Final Report & Inclusive Design Philosophy

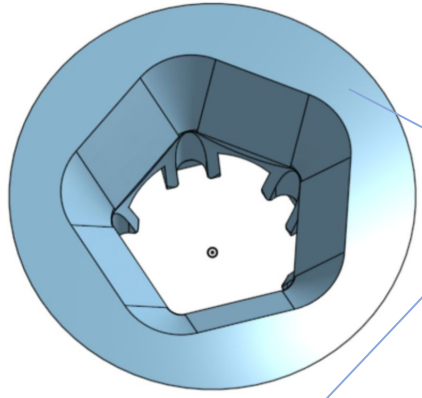Reid Alexander - June 6, 2024

1.

Refine your final idea

Problem Statement

How might we design a product with **versatile functionality** while maintaining an **elegant aesthetic** to uplift Mary both physically & mentally?
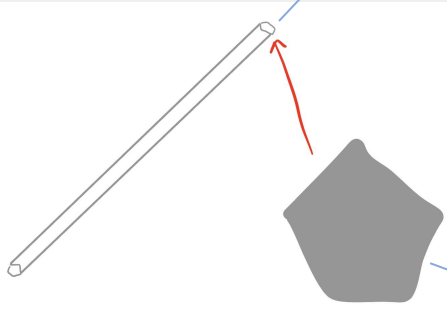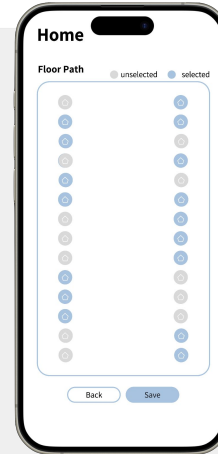
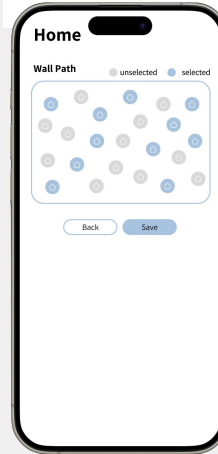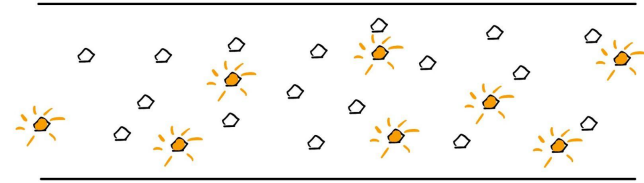# Final Design - The WANDer

The WANDer & wall hole are **pentagonal**, offering more stability & grip
-
The hole will narrow as it gets deeper for easier entrance & harder exit for the WANDer.

Aluminum

Light Functions

Each hole has LED lights that will light up a path for the user to stick their WANDer in. The lights' color, pattern, & brightness can be controlled through the interface.

Final Design - Wall/Ceiling

Wall tracks

Useful diagram of internal mechanisms (courtesy of Lucas)
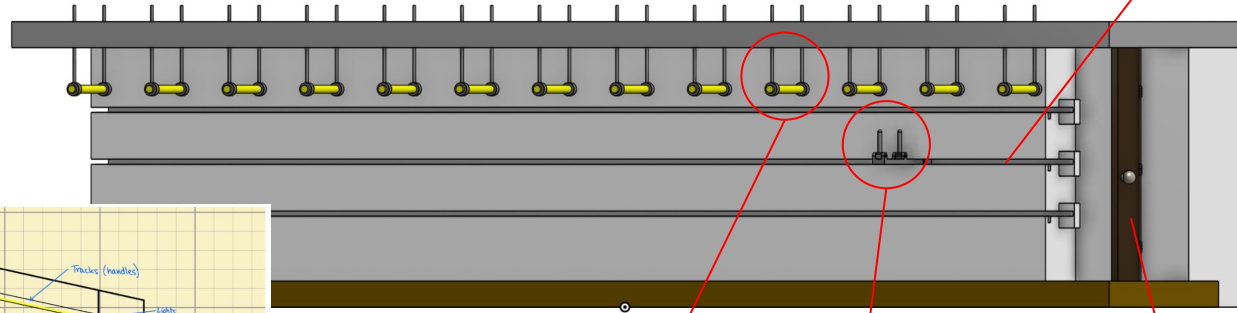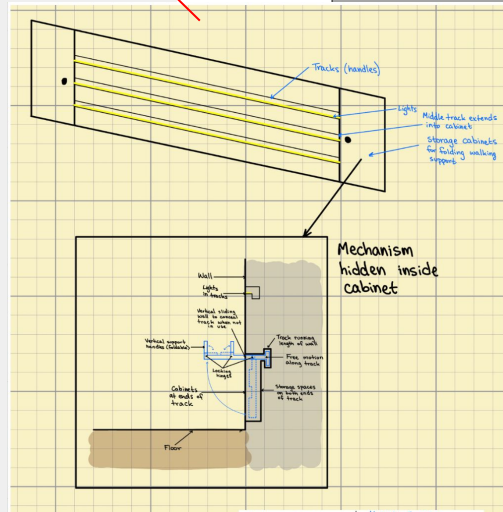
Extendable lights: can be flush with the ceiling, or lowered for use

Support handle: slides along tracks in the wall for mobility

Storage closet: can tuck away support handle – "out of sight, out of mind"

Final Design - Chair
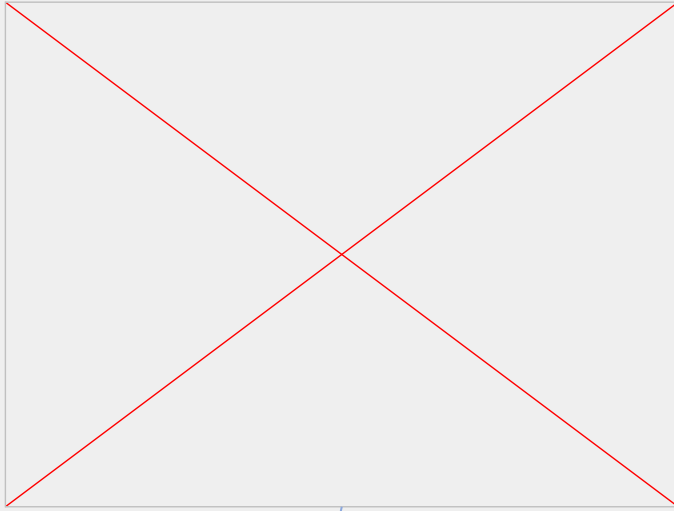
Video of operation
(courtesy of Jordan)
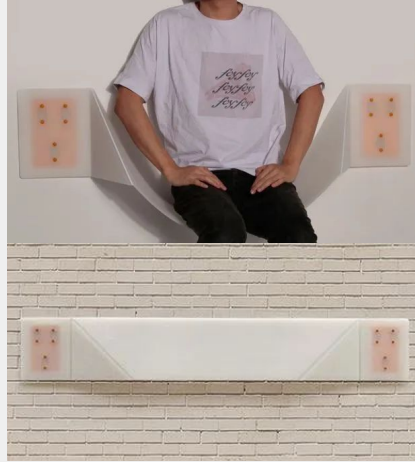
- One side stays stationary & the other side slides (A to B)
- Stays completely flat on wall & would slide when weight is applied
- Mary always liked the example of a warm rock to lay on, so it's inspired by that (could have heating features if desired)

Final Design - Interface
My largest contribution

Page after download

Account builder

Profile set up

Emergency contact set up; can call them from your homescreen

Welcome back screen (if you've previously had the app/account)

Log in

Sign up

Create account

Full name: Mary Meyer

Email address: ...@gmail.com

Create a password: ....

Sign up

What would you like to be called?

Pronouns:

Set profile photo: Take photo   Photo library   Browse avatars

Set up emergency information

Complete

Set up emergency contact information

Contact name:

Phone number:

Comments:

Save

Welcome back

Email address: @gmail.com

Password: ....

Login

Final Design - Interface

My largest contribution

Page when opening app
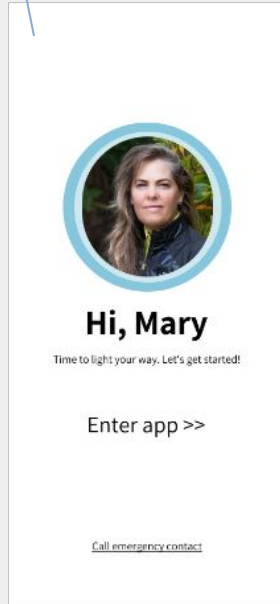
Selecting whether you're controlling the floor or wall lights
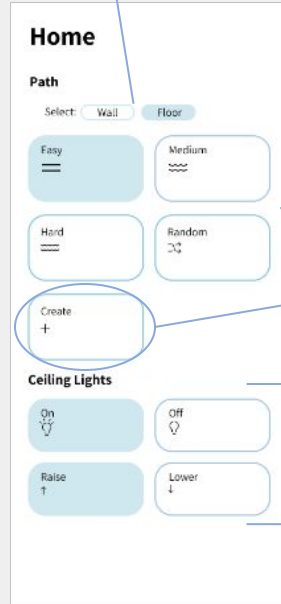
Select randomized pattern or automated challenge levels

Hi, Mary

Time to light your way. Let's get started!

Enter app >>

Call emergency contact

Home

Path

Select: Wall | Floor

Easy | Medium

Hard | Random

Create +

Ceiling Lights

On | Off

Raise | Lower
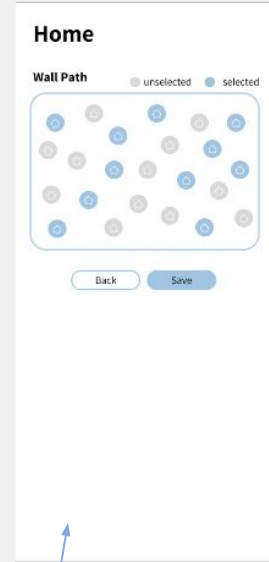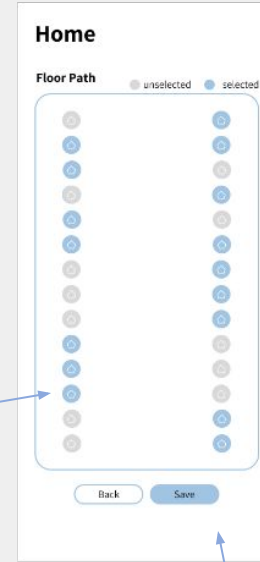
Control ceiling lights (raise to put flush with ceiling, lower to use for mobility)

Home

Floor Path — unselected — selected

Back | Save

Home

Wall Path — unselected — selected

Back | Save

Light controls for wall & floor: you can choose your own pattern or have an automated one. These are the holes that will light up for the WANDer to be placed in.

Key Elements

Mary was seeking an aesthetically pleasing yet highly functional living space, as she firmly believed that a visually appealing environment could promote healing and well-being. For our group, Directional Mobility, Mary's primary request was for directional aids that could provide physical assistance while seamlessly integrating into the home's design.

She shared images of dual-purpose lighting tools that not only illuminated the space but also served as mobility aids. Additionally, Mary expressed her interest in incorporating floor patterns with integrated lighting to enhance navigation. Among her ideas, she particularly favored the concept of a bamboo stick for mobility assistance. She also enjoyed the thought of a statement piece.

Inspired by Mary's vision, we combined all her ideas into a single, cohesive design solution. The bamboo stick evolved into the WANDer, a sleek and stylish mobility aid that seamlessly blended form and function. Our floor and wall lighting incorporated the dual-purpose lighting tools she envisioned, seamlessly integrated with the WANDer to provide both illumination and directional guidance.
Furthermore, we transformed the entire concept into a captivating statement piece for the main living area. By maximizing affordances within a single, unified design, we encapsulated everything Mary requested

Client feedback

During the initial pitch, we shared three concepts (Mary & Stan liked all of them)

- Mary liked ceiling/wall devices; liking the idea of activating multiple muscle groups + being able to attach different items to ceiling/wall tools.
- Mary didn't understand our initial "cane" concept, but Stan did & really liked it. This meant we had to repitch/rephrase to make it more easily grasped.
- Stan suggested having the holes light up prior to w& insertion (rather than after)

During the last to final pitch, we finalized our ideas in "Wall" & "Cane": Wall had a chair option, & both had an interface component.

- Not a ton of constructive feedback.
- Applauded our group for having so many different kinds of prototypes & visuals (CAD, app interface, physical paper, sketches, etc.), saying that it was helpful & easier to understand.
- Largest piece of feedback: dislike of the word "cane" → changed it to:
  The WANDer

2.

Write up a final analysis & reflection

Highlights: Step one

Client interview, note taking, & problem definition

When creating the client interview questions, Jordan and I led the discussion and organization of our groups' post-it notes. We took the questions everyone wrote **P1**, and combined them into sections on a whiteboard. Then they were consolidated into our 7 primary questions for Mary. Those were then used in my notetaking document for **P2**, where I wrote down my strongest takeaways from our interview to create a problem definition and *how might we* statements in **P3** to return to my group.

Highlights

Directional Mobility

FINAL IDEAS
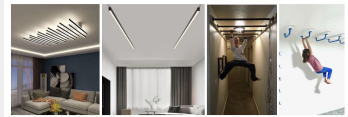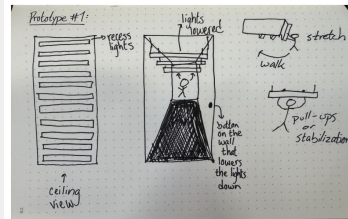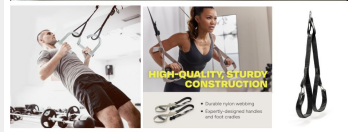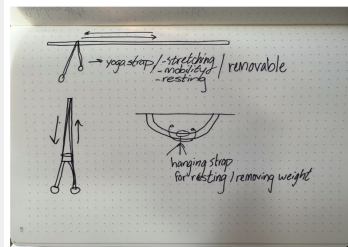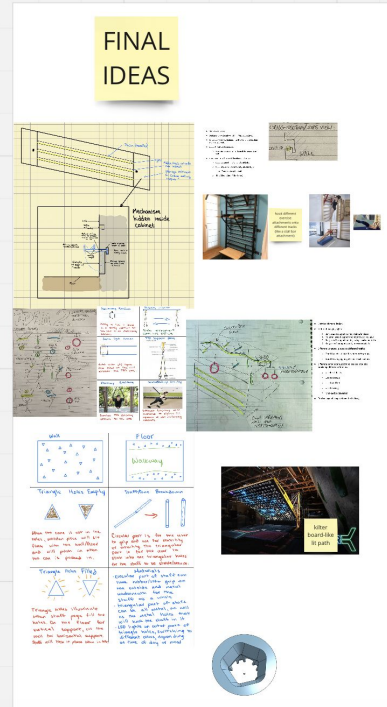
Problem definition + ideation

I then took our group discussions and created these sketches when ideating for **P4**. As a group, we took all of our sketches and pitched three to Mary: Canes that fit in holes in the wall/floor, retractable ceiling lights that act as monkey bars, and a wall that possesses sliders to put objects in them.

These are the takeaways from our pitch used in **P5**:

- Mary loved the retractable lights & stretching devices + idea of activating multiple muscle groups. Also liked being able to attach different items to those ceiling and wall tools
- The WANDer was my favorite, but the only idea Mary initially didn't understand. Stan really liked it. They suggested that we make the poles into asymmetrical shapes. Stan also suggested that maybe we have the shapes light up before we put the poles in them (rather than vice versa)

Highlights: Interface

contribution
Interface Design

Remi and I worked extensively on designing an app interface for our physical house prototypes.

This app allows the user to create paths in the wall/floor light holes to take it easier or create a challenging exercise. The paths can also be randomized.

Whether or not Mary likes the idea of an app on her phone, this app is a useful depiction how our ideas work and their practicality.

We also thought we could also embed it into a tablet next to our wall/floor light designs so she can operate it as she uses our designs. We can also add a voice recognition component.
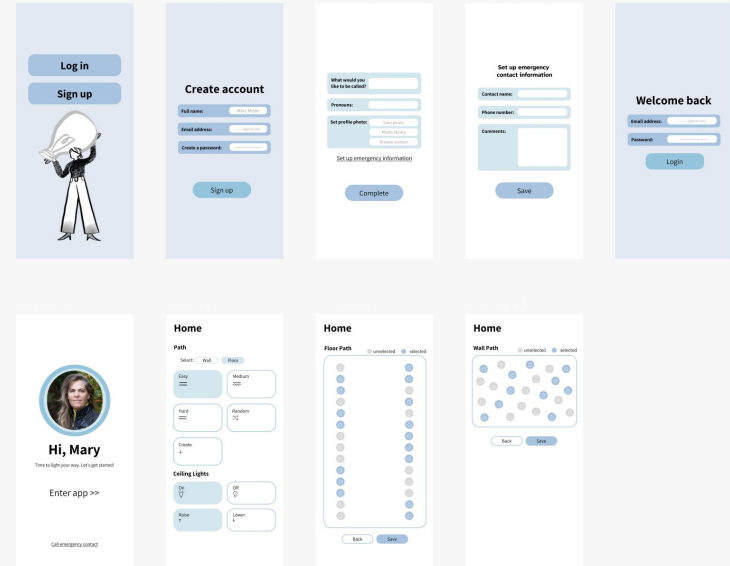
Highlights: advancement

Throughout all of our assignments and pitches, these are the modifications we came up with for our previous ideas

Proposed Modifications

- Wall and Lights will be combined side-by-side
- **Wall**
  - Bars on a track to support walking down hallway
  - Lights that start dim and become brighter as you move along the wall/track
  - Chairs at the ends of the wall for breaks
  - Table at the ends of the wall
  - Integration with door frame pull-up bars on the market
    - Modifying the inner cutout to eliminate need for uniquely manufactured attachments
- **Lights**
  - Mirror light pattern on the floor with lights on the ceiling
- **Cane**
  - App interface
    - Color control, extension/retraction, lit path (chosen and randomize)
  - Light path on peg holes to guide the user through the walkway
  - New pentagonal shape to the cane and holes
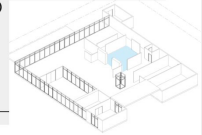
We combined our ideas and pitched them in two groups:

Wall & WANDer

Highlights: final revision ideas

We all received a ton of constructive feedback. They applauded us for having so many different kinds of prototypes and visuals (CAD, app interface, paper models, sketches, etc.), saying that it was easier to grasp.

The biggest piece of feedback we received was the extreme dislike of the word "cane." With our time at the end of last class, our group came up with other name ideas. We created a list (in progress) for Mary & Stan to choose from so they'd have options. For the cane replacement name, we landed on: **The WANDer**

Collaboration Takeaways

- **How design makes us feel**
  - Importance of wording ("cane")
  - Encourage playfulness; motivation to move
  - Aesthetics and function going hand-in-hand
- **Designing**
  - "Go with your intuition" (design instincts)
  - Go with simplicity
  - Go for lots of affordances
- **Communication**
  - Present ideas in multiple ways to help audience understand
  - During interviews, there's more to pick up on than answers to your questions (nuance, nonverbal feedback)

Alternative Names

- Stride Staff
- WANDer
- PentaGlow
- GlowGrip
- PentaBeam
- LumiStick

Reflection

We would not have been able to design for Mary without Mary in the room. Having a participant from the target user group provided invaluable insights into their needs, preferences, and pain points that we simply could not have anticipated or fully understood without their input.

Working in our (super)group was incredibly useful; we all worked very well together. The diverse perspectives and backgrounds within the group facilitated a rich exchange of ideas, allowing us to combine and build upon each other's concepts. This synergistic approach yielded a multitude of viable design solutions that we could explore and refine together

The depth of our participant's emotional response to the subject matter was somewhat unexpected. It was a poignant reminder of the need for constant sensitivity in our interactions, as we can never fully anticipate the emotional impact of our work.

Shadowing and more time with the user/client would have been beneficial if it were feasible. It was difficult because we had to opt out of asking certain questions due to fear of discomfort or offense. The specific struggle with MS was slightly beaten around the bush when it came time for interviews. We may have been able to do this research through observation instead of interviews. Additionally, more research time would have been nice; that way, we could find answers to questions we couldn't get directly from Mary.

I would have liked more time to strengthen and enhance our digital interface, showing its features and how it would appear on a wall tablet or with voice recognition features. Also, more time to create more physical prototypes could have been interesting, as it may have revealed additional insights or design considerations that were not apparent in the digital prototypes alone.

Reflection pt. 2

No matter how well-intentioned a design may be, there is always a risk of inadvertently excluding certain user groups. This could be due to physical, cognitive, or technological limitations, cultural differences, or other factors not initially considered. Regarding my own positionality, as someone who is non-disabled, I had trouble understanding how certain things Mary shared would be useful for her daily life. This is where I had to throw out my design instincts and trust my client wholly.

Our designs were fairly arm-oriented. Using the WANDer requires some sense of arm mobility, which could exclude some users; it could even exclude Mary if she has a day where arm movement is more difficult. Our "monkey bar" feature also requires that someone have enough strength in their arms on any given day to use that feature. It would be ideal to develop more features or tools for those with more leg strength or even those who experience a lack of mobility in any/all limbs.

I would have liked to do more user research with others besides Mary. I think talking with people with a variety of disabilities or other people with varying severities of MS would have been useful. This project also did not encapsulate those with more invisible disabilities, like ones that affect people mentally. That could have been a lens to look through with regard to this house design.

Ultimately, reflecting on a design's positionality and politics is not a one-time exercise but an ongoing process that requires a commitment to inclusivity, accessibility, and continuous improvement. By actively seeking out and addressing potential exclusions, we can create truly inclusive and beneficial designs for a diverse range of users.

3.

Design philosophy & commitments

Inclusive design

Inclusive design is a user-centered approach that aims to create products, services, & environments accessible & usable by as many people as possible, regardless of their abilities, backgrounds, or circumstances. It goes beyond merely complying with accessibility standards by proactively considering potential users' diverse needs & perspectives throughout the design process.

As a designer/engineer, embracing inclusive design means actively seeking out & addressing potential barriers or mismatches between users & the products or environments we create. It involves developing empathy for diverse user needs, fostering diverse teams, & iteratively testing & refining solutions to be as inclusive as possible. Ultimately, inclusive design is about creating solutions that empower & enable people rather than excluding or marginalizing them.

Inclusive design pt. 2

Referencing our week 1 introduction, the phrase "inclusive design" describes the **PROCESS** of designing. This is the exercise of designing for users who are frequently excluded. This is critical to me as an engineer & designer because all designers must be inclusive. As stated in week 1, the "average" human doesn't exist. Engineers are privileged to have the education & position we have, so it's crucial to use that for those who don't have access themselves. Additionally, "algorithms outlast programmers;" what we make now will outlive us & influence the future of design; let's leave behind something good.

What I took away from Valerie Fletcher's (IHCD) talk on March 28th was that design must be **radical** to be effective. She reiterated the points we'd learned in class: design is most important on the **ends of any spectrum**. If the design works there, it should work for everyone in between & is therefore better for everyone. This is important knowledge for me as the designer, as I need to be alert to what the edges of the spectrum look like & focus there.

Inclusive design pt. 3

The reading titled _The Universal Design Ideal_ by Anna Leahy hones in on **mismatches**, which we also read about in a few other places. This article also specifies that inclusive design must go **beyond visible disabilities** & mismatches to consider mental disabilities. "_Access is central to inclusive design; aesthetics & diversity – beauty & the 'everyone' – are not. 'An inclusive designer is someone, arguably anyone,' Holmes writes, 'who recognises & remedies mismatched interactions between people & their world.'_"

My favorite talk in this class was on March 18th when Kim Hallett, an engineer at Triton, came to speak to us. Her whole talk was fascinating. My dad was a Naval test pilot for 28 years, & trust me, I've heard many crude stories about piddle packs. I talked to my table group about that because I find that interesting; for women, there is a stigma around in-flight bladder relief, & for men, it's just funny. She defined inclusive design as focusing on the needs of those in an under-resourced population. I appreciated her sharing that you will never get it right the first time, & that's okay; it doesn't need to feel like a failure, just a learning experience.

Philosophy

My design philosophy centers around creating truly inclusive and accessible solutions that embrace the full spectrum of human diversity. I believe in actively involving people with diverse abilities, backgrounds, and perspectives through a co-design process. I take a holistic approach that accounts for all factors that can impact usability. My goal is to develop flexible and adaptable designs tailored to individual needs. Above all, I strive to enhance user experience for everyone by prioritizing inclusivity and ensuring no one is left behind.

Philosophy of inclusive design

1. **Recognizing human diversity:** Embrace the inherent diversity in human abilities, characteristics, & experiences; recognize that disability & exclusion can be situational & experienced by anyone.

2. **Co-design & diverse perspectives:** Emphasize the importance of involving & co-designing with people with various perspectives, abilities, & backgrounds. This includes having diverse teams & actively seeking input from potential users during the design process.

3. **A holistic approach:** Consider not just physical or cognitive disabilities but also factors such as age, gender, culture, socioeconomic status, & situational limitations that can impact a person's ability to use a product or environment effectively.

4. **Adaptability & flexibility:** Create solutions that are flexible & adaptable to different user needs & preferences rather than offering a one-size-fits-all approach. This can involve providing multiple modes of interaction or customizable features.

5. **Enhancing user experience:** Strive to provide an optimal user experience for everyone, regardless of their abilities or circumstances.

Commitments

★ Use inclusive language in all forms of communication, avoiding harmful stereotypes, microaggressions, and ableist terminology.
★ Give myself and others grace; we're all going to mess up and say or do the wrong things.
★ Not get set in my ways – Disagree with myself! Admit when I think I was wrong!
★ Advocate for accessibility and accommodations in all spaces, ensuring equal opportunities for participation and engagement.
★ Make everyone feel like everything they say is digested fully and truly valued, helping to encourage any and all contributions.
★ Build collaborative relationships with each of my peers.
★ Know that I'm never done learning; continue understanding how to be most inclusive in my design.
★ Accept that I may not always entirely understand why someone may need something or why it may be helpful, and that's where I need to be able to trust the client/user.
★ Maximize affordances.
★ Listen attentively, hear everyone out, be inquisitive, and be genuine.
★ Present ideas in multiple ways to help audience understand; that's something Mary complemented us on in our presentation: a lot of different mediums.

References

1) Coppola, Sarah. "Week 1: User centered, Universal, Inclusive, and Assistive Design - Tuesday" HCDE 315, 26 Mar. 2024, University of Washington, Seattle, WA. Lecture.
2) Coppola, Sarah. "Week 1: User centered, Universal, Inclusive, and Assistive Design - Thursday" HCDE 315, 28 Mar. 2024, University of Washington, Seattle, WA. Lecture.
3) Fletcher, Valerie. "Inclusive Design as a Framework For Social Equity." IHCD, 28 Apr. 2024, University of Washington, Seattle, WA. Guest Speaker Lecture.
4) Leahy, Anna. "The Universal Design Ideal: An Environment Designed to Suit Every Body Is Better for All: Aeon Essays." *Aeon*, 2 Apr. 2019, aeon.co/essays/an-environment-designed-to-suit-every-body-is-better-for-all?fbclid=IwAR0FKzGA8 f0zY4P5FMSGshMucObS4JaOk6MKqTzN1Vtv5dyhqm_mo1UUYuQ.
5) Hallett, Kim. "Designing for sex/gender minority." Triton Systems, Inc., 18 Apr. 2024, University of Washington, Seattle, WA. Guest Speaker Lecture.

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