the same world as anyone else.

Assistive technologies

Cochlear implants • Infrared and audio induction loop systems • Sign language • American Sign Language (ASL) grammar (facial expressions) • Lip reading software

Solutions

- **Avoid requiring audio-only** interactions.
- Allow **multiple methods of contact**.
- Optimize for **ASL grammar**.
- Enable **synchronized live captions**.
- Provide **text transcripts** (including all narration, dialog, gestures, and other important sounds) for pre-recorded audio files.
- Include **sign language interpretation** for live events.

Clinical diagnosis examples

Deaf • Otitis Media • Cytomegalovirus • Syphilis • Rubella • Presbycusis • Chronic Ear Infections • Meningitis • Lead Poisoning • Multiple Sclerosis • Premature Birth • Autism Spectrum Disorder • Head Injuries • Down Syndrome • Alzheimer's Disease • Dementia • Diabetes • Stroke • Meniere's Disease

DISABILITY

Speech

FUNCTIONAL LIMITATION

Trouble speaking/ cannot speak at all

Digital challenges

People experiencing trouble speaking may have difficulty in vocal production (quality, pitch, etc.), articulation (sounds, substitutions, etc.), and fluency (flow, rate, rhythm, etc.). **Being understood by others or recognized by voice recognition software can be a challenge**. To provide an equal experience, people with a speech disability may **rely heavily on alternative methods of contact**.

Assistive technologies

Text-to-speech (TTS) readers • Sign language • Voice amplification systems • Stuttering aids • Artificial larynx • Communication boards • Symbol making software

Solutions

- **Avoid voice-only services and commands**.
- Allow for **elongated pauses** while listening, if requiring voice.
- Provide **multiple methods of contact**.

Clinical diagnosis examples

Apraxia of Speech (AOS) • Cluttering • Dysarthria • Speech Sound Disorder • Stuttering • Muteness • Cerebral Palsy • Motor Neurone Disease (MND) • Head Injuries • Stroke • Autism Spectrum Disorder • Down Syndrome • Multiple Sclerosis • Alzheimer's Disease • Dementia

DISABILITY

Cognitive

FUNCTIONAL LIMITATION

Memory

Digital challenges

Individuals with memory impairments experience short-term memory and/or long-term memory loss. They will typically have **difficulty or the inability to recall, retain, recognize, and orient themselves within a space**. **Predictable and recognizable interface paradigms minimize memory requirements**. Asking them to recall information or complete complex, multi-staged, and time-consuming tasks causes them to become fatigued and eventually quit.

Assistive technologies

Memory aids • Note-taking software • Organizational tools • Reminder systems

Solutions

- Use **consistent navigation and layout**.
- Use **consistent functionality and interaction**.
- Use **consistent labeling of forms, buttons, etc**.
- Provide **descriptive and informative headers**.
- Present important **information upfront**.
- Allow **multiple ways of navigation**.
- **Avoid long lists of options or tasks**.
- **Avoid requiring memorization**.

Clinical diagnosis examples

Attention Deficit Hyperactivity Disorder (ADHD) • Attention Deficit Disorder (ADD) • Dyslexia • Intellectual Disabilities • Anxiety • Delirium • Depression • Dyscalculia • Dysgraphia • Schizophrenia • Down Syndrome • Alzheimer's Disease • Dementia • Stroke • Lupus • Autism Spectrum Disorder • Epilepsy • Seizures • Multiple Sclerosis • Fibromyalgia • Prader-Willi Syndrome

DISABILITY

Cognitive

FUNCTIONAL LIMITATION

Solving problems

Digital challenges

Cognitive impairments may lead to difficulty solving problems. **Low resilience** can occur in people with this impairment, **causing possible frustration and abandonment of tasks**. The impairment can also affect **comprehension—especially with visual, verbal, or numerical thinking**. Words are sometimes easier to understand than numerical references, like percentages and digits.

Assistive technologies

Educational software • Note-taking software

Solutions

- Ensure **CAPTCHA puzzles are easy** to achieve.
- Use **directive language for error messages**.
- Use **logical sequencing for tasks**.
- **Avoid having users do math**.
- **Minimize the usage of numerical references** like percentages.

Clinical diagnosis examples

Attention Deficit Hyperactivity Disorder (ADHD) • Attention Deficit Disorder (ADD) • Dyslexia • Intellectual Disabilities • Anxiety • Delirium • Depression • Dyscalculia • Schizophrenia • Down Syndrome • Alzheimer's Disease • Dementia • Stroke • Autism Spectrum Disorder • Epilipsy • Multiple Sclerosis • Fibromyalgia • Prader-Willi Syndrome

DISABILITY

Cognitive

FUNCTIONAL LIMITATION

Focus

Digital challenges

People experiencing focus limitations find it **hard to concentrate and keep attention for periods of time**. **Once interrupted, regaining focus is extremely difficult**, even while completing a seemingly simple task. **It is important to have clearly structured content** that facilitates orientation and to **suppress flickering, flashing, or otherwise distracting content**. In these cases, less is more.

Assistive technologies

Educational software • Note-taking software • Organizational tools • Reminder systems

Solutions

- **Avoid clutter and distractions** in designs.
- **Avoid jumping behaviors or opening new windows without warning**.
- **Avoid blinking, flickering, moving, and flashing content**.
- Ensure **focus state** (which shows when users highlight interactive elements on a screen) **is clearly visible**.
- Allow **control over timeouts and preserve data if actions are not taken**.

Clinical diagnosis examples

Attention Deficit Hyperactivity Disorder (ADHD) • Attention Deficit Disorder (ADD) • Dyslexia • Anxiety • Delirium • Depression • Paranoia • Schizophrenia • Alzheimer's Disease • Dementia • Lupus • Autism Spectrum Disorder • Epilepsy • Seizures • Migraines • Multiple Sclerosis • Fibromyalgia • Prader-Willi Syndrome

DISABILITY

Cognitive

FUNCTIONAL LIMITATION

Learning or understanding

Digital challenges

People with learning or understanding limitations have a **hard time processing information—varying from verbal, reading, and linguistic comprehension**. They also may **process information at different speeds and need additional time understanding relationships and the volume of information presented**. Activities seem impossible to tackle when **feeling overwhelmed by too much information**. They prefer simple, clear language and may rely on supporting graphics and familiar symbols to understand content.

Assistive technologies

Educational software • Note-taking software • Organizational tools

Solutions

- Use **logical, linear architecture**.
- Use **plain, human language**.
- Ensure text is of an **appropriate reading level**.
- Use **white space** between blocks of text.
- **Avoid jargon, idioms, sarcasm, abbreviations, acronyms, and generic calls to action**.
- Use **adequate spacing** between lines, words, and letters for better readability.
- Use **universally recognizable symbols**.

Clinical diagnosis examples

Dyslexia • Intellectual Disabilities • Anxiety • Delirium • Depression • Dyscalculia • Dysgraphia • Paranoia • Schizophrenia • Down Syndrome • Alzheimer's Disease • Dementia • Stroke • Autism Spectrum Disorder • Epilepsy • Seizures • Multiple Sclerosis • Fibromyalgia • Prader-Willi Syndrome

DISABILITY

Physical

FUNCTIONAL LIMITATION

Missing or paralysis/ limited use of limbs

Digital challenges

Limited use, loss, or paralysis in any or all four limbs can **affect overall mobility, balance, coordination, speed, endurance, and movement**. Assistive technologies (AT)—like adaptive switches and head wands—allow people to leverage other parts of their body and access content that might have otherwise been difficult. **More time to type, click, or complete actions can be helpful**.

Assistive technologies

Adaptive switches • Eye tracking software • Sip-n-puff systems • Mouth sticks • Head wands • Voice recognition software • Prosthetic devices • Orthotic devices • Exoskeletons • Wheelchairs • Walkers • Crutches • Canes • Power chairs • Scooters • Transfer devices • Service dogs

Solutions

- Ensure the **full experience is accessible through a keyboard and other AT devices**.
- Allow for both **portrait and landscape orientations**.
- Allow **autocomplete and autofill options**.
- Allow for **easy error corrections and prevention**.
- **Avoid requiring directional gesture and interactions like swiping and sliders**.

Clinical diagnosis examples

Amputation • Quadriplegia • Arthritis • Rheumatism • Muscular Dystrophy • Repetitive Stress Injury • Parkinson's Disease • Dwarfism • Cerebral Palsy • Spina Bifida • Lupus • Epilepsy • Seizures • Down Syndrome • Diabetes • Rubella • Autism Spectrum Disorder • Multiple Sclerosis • Alzheimer's Disease • Stroke

DISABILITY

Physical

FUNCTIONAL LIMITATION

Dexterity

Digital challenges

Dexterity limitations lower the ability to manipulate objects with hands or fingers. People may experience issues with **grasping, gripping, pinching, stiffness, and tremors**. Low grip strength and movement make **aiming and tapping actions difficult.** It becomes **frustrating to target small user interface (UI) elements or elements requiring rapid movements, coordination, and goal-directed actions**.

Assistive technologies

Voice recognition software • Adapted pen grips • Gripping aids • Orthotic devices • Exoskeletons • Specialized keyboards and mice

Solutions

- Create **large clickable target areas**.
- **Avoid using hover or focus states to trigger additional content**.
- **Avoid any unnecessary keystrokes**.
- **Avoid requiring mouse-only, path-based gestures and interactions**.

Clinical diagnosis examples

Arthritis • Fibromyalgia • Headaches • Dysgraphia • Rheumatism • Muscular Dystrophy • Repetitive Stress Injury • Parkinson's Disease • Cerebral Palsy • Spina Bifida • Lupus • Prader-Willi Syndrome • Epilepsy • Seizures • Down Syndrome • Diabetes • Rubella • Autism Spectrum Disorder • Multiple Sclerosis • Alzheimer's Disease • Stroke

Reference

This chart gives a quick overview of all 12 cards, spanning five disability categories and 17 functional limitations. Some cards feature multiple functional limitations.

DISABILITY	#	FUNCTIONAL LIMITATION
Visual 	1	**Color vision deficiency:** Unable to perceive certain colors or complete loss of color.
	2	**Partially sighted/low vision:** Able to see in blurs/varying degrees of distortion.
	3	**Legally/totally blind:** Extreme difficulty seeing/complete loss of sight.
Auditory 	4	**Low auditory loss:** Distorted and/or intensified sounds.
	5	**Nearly complete/complete auditory loss:** Extreme difficulty/total loss of hearing.
Speech 	6	**Trouble speaking/cannot speak at all:** Struggles with/complete loss of speech.
Cognitive 	7	**Memory:** Trouble storing and/or recalling information; inability to remember.
	8	**Solving problems:** Trouble finding solutions to challenges and/or issues.
	9	**Focus:** Difficulty concentrating and/or regaining concentration.
	10	**Learning or understanding:** Difficulty with linguistic, verbal, and/or reading comprehension.
Physical 	11	**Missing or paralysis/limited use of limbs:** Complete lack of/limited body mobility.
	12	**Dexterity:** Issues with hand and/or finger agility.

Join Product Lab Research Program

If you use ServiceNow and are interested in participating in accessibility research studies to improve our experiences, please join our Product Lab Research Program.

- Receive exclusive invitations to participate in interactive feedback sessions with experienced researchers.
- Receive newsletters and keep up to date with new developments and case studies.

It's easy to join!

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2. Sign electronic NDA
3. Complete membership profile

Contact us with any questions or if you need help registering

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