# Universal Design in Practice

**"The essence of universal design lies in its ability to create beauty and mediate extremes without destroying differences in places, experiences, and things."[1]**

- Bill Stumpf and Don Chadwick, Designers

A section of the Perkins&Will Disability Inclusion series

Note: Color choices have been reviewed for accessibility and this document uses alt text. The document's font, Atkinson Hyperlegible, was chosen due to its demonstrated increased accessibility for readers.

# Why Should You Care?

As designers, architects, and planners, our choices determine what is accessible and enjoyable and what becomes a frustrating barrier in someone's life. We should strive to design for all users and their varying abilities, shapes, and sizes. If we design intentionally with the understanding that people have different needs, we create environments that are useful to more people. **Thoughtfully designed spaces benefit everyone.**


This is an example of low-contrast room signage. Due to the color combination, the room ID is difficult to decipher.

Design can improve people's access to things or places. For example, signage can provide helpful wayfinding that benefits many people. Design choices can also have unintended effects. For instance, if that signage is designed with colors that don't account for people with visual impairments or color blindness, some users may find it difficult or even impossible to read.


This is an example of high-contrast room signage that is easier to read than the example above.

Universal design is a useful framework to use when trying to design as inclusively as possible. Universal design is "the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design."[2] **The goal of using universal design in our projects is to allow for as many users as possible to enjoy the spaces and designs that we create.**

# History of Universal Design

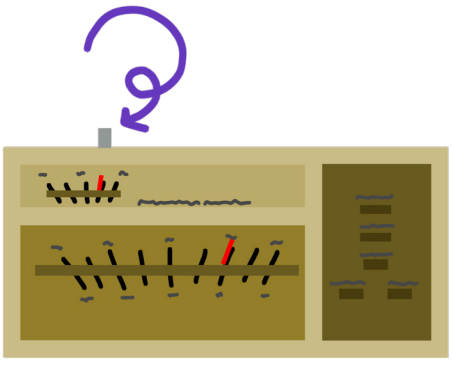
The Universal Design movement developed along a similar timeline to the disability inclusion movement. To learn more about that movement, check out the Disability Inclusion timeline on **PRECEDE!**[3] Today, "Universal Design" can mean many things: disability inclusion, accessible products, features of the built environment, or even ways of communicating. But how did it all start?

**The philosophy of Universal Design is directly tied to the barrier-free work of disability advocates and scholars.** Ronald Mace, an architect and wheelchair user, found codes and standards were not inclusive enough. In the 1970's, Mace founded Barrier Free Environments, Inc. (BFE) to broaden accessibility within residential environments. BFE partnered with the Center for Accessible Housing (CAH) on many projects. One example is a better-designed thermostat, which could be adjusted without twisting of the wrist, pinching of the fingers, good eyesight, or the ability to read and interpret numbers.[4]

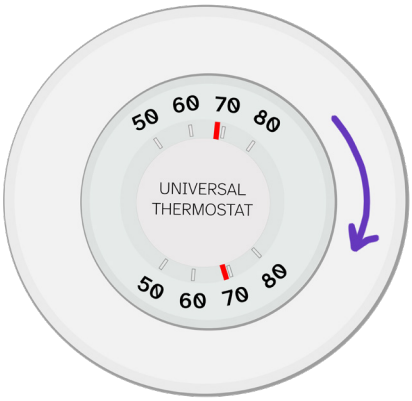
## Why It Matters To Design

The CAH eventually transformed into the Center for Universal Design at the North Carolina State University.[5] Mace led a team of architects, researchers, designers, and engineers. In 1997, the team formalized guidelines as the 7 Principles of Universal Design. These principles were developed as a guide to inform the design process, not as a prescriptive checklist of what makes something 'good design.' **Their purpose is to spark critical thinking and creativity—helping designers consider the diverse ways people interact with products, spaces, and systems.**

The 7 Principles have been used as inspiration throughout the globe for designing inclusively. These principles even act as the basis for the 2006 United Nations Convention for the Rights of Persons with Disabilities (CRPD).[6]



This is an example of an old thermostat model. The numbers are small and difficult to read. The control is hard to grasp and requires pinching of the fingers and twisting of the wrist to operate.




This is an example of the more universally designed thermostat by BFE and CAH. The large center dial adjusts the temperature - it is easy to use and intuitive to understand.

# The 7 Principles of Universal Design[7]

The principles can be applied to environments, physical objects, and communications – they are meant to encourage designers to think of a broader user experience. These principles can be mix and matched, and all don't need to be used!

**1. Equitable Use – Useful and marketable to people with diverse abilities.**

Example: Power doors with sensors at entrances that are convenient for all people

**2. Flexibility in Use – Accommodates a wide range of individual preferences and abilities.**

Example: Scissors designed for right- or left-handed people

**3. Simple and Intuitive Use – Easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.**

Example: An assembly instruction packet that includes diagrams and is written in multiple languages

**4. Perceptible Information – Communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.**

Example: Braille restroom plans incorporated in room signage to identify locations of fixtures, soap, and drying stations[8]

**5. Tolerance for Error – Minimizes hazards and the adverse consequences of accidental or unintended actions.**

Example: Induction cook top that cannot be accidentally turned on unless a cooking pan is present

**6. Low Physical Effort – Used efficiently and comfortably and with a minimum of fatigue.**

Example: Touch lamps operated without a switch

**7. Size and Space for Approach and Use – Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.**

Example: A lounge area with a range of seating/table options, including spaces sized for a wheelchair and seats sized for larger individuals

# Inclusive Design

## Universal Design is not always the answer

Universal Design is not a perfect approach. Some disability justice and access critics point out that "while UD offers a valuable framework, it has limitations. It may not fully address the needs of folks requiring specialized adaptations, or a simplistic application can lead to 'one-size-fits-none' solutions."[9] As scholar Aimi Hamraie has phrased the question: **"When the goal is to design for 'everyone,'... who counts as everyone and how do designers know?"**[10]

Every individual person has different needs, and one design solution or response is unlikely to meet every varying need at once. In addition, sometimes a person's specific need conflicts with another. For example, a swing up grab bar installed in a restroom can benefit one type of user but it can be considered a barrier within the maneuvering clearance at a toilet required for another user.

**Universal Design is not perfect - but it is a step forward in accessible design.**

**Design shapes the world we live in, but society and policy control who has access to good design.**

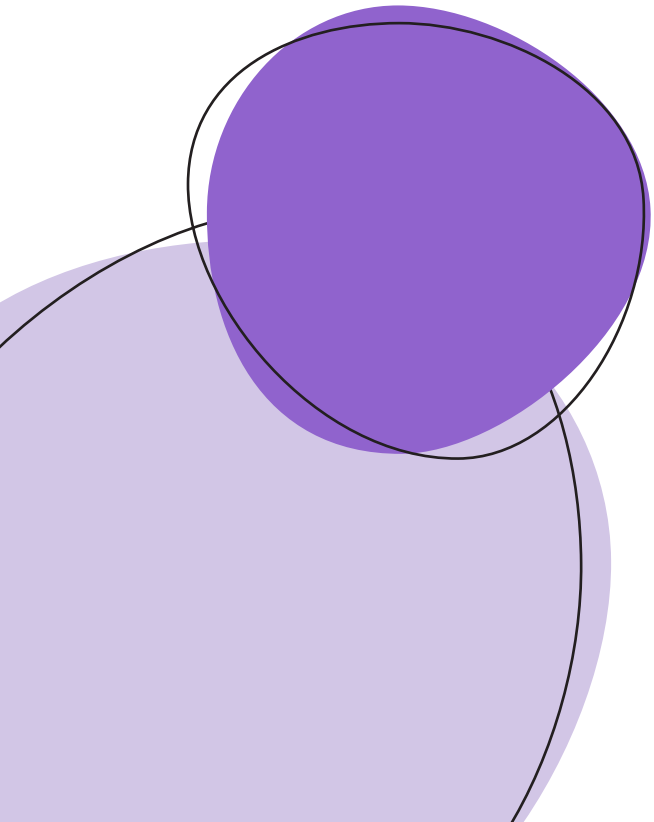
The 2006 UN Convention of Persons with Disabilities (CRPD) has been ratified by more than 180 countries, influencing accessibility standards, legal protections, and inclusive design policies around the world. However, the United States has not yet ratified this treaty, relying instead on domestic legislation such as the Americans with Disabilities Act (ADA). **This gap underscores the ongoing debate about the role of international frameworks in shaping U.S. disability policy and the global importance of Universal Design as a shared standard for inclusion.**

# Inclusive Design

## Resources for Designing Inclusively

Many designers have wondered if there is a clear-cut Universal Design “checklist” we use within Perkins&Will. While we understand the desire for such confirmed proof that a team has “designed universally”, we feel that such a checklist goes against the intent of Universal Design and other inclusive design principles.

The intent of these design philosophies is to truly think about potential users of a space: their needs, their bodies, and how they will move within and without our designs. There are indeed plenty of helpful resources to help better implement Universal Design and inclusive design principles. Here are some of our favorites!



- **Inclusive Design Standards by the Kelsey**

  A disability-forward organization focused on advocating for more inclusive housing design.

- **Centre for Excellence in Universal Design (CEUD)**

  An organization focused on promoting Universal Design through guidelines and education.

- **Communication Toolkit**

  This is published by the CEUD, see above.

- **Universal Design for Learning**

  This is a framework by Smith System that is focused on how to design effectively for varying student needs and normalizing those varied needs.

- **Design Principles to Accommodate Older Adults**

  Published by the National Institutes of Health.

# Inclusive Design Philosophies & Overlaps

A conference table has space for five comfortable chairs grouped around it. A wooden stool off to the side may be used by another attendee - but is this providing an equitable experience?

### Barrier-Free Design / "ADA" Scenario

Barrier-free work designs to the bare minimum of accessible codes and standards.

Imagine that you arrive at a meeting, the table is full and all the chairs are in use. You find a chair in the hallway, bring it into the room, and must sit by the wall. The meeting organizers were able to accommodate you, but it is the bare minimum.

### Human-Centered Design (HCD) Scenario

"Human-centered design is a problem-solving technique that puts real people at the center of the development process, enabling you to create products and services that resonate and are tailored to your audience's needs."[11]

Imagine that while planning the meeting, the organizer sent a survey to all participants for feedback regarding conference room type, digital technology capabilities, and chair style preference. The meeting organizers have asked all users for input.

### Universal Design (UD) Scenario

Universal design accommodates the broadest range of users possible, without need for adaption.

Imagine that you arrive at a meeting and there is a reserved space at the table for you, with an ergonomic adjustable chair. The path to your seat is clear and without obstruction. The meeting organizers have endeavored to make all users similarly accommodated.

### Inclusive Design Scenario

"Instead of the 'one-size-fits-most' approach that can be inherent within Universal Design, inclusive design aims to design for a range of abilities."[12] Inclusive design adapts to a user's needs. The approach often focuses on policy.

Imagine that while planning the meeting, the organizer decided to open partitipcation to both in-person and virtual attendees to accommodate people's schedules, commutes, and comfort levels. This is a shift in policy, taking into consideration more than just the built environment.

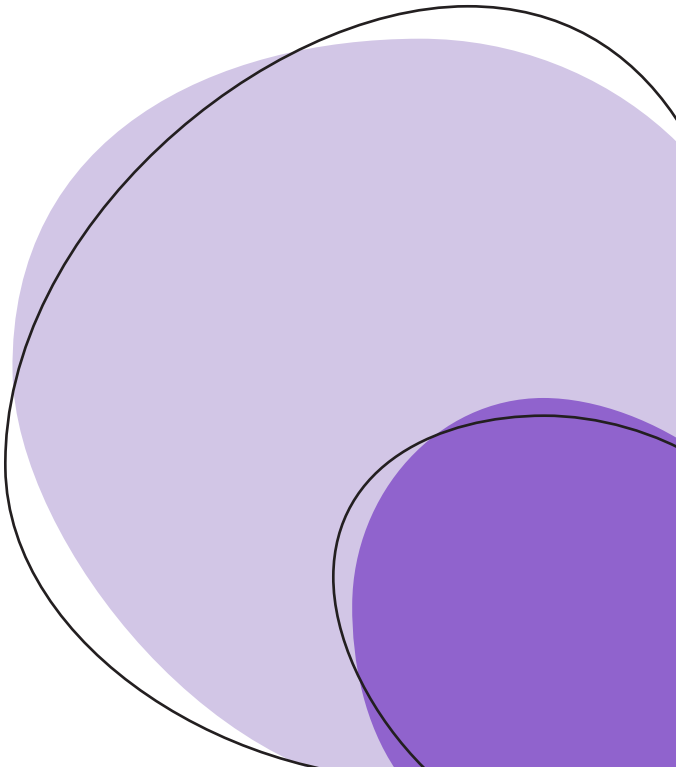
# What Can You Do?

The actions below are just some examples of how you can implement universal design principles. You'll notice each of these actions benefit more than one type of user. **Good design improves the quality of life for all people.**

- When appropriate, specify fixtures and/or furnishings to be at child height or adjustable height. This helps people of all statures.
- Provide furniture for multiple sizes and shapes of bodies. Consider elements with and without backrests and arms.
- Design text and signage with clear fonts and high contrast. This helps the elderly and those with visual and cognitive disabilities.
- Provide for dimmable lighting and consider using full-spectrum lighting. Elderly people and those with visual disabilities may need brighter lighting, but those with light sensitivities will benefit from a gentler lighting approach.
- Facilitate listening opportunities. Consult users with disabilities that will be impacted by your designs. Listen to and learn from their unique perspectives. Be open to feedback, iterate and consider creative solutions.
- Consider using symbols and arrows in addition to text to communicate information effectively. This helps those with a different primary language, along with those who do not read.
- Be intentional with communication and signage. Colloquial phrases or references are not understood by all communities.
- Be purposeful about tactile usage for people that are low vision or blind. Tactile surfaces can help convey information for those that cannot read braille.

## ! Key Takeaway

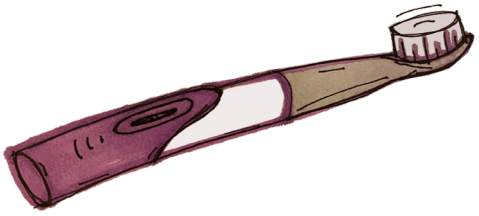
**Universal Design is good design. It champions all people by designing for diverse characteristics and needs.** It is not a perfect solution, but the intent is to improve access to products and environments for as many people as possible. As designers, we get to push design to new limits. **How far can we go?**



# Did You Know?

## Electric Toothbrushes[13]

The first electric toothbrush was developed to expand access to oral hygiene for those who could not brush comfortably or effectively with a manual toothbrush. Today, electric toothbrushes are preferred by many over manual toothbrushes not just for necessity but for convenience.



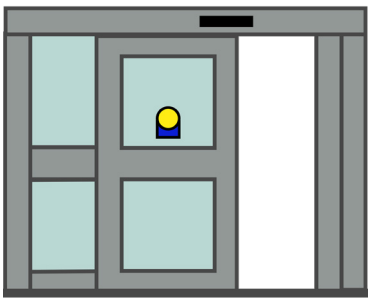
This is an example of an electric toothbrush.

## Audio Books[14]

The first audiobooks were released by the American Foundation for the Blind in 1932 and were intended for use by the visually impaired. These were recordings of books on vinyl records and fit 15 minutes of speech on each side. After this, more recording companies developed audiobooks. Today, the number of audiobooks available has drastically increased - they are popular with more than just their initially intended audience. Audiobooks have made books more accessible to children, those with reading difficulties, those navigating language barriers, and those who like to listen to books while otherwise multitasking.

## Automatic Doors [15]

The first modern automatic doors appeared in the 1930s when engineers designed an optical sensor to open doors. This sensor was installed in a restaurant to help overladen waiters easily move between spaces. In the 1950s, the first mat actuator sliding automatic doors were designed to help residents who were struggling with swing doors in areas with high winds. Today, automatic doors are common helpful features in hospitals, airports, grocery stores, and other commercial buildings. Automatic doors benefit those with limited mobility while simultaneously improving hygiene thanks to their contact-free nature.



This is an example of an automatic sliding door.

**Increasing access benefits everyone.**

# Dig Deeper

Check out these resources to learn more!

- **Building Access: Universal Design and the Politics of Disability, Aimi Hamraie**

- **Lives Worth Living : the Great Fight for Disability Rights, a film by Eric Neudel.**

- **The RL Mace Universal Design Institute**
- **Center for Universal Design**
- **Institute for Human Centered Design**

## Authors' Note

This document is primarily US-centric. This is in part due to the authors' lived experience and knowledge base. We acknowledge that disability inclusion is a global issue, and hope that this work can be expanded upon and applied from an international perspective.

We welcome feedback! If you have any questions or insights to add, or you are interested in learning more, please reach out to the co- authors: **Kate Dailey** (Architect, Perkins&Will) and **Joanne Koola** (Designer, Perkins&Will).

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# Full Guidelines for the 7 Principles of UD[16]

**1. Equitable Use** – The design is useful and marketable to people with diverse abilities.

1a. Provide the same means of use for all users: identical whenever possible; equivalent when not.

1b. Avoid segregating or stigmatizing any users.

1c. Provisions for privacy, security, and safety should be equally available to all users.

1d. Make the design appealing to all users.

**2. Flexibility in Use** – The design accommodates a wide range of individual preferences and abilities.

2a. Provide choice in methods of use.

2b. Accommodate right- or left-handed access and use.

2c. Facilitate the user's accuracy and precision.

2d. Provide adaptability to the user's pace.

**3. Simple and Intuitive Use** – Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

3a. Eliminate unnecessary complexity.

3b. Be consistent with user expectations and intuition.

3c. Accommodate a wide range of literacy and language skills.

3d. Arrange information consistent with its importance.

3e. Provide effective prompting and feedback during and after task completion

**4. Perceptible Information** – The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

4a. Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.

4b. Provide adequate contrast between essential information and its surroundings.

4c. Maximize 'legibility' of essential information.

4d. Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).

4e. Provide compatibility with a variety of techniques or devices used by people with sensory limitations.

**5. Tolerance for Error** – The design minimizes hazards and the adverse consequences of accidental or unintended actions.

5a. Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.

5b. Provide warnings of hazards and errors.

5c. Provide fail safe features.

5d. Discourage unconscious action in tasks that require vigilance.

**6. Low Physical Effort** – The design can be used efficiently and comfortably and with a minimum of fatigue.

6a. Allow user to maintain a neutral body position.

6b. Use reasonable operating forces.

6c. Minimize repetitive actions.

6d. Minimize sustained physical effort.

**7. Size and Space for Approach and Use** – Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

7a. Provide a clear line of sight to important elements for any seated or standing user.

7b. Make reach to all components comfortable for any seated or standing user.

7c. Accommodate variations in hand and grip size.

7d. Provide adequate space for the use of assistive devices or personal assistance.

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