January 13, 2026

Creating Assistive Technologies - Understanding the Problem

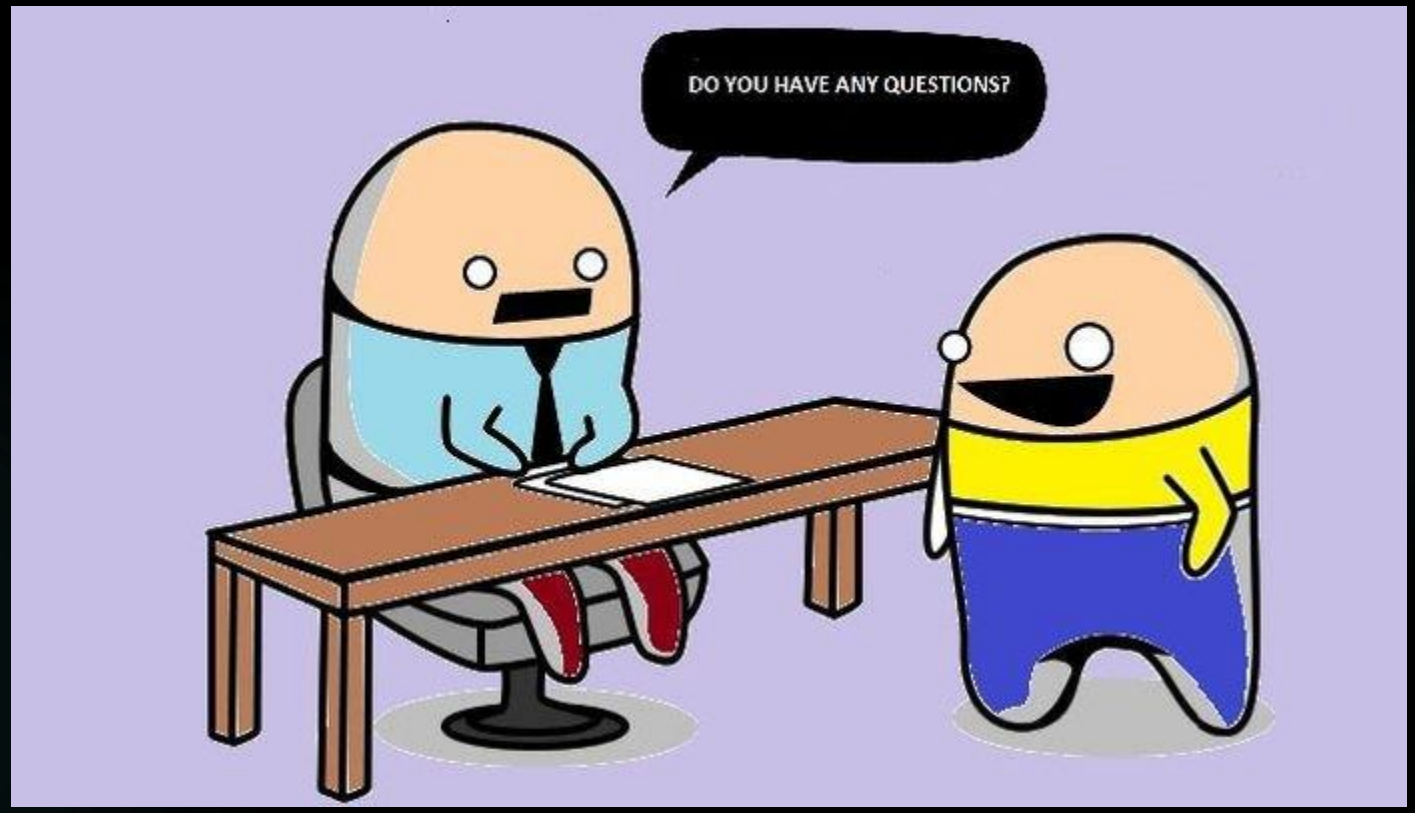
ENGR110/210
Perspectives in Assistive Technology



Gayle Curtis, MS

Guest Speaker

Do You Have Any Questions?



Odds & Ends



- Week 1 in Review sent on Saturday
- Pre-apology
- Face blindness - Brad Pitt

- Sign up for PRL Safety Quiz & Training
- Meet with your Project Suggestor







Attendance Sheet, Evaluation Form, and Meet with Dave Signup







For all students:

- Sign Attendance Sheet - important to verify your attendance
- Sign up to meet with Dave for lecture makeup, Individual Project discussion, or Team Project progress

For everyone:

- Fill out Class Session Evaluation Form (**in ink**)

Pre-lecture Discussion Topics



- Overview of Accessibility - How this design feature relates to products, with many examples
- Ableism - Definition and examples of Ableism
- Ethical / Moral Dilemmas Related to Disability
- Assistive Robotics - Robotic technology benefitting people with disabilities and older adults
- In the News - New Assistive Technology products and research
- Vintage Assistive Technology - Products and devices from the past
- Ten Commandments of Making - Adam Savage's Maker Faire video
- The Upside of Failure - Learning from prototypes that didn't work
- Who is Disabled? - Making a determination with limited information
- Video Theatre - Watch and discuss videos of new products and prototypes
- Product Pricing - What goes into making and selling an Assistive Technology device
- Innovative Marketing Metrics - How we use words to measure and advertise
- Famous People with Disabilities - Focus on TV characters

For Students Working on Team Projects

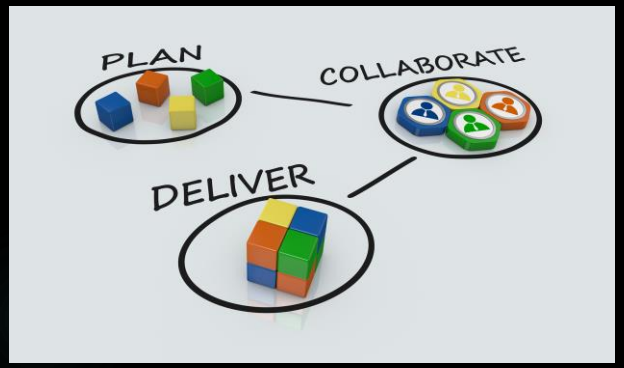
- **Teams** not **Groups**
- 7 teams have been formed:
  - 5 with 4 team members
  - 2 with 3 team members
- Schedule to meet to discuss project
- How was the team formation & project selection process?



Student Team Project Selections



First Team with No Name	Treats for Nathan
Second Team with No Name	Laptray Artwork Easel
Third Team with No Name	Obstacle Detector 1
Fourth Team with No Name	Magical Bridge Playground Attractions 1
Fifth Team with No Name	Obstacle Detector 2
Sixth Team with No Name	Footshell
Seventh Team with No Name	Magical Bridge Playground Attractions 2



Deliverables for Team Projects

- Meet with me after your team has achieved a full understanding of the challenge and have a few ideas
- Meet with your project suggestor
- Fabricate prototypes
- Mid-term presentation & report
- End-of-term presentation & report
- End-of-term project demonstration



Project Documentation

- Lab notebooks are not required
- Optional diary for your Individual Reflection
- Take photos and short videos:
  - Working with Project Suggestor
  - Illustrating your design and fabrication processes
  - Prototypes
  - Glamor shot



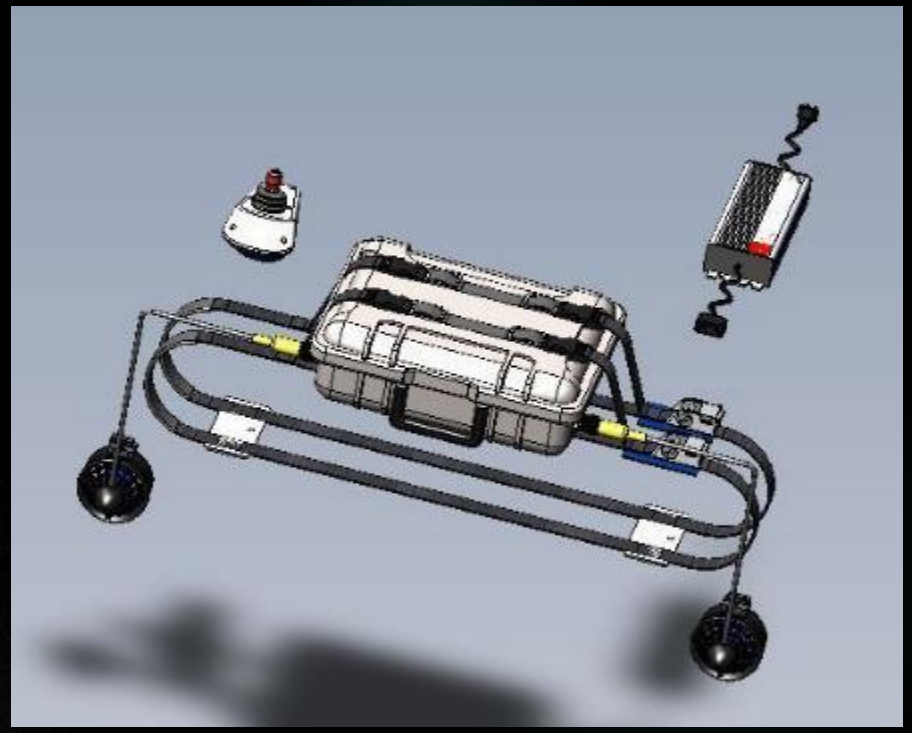






Other Items

- **Your project effort is largely self-directed**
- **Weekly progress reports**
- **Your class participation is appreciated**
- **How to order parts & supplies**





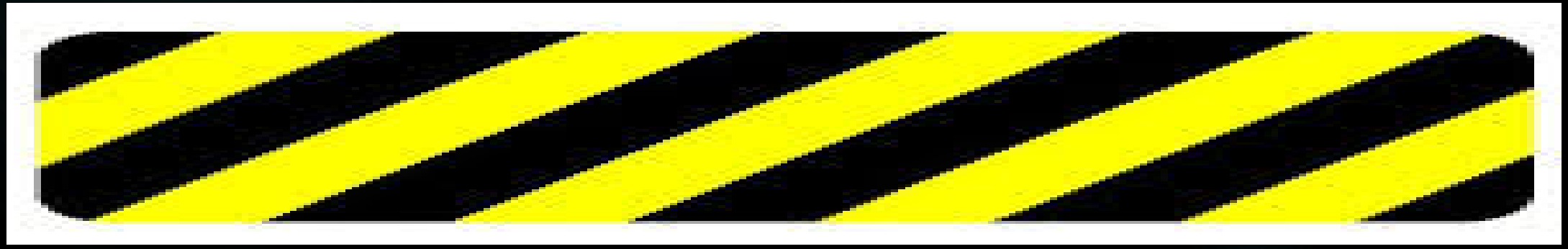




Team Hazards



- Leadership vacuum
- Task assignment
- Finding meeting times
- Getting started
- Making progress
- Procrastination
- Lack of participation by a team member



Work with Diligence

- Time is your team's most precious resource
- 7 weeks of class left to work on your projects
- Mid-term presentations in 4 weeks!



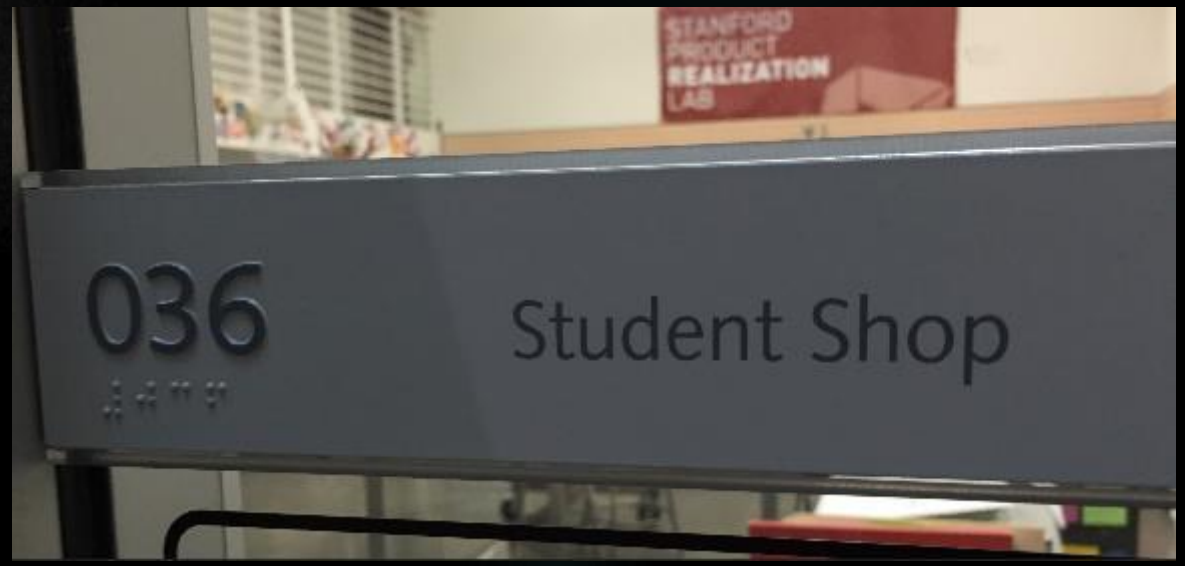


Miscellany



1. Weblinks and slides linked on lecture webpages
2. Last bits:
   - I have difficulty remembering names & recognizing faces
   - I strive to be supportive, flexible, and accommodating
   - I want to award excellent grades
   - **Sign up for PRL Safety Training**





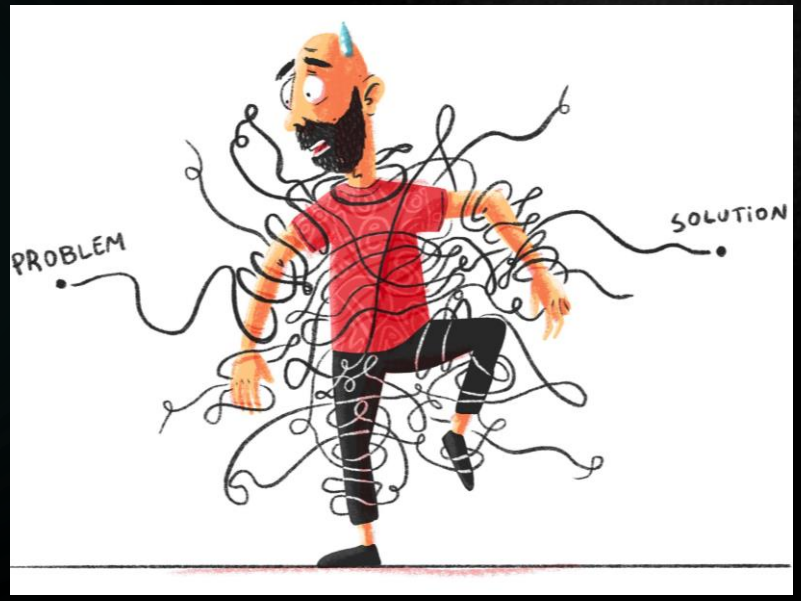
Questions?

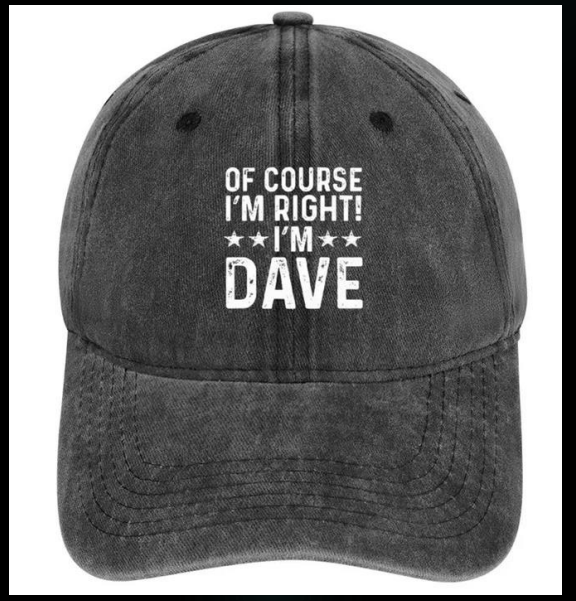

discover
questions
how?
asking questions
where?
?
why
challenge
who?
QUESTIONS
clues
ask
who?
discover
what?
when?
Knowing
investigation
?
clues
how
why?
ask
knowing
investigation



Design Process

- Gayle & I have similar - but not identical - thoughts about Design Process
  - I have an engineering outlook based on teaching this course
  - Gayle has a Product Design viewpoint





THE Engineering DESIGN PROCESS





- A process is a step-by-step plan of action employed by makers, designers, or engineers to achieve a goal.

- Using a structured process increases the chances of success - and getting a good grade.



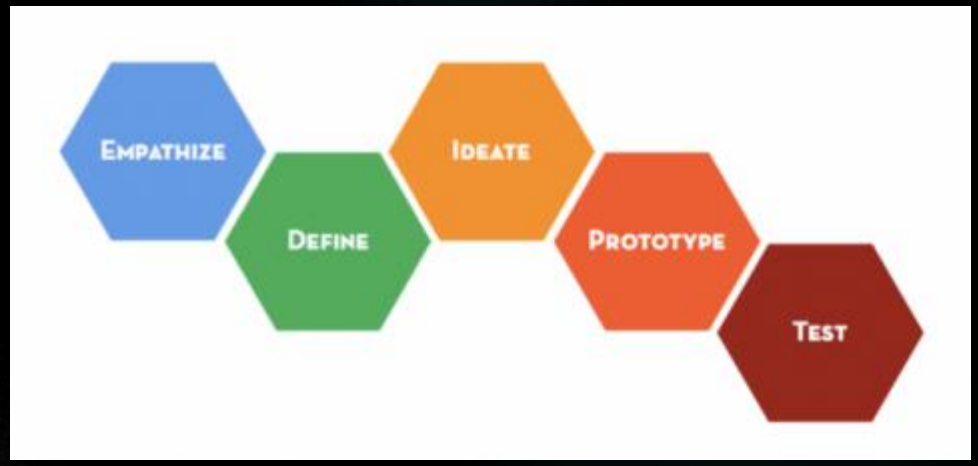


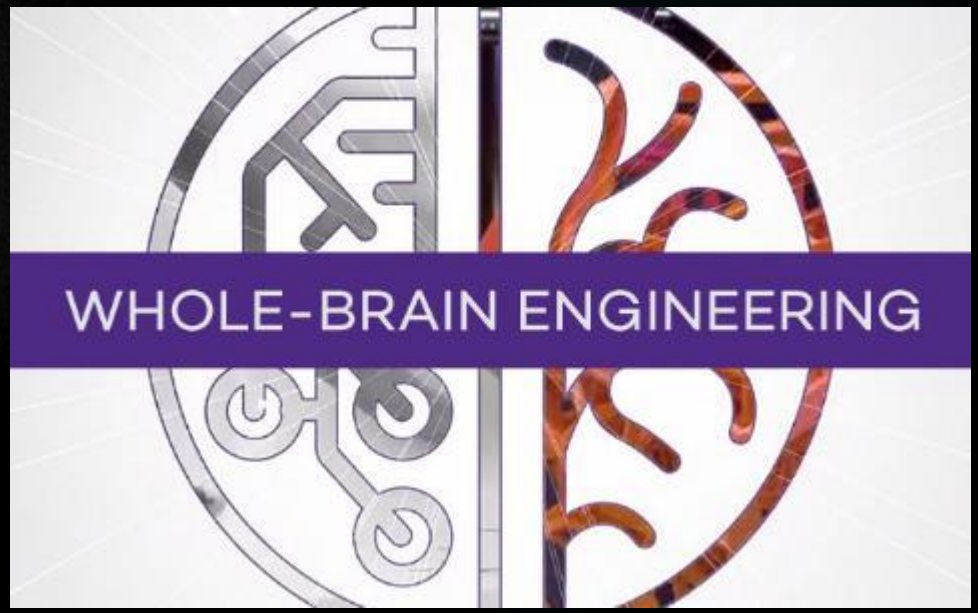


Design Processes

- Design Thinking - d.school Stanford
- Liberatory Design - USF
- People-First Engineering - UM
- Whole-Brain Engineering - NU
- Human-Centered Design
- User-Centered Design
- Black-Centered Design
- Empathetic Design
- Compassionate Design
- Co-Design
- Cooperative Design
- Bystander Design

- Biological Design Process = Evolution

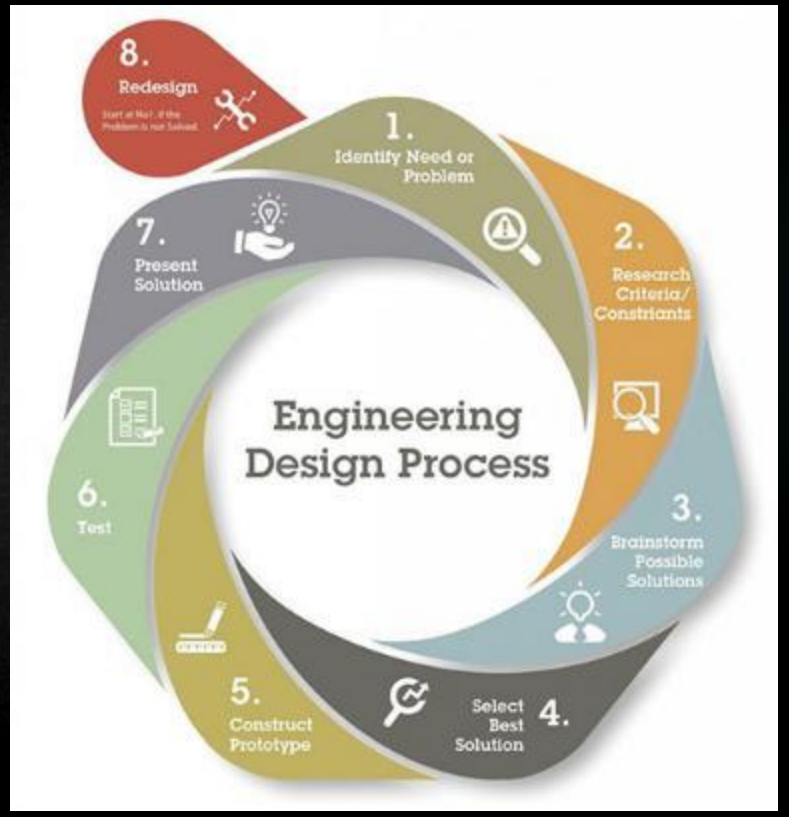




The Engineering Design Process
Activities

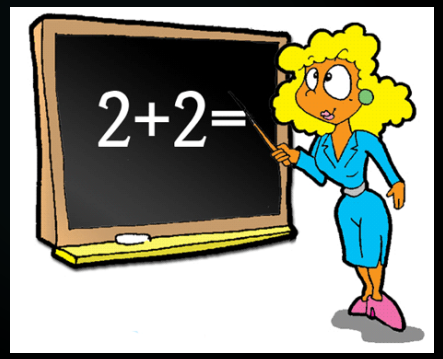
- **The Problem / Challenge**
- Brainstorming
- Selecting Design Concepts
- Prototyping (5 sub-activities)
- Communication (4 sub-activities)
- Role of the User

DESIGN SQUAD











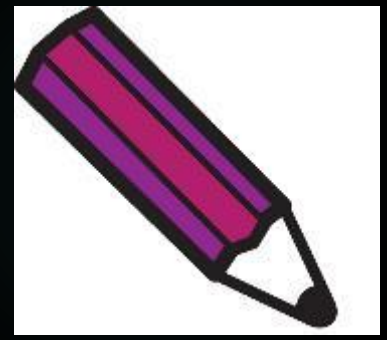
The Design Process

The Problem / Challenge

1. Search for the Problem
2. Identify the Problem
3. Describe the Problem
4. Pitch the Problem
5. **Understand the Problem**
6. Determine what is needed to address / solve the problem













The Design Process
Understand the Problem

- Clarify goals and objectives
  - Incorporate users' perspectives and standards of care
- Gather information
  - WWW, library, journals (research)
  - Product catalogs (existing products)
  - Stakeholders (family, caregivers)
  - Experts & health care professionals





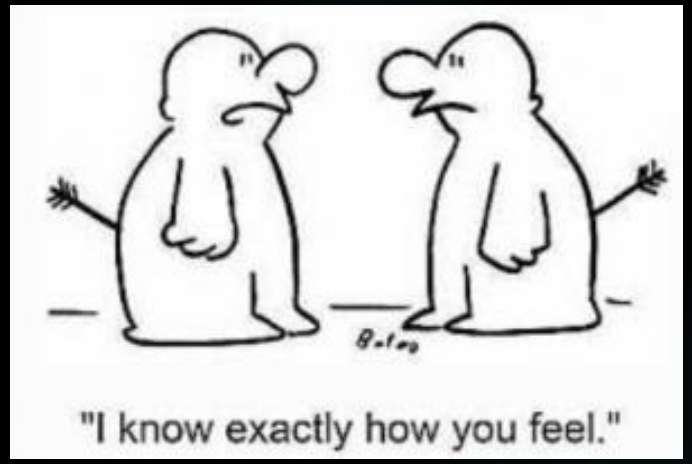
AbleData
Tools & Technologies to Enhance Life







The Design Process
Understand the Problem



- Sometimes called "Empathy"
- Find out as much as you can
- User's specific background and situation
- Review information on the disability condition
- Solicit the perspectives of people with disabilities and older adults, family members, friends, health care professionals, colleagues, researchers, engineers, product suppliers
- Query professionals via online listservs









The Design Process
Understand the Problem



- *"While a user may have a very good handle on The Problem, he/she may not fully appreciate the benefits and limitations of technology."*



- *"Since each person has his/her own circumstances, desires, and sense of aesthetics, a solution for one user may not generalize to the entire user population."*

- *"Creativity isn't a substitute for fully understanding the problem."*





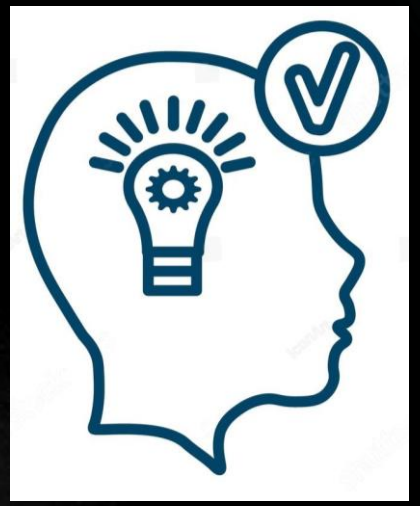




The Design Process
Understand the Problem

Research current solutions

- Published research
- Articles in popular media
- Previous student projects
- Product catalogs

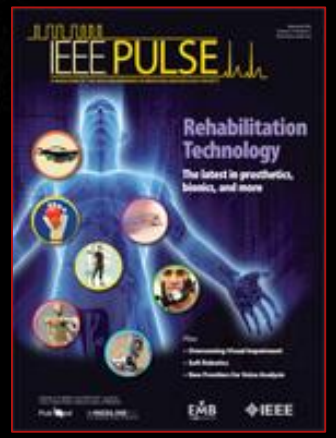














The Design Process
Understand the Problem





Research current solutions

- What products currently address the problem?
- What products are most commonly used?
- What is considered the standard of care?
- Because - You do not want to reinvent what already exists or has already been tried
- Build on existing solutions

Most of the time

"~~Sometimes~~ the only problem is a lack of awareness of a suitable existing solution."

AbleData

Your Source for Assistive Technology Information



The Design Process
Understand the Problem

- Determine why current "solutions" don't work
  - Important to find limitations of current products:
    - High cost, weight, reliability, etc
    - Ineffectiveness
    - Non-compliance or non-use
    - Poor aesthetics, functionality, durability, fit
    - Does not take advantage of current technology
- Why a new solution may not work

"The old shoe is more comfortable."
Barbara (age 92)















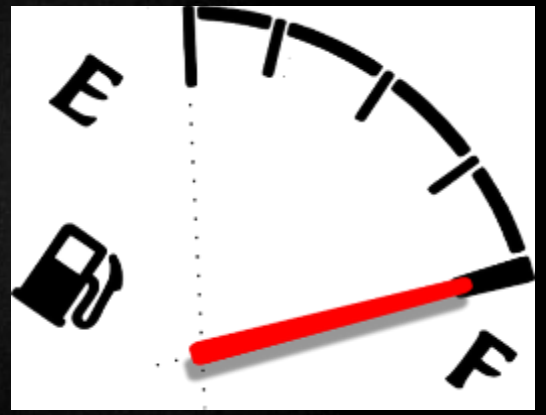


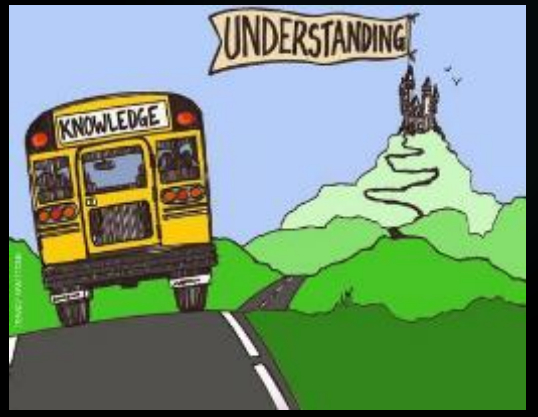
The Design Process
Judge the Need

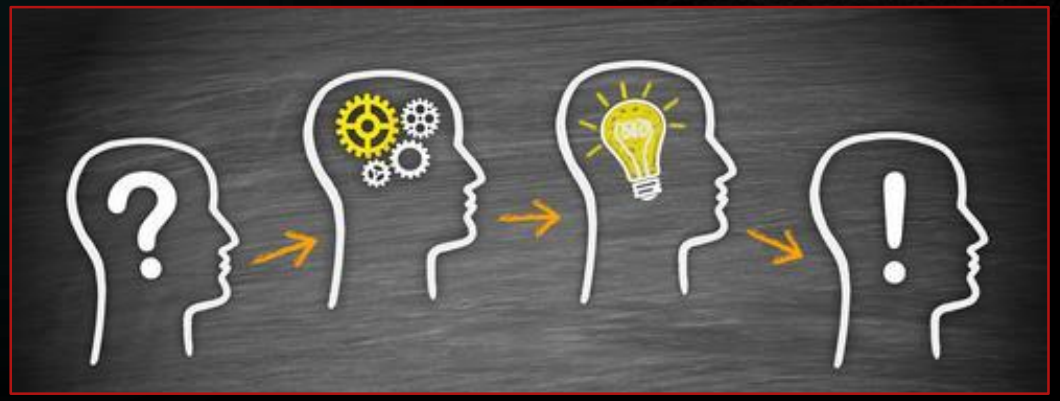
"Judge what is needed to address or solve the challenge from a full understanding of the problem."

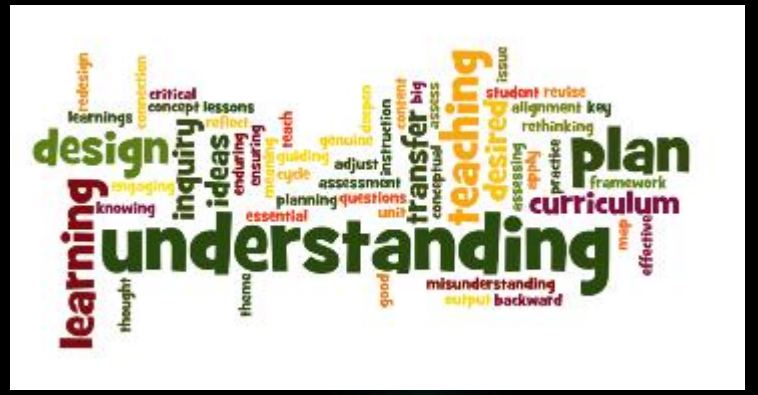




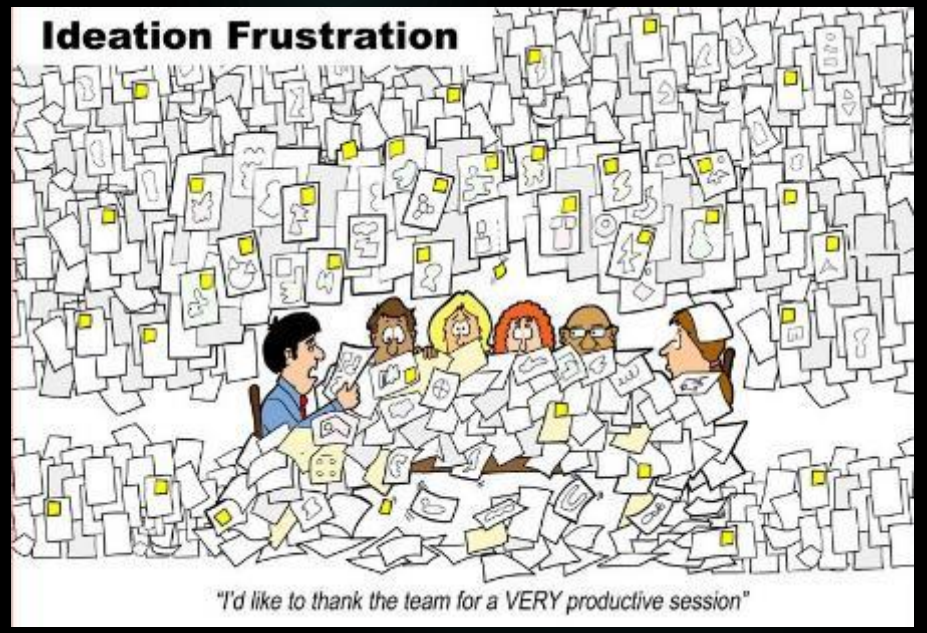








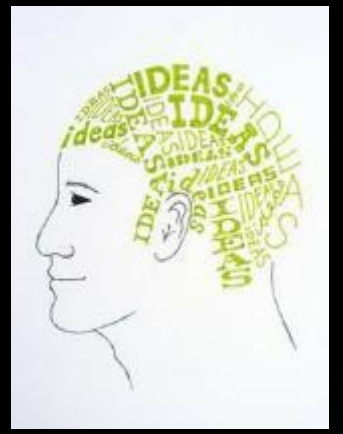
The Design Process
Brainstorming



- Idea Generation - also know as "Ideation"
  - Morphological charts
  - Brainstorming
  - Other techniques
- Develop multiple preliminary ideas, concepts
- Don't get stuck on your original idea - Anchor Effect









The Design Process
Survey Technology





- Seek out technology - including existing products - that could be brought to bear on the problem











How to interact with users

- Observe the problem / challenge in-person
- Interview, encourage them to tell a story
- Understand what a solution should do, but not how to do it
- List design features - don't forget the "coolness factor"
- Recognize that you may not be aware of the limitations and benefits of technology
- Interact with user / suggestor

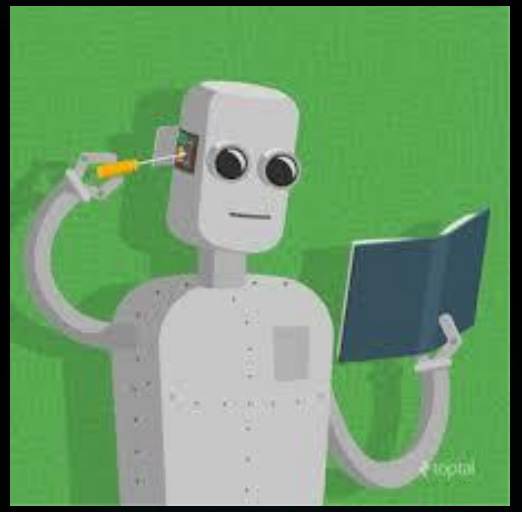






Engineering Design Process

- Does not include:
  - Building to another's vision
  - Making incremental improvements
- Utilize project resources and team skills
  - Person who suggested project / user
  - Course resource people
  - PRL & its CAs
  - Classmates
  - Course Assistants
  - Dave
- **Make and justify all your project decisions**





Other Observations





- Assistive Technology is a highly fragmented market
- A small market means high prices
- Avoid getting stuck in one aspect of the design process





"It's not a failure if you learn something."



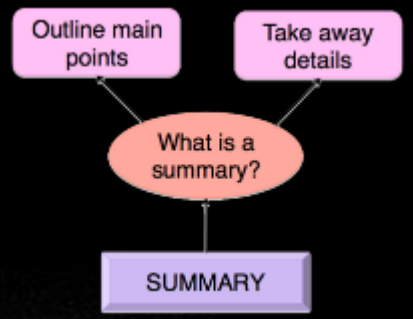




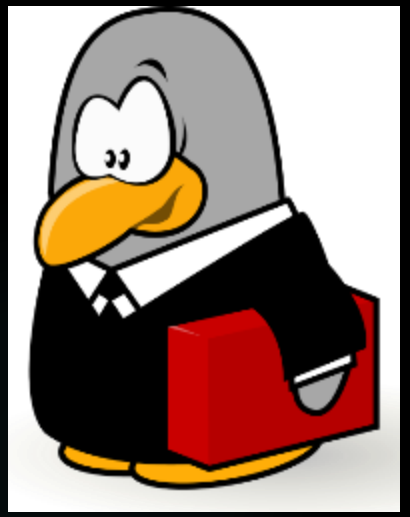




SUMMARY









- Describe the problem
- Understand the problem
- Survey technology that addresses the problem
- Engage with users during prototyping
- Very few design concepts make it to market
- Advice for student engineers:
  - Employ users, caregivers, heath care providers, and experts at each stage of the design process
  - Anticipate and plan for both successes and setbacks during development
  - "Fail" early and learn from "failures"
  - Start prototyping with low-cost materials





Thursday, January 15th



Bridging the Gap between Consumers and Products in Rehabilitation Medicine

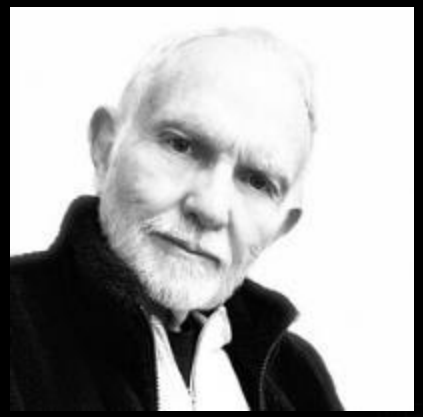
Deborah E. Kenney, MS, OTR/L

Stanford University

VA Palo Alto Health Care System

Foothill College

Today





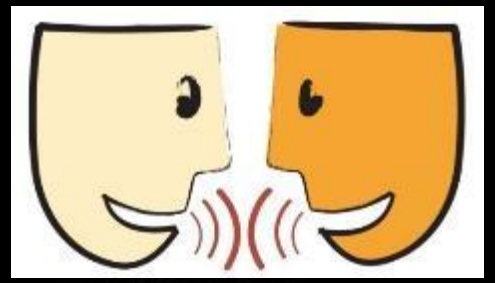




Creating Assistive Technologies - Understanding the Problem

Gayle Curtis, MS - UX Design Consultant

Break Activities



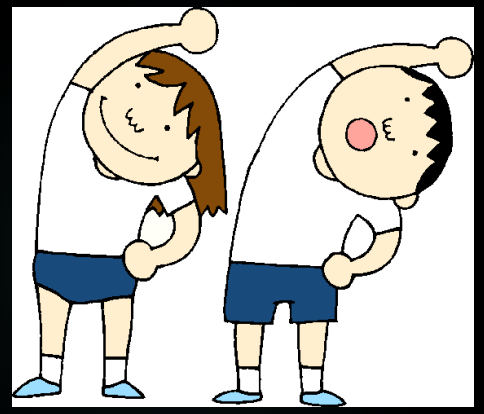




- Fill out forms
- Attendance sheet
- Stand up and stretch
- Take a bio-break
- Text message
- Web-surf
- Respond to email
- Talk with classmates
- Reflect on what was presented in class









Short Break



