January 14, 2020

Creating Assistive Technologies - Understanding the Problem

ENGR110/210
Perspectives in Assistive Technology

David L. Jaffe, MS

Instructor

14

Years

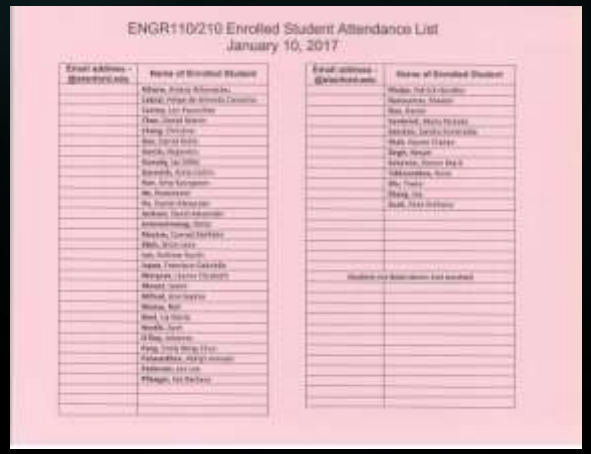
Attendance Sheet, Evaluation Form, and Meet with Dave Signup

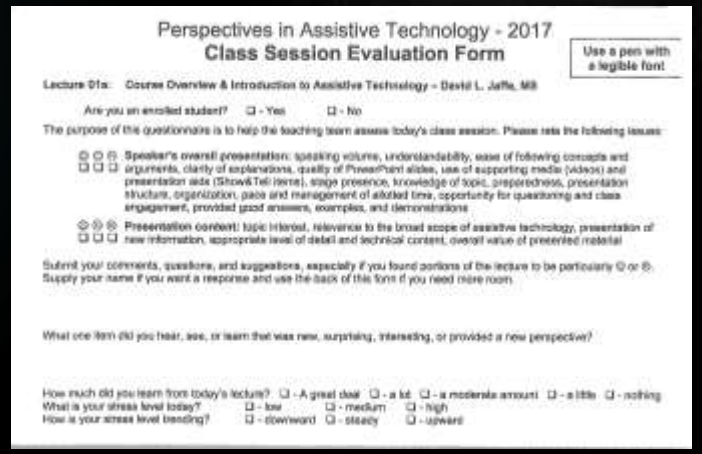
For all students:

- Sign Attendance Sheet - important to verify your attendance
- Sign up to meet with Dave for lecture makeup and Individual Project approval

For everyone:

- Fill out Class Session Evaluation Form


ENGR110/210 Enrolled Student Attendance List
January 10, 2017


Perspectives in Assistive Technology - 2017
Class Session Evaluation Form

Use a pen with a legible font

Lecture 01a: Course Overview & Introduction to Assistive Technology – David L. Jaffe, MS

Are you an enrolled student? ☐ - Yes ☐ - No

The purpose of the questionnaire is to help the teaching team assess today's class session. Please rate the following issues:

☹ ☹ ☹ ☐ ☐ ☐ **Speaker's overall presentation:** speaking volume, understandability, ease of following concepts and arguments, clarity of explanations, quality of PowerPoint slides, use of supporting media (videos) and presentation aids (Show&Tell items), stage presence, knowledge of topic, preparedness, presentation structure, organization, pace and management of allotted time, opportunity for questioning and class engagement, provided good answers, examples, and demonstrations

☺ ☺ ☺ ☐ ☐ ☐ **Presentation content:** topic interest, relevance to the broad scope of assistive technology, presentation of new information, appropriate level of detail and technical content, overall value of presented material

Submit your comments, questions, and suggestions, especially if you found portions of the lecture to be particularly ☺ or ☹. Supply your name if you want a response and use the back of this form if you need more room.

What one item did you hear, see, or learn that was new, surprising, interesting, or provided a new perspective?

How much did you learn from today's lecture? ☐ - A great deal ☐ - a lot ☐ - a moderate amount ☐ - a little ☐ - nothing
What is your stress level today? ☐ - low ☐ - medium ☐ - high
How is your stress level trending? ☐ - downward ☐ - steady ☐ - upward

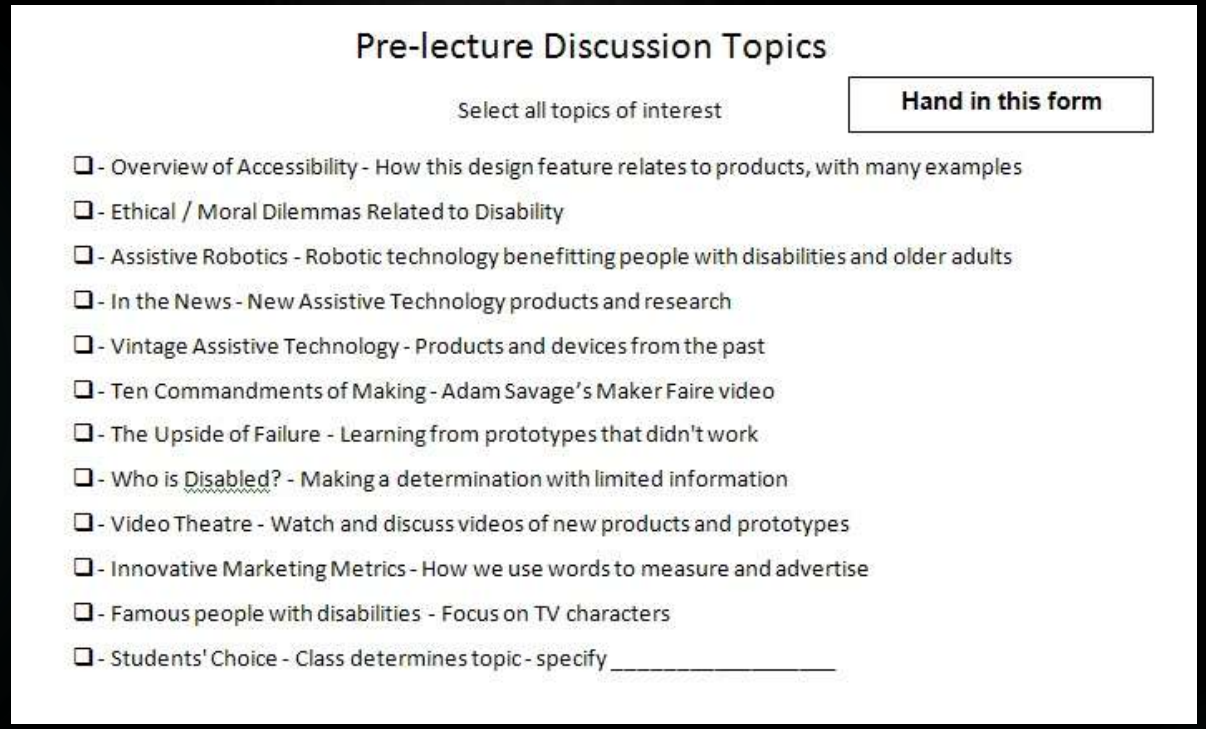

Sign Up to Meet with Dave

Before class outside Thornton 110
After class in Thornton 110
Other times in Peterson Building, Room 113

Date & Time	Enter Team Name & Specify 15 minute time block
Wednesday – January 18th	
Morning – 8:30am – 11:30am	
Afternoon – 1:00pm – 4:30pm	
Thursday – January 19th	
Morning – 8:30am – 11:30am	
Afternoon – 1pm – 3:30pm	
Before class – 9:45pm – outside classroom	
After class – 5pm	
Friday– January 20th	
Morning – 9:30am – 11:00am	

Pre-lecture Discussion Topics

Select all topics of interest



Pre-lecture Discussion Topics

Select all topics of interest

Hand in this form

- ❑ - Overview of Accessibility - How this design feature relates to products, with many examples
- ❑ - 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
- ❑ - Innovative Marketing Metrics - How we use words to measure and advertise
- ❑ - Famous people with disabilities - Focus on TV characters
- ❑ - Students' Choice - Class determines topic - specify _____

For Students working on Projects for 1 or 2 credit units

- Consider the these options:
  - Assistive technology topic
  - Paper design of an assistive technology device
  - Work of art
  - Aftermarket aesthetic, functionality, usability design
- Interview an individual with a disability. This could include: a family member, a friend, a classmate, a community member attending class, or others that I can suggest
- Report on their lives, challenges they have faced, successes they have achieved, desires for their future, assistive technology they use, and problems they have experienced with them.
- Meet with Dave to agree on project

Team Project Selection Policies

- Ok for the two Magical Bridge Playground teams to share background tasks
  - Driving to the facility
  - Interviewing project suggestors and users

Project Documentation

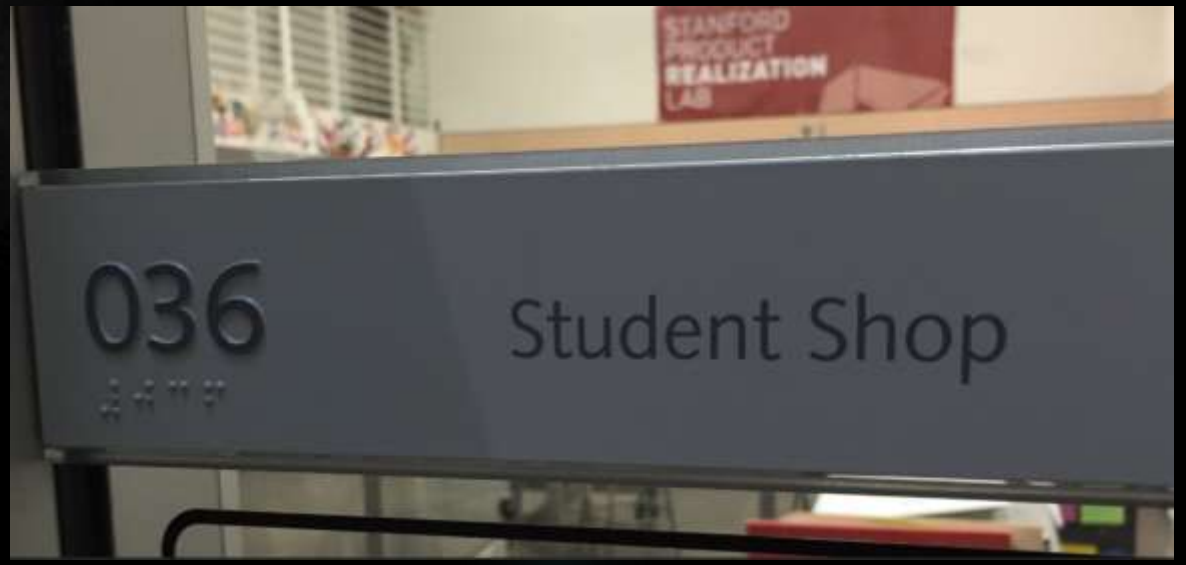
- Lab notebooks are not required
- Optional diary for your Individual Reflection
- Take photos and short videos:
  - Your team working with a person with a disability
  - Illustrating your design process
  - Prototypes

Work with Diligence

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

Miscellany

1. Weblinks, videos, and photos linked from lecture webpages
2. Anonymous Suggestion Box for comments and rhetorical questions
3. Sign up for PRL Safety Orientation & Shop passes
4. Last bits:
   - I have difficulty remembering names
   - I am on your team
   - I am on your side
   - I want to award good grades

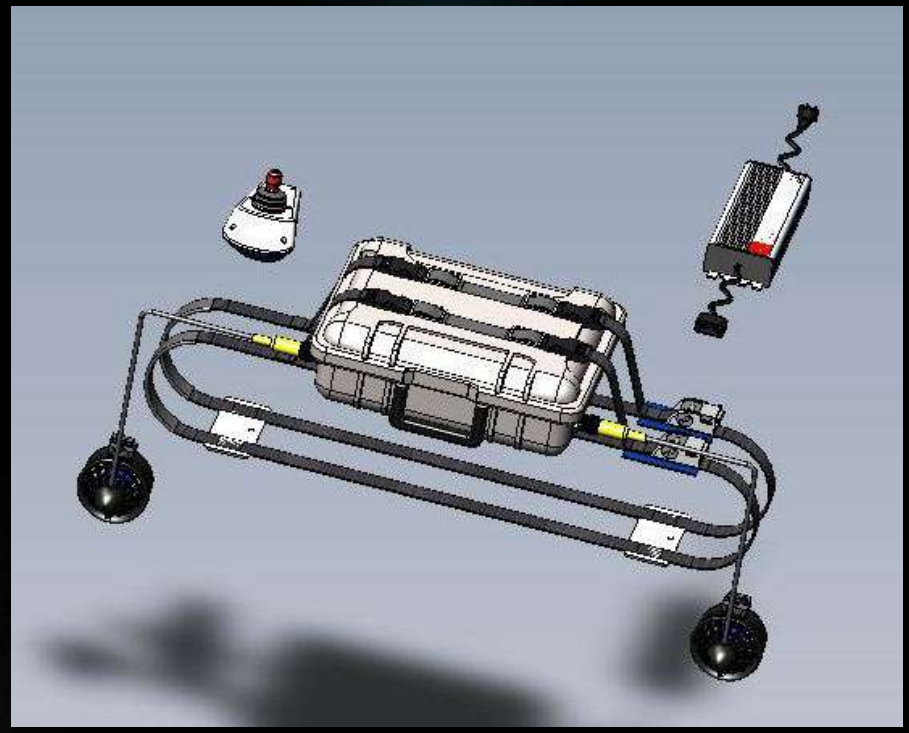


Formed Project Teams

- **Team MDM -** Project with Magical Bridge Playground
- **The Banana Slugs** - TravelScoot Camping Project with Abby
- **The Second Team with No Name** - Photography Access with Paul
- **Team Unrestrained** - Wheelchair Restraint for Danny
- **The Fourth Team with No Name** - Laptray for Ben
- **The Fifth Team with No Name** - Laptray for Abby
- **The Sixth Team with No Name** - WHILL Visibility with Abby
- **The Seventh Team with No Name** - Arm rest Project with Nick
- **The Last Team with No Name** - Project with the Magical Bridge Playground

Other Items

- Your team project effort is self-directed
- Your project budget is $200
- Your class participation is appreciated



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

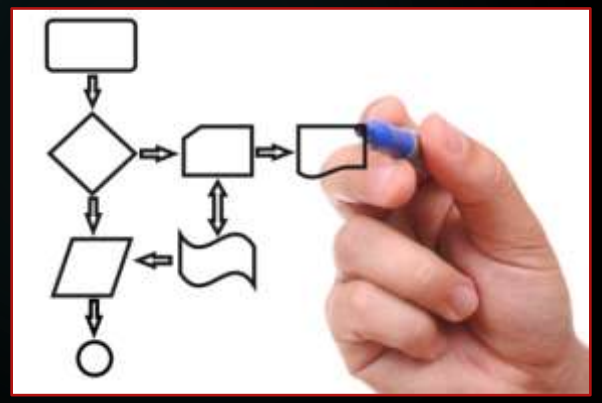
Design Process

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

THE DESIGN PROCESS

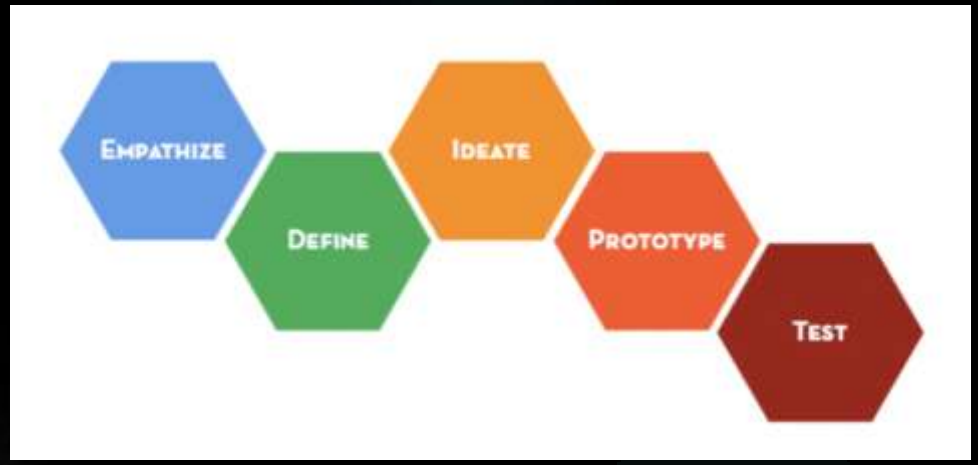
- A process is a step-by-step plan of action employed by makers, designers, or engineers to achieve a goal.

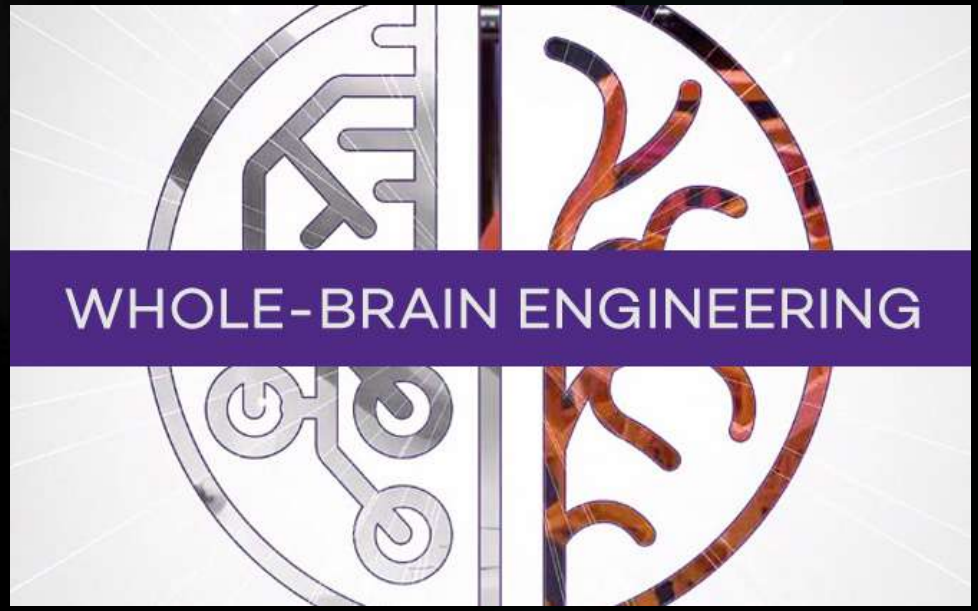
- Using a structured process increases the chances of success.



Design Processes

- Design Thinking - d.school
- Whole-Brain Engineering - Northwestern
- Human-Centered Design
- User-Centered Design
- Empathetic Design
- Compassionate Design
- Co-Design
- Cooperative Design
- Bystander Design

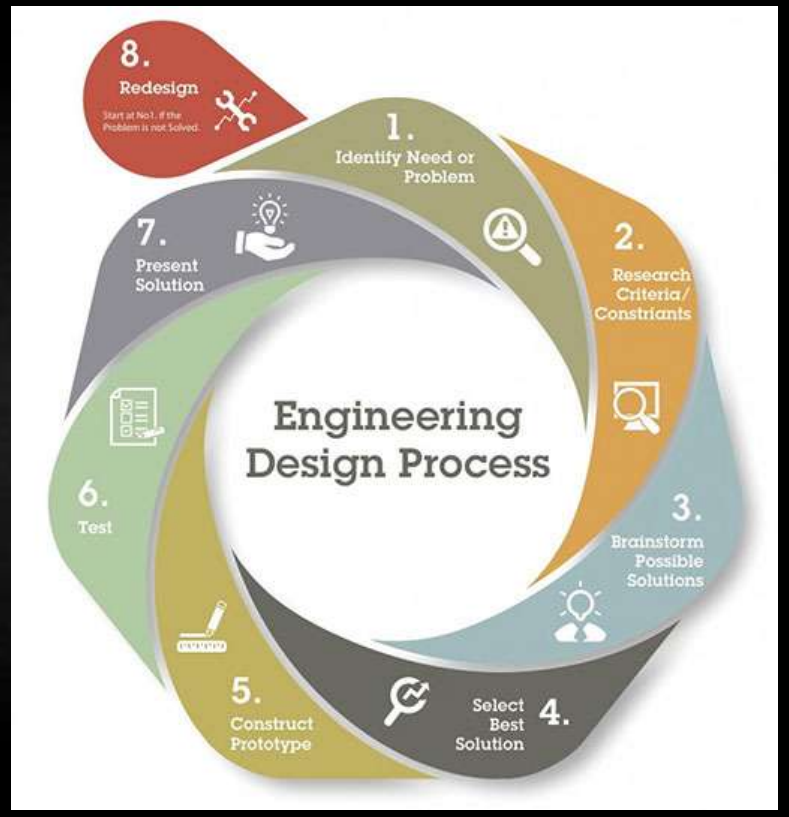


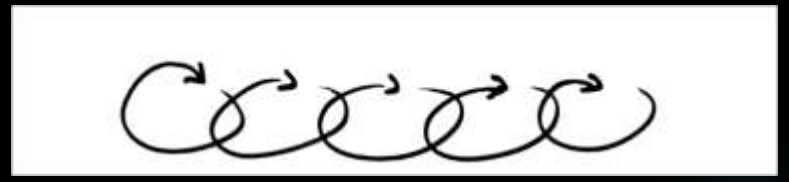


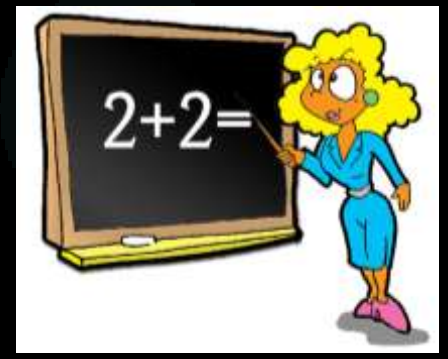
The Engineering Design Process
Activities

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

DESIGN SQUAD



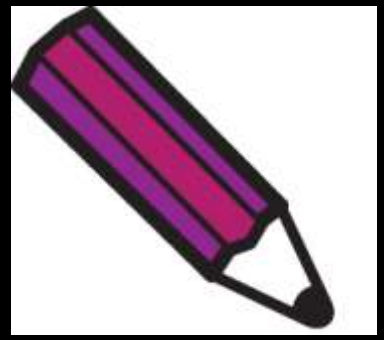


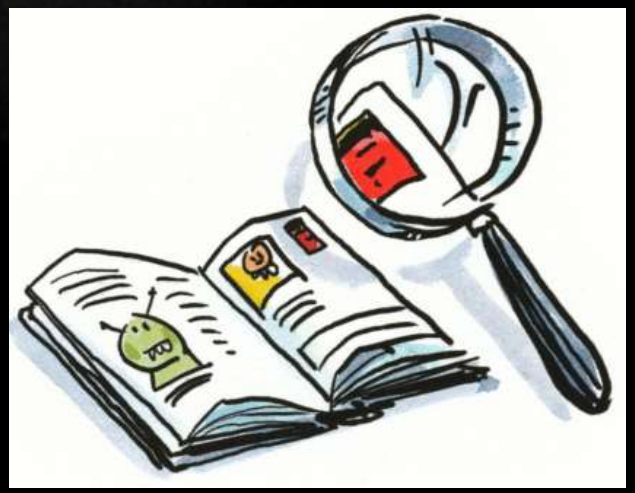


The Design Process

The Problem

1. Search for the Problem
2. Identify the Problem
3. Describe the Problem
4. Understand the Problem
5. Determine the Need



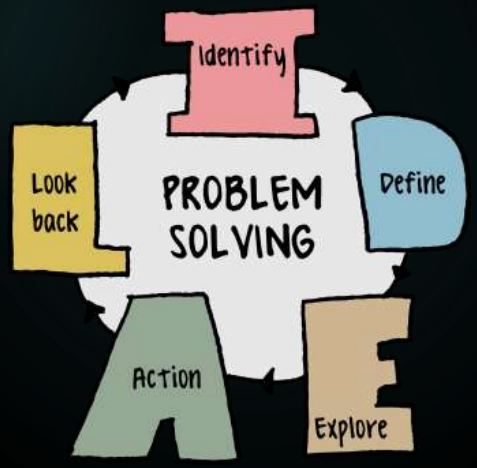


The Design Process
Search for the Problem

- Pick a field, user group, technology
- Employ ethnography, observation, discussion, interview techniques

The Design Process
Identify the Problem

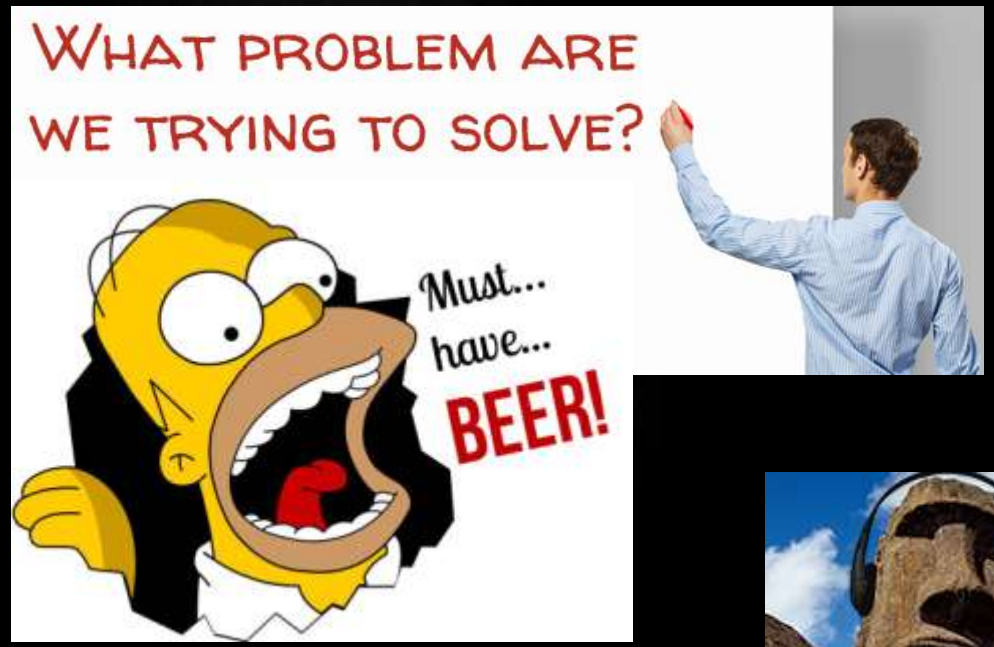
- Identify a specific challenge
- Identify the customers / stakeholders
- Identify resources and technologies

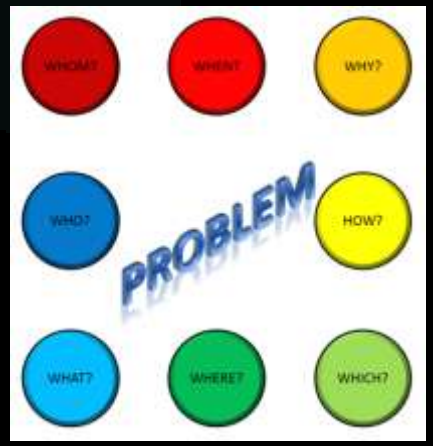


The Design Process
The Problem Statement

Compose a written problem statement that includes:

- Project Title
- Background
- Problem
- Goal / Aim
- Design Criteria
- Other Information
- Contacts





insert title here

a catchy phrase would be great too

Problem Statement Example

Enhanced Visibility Project

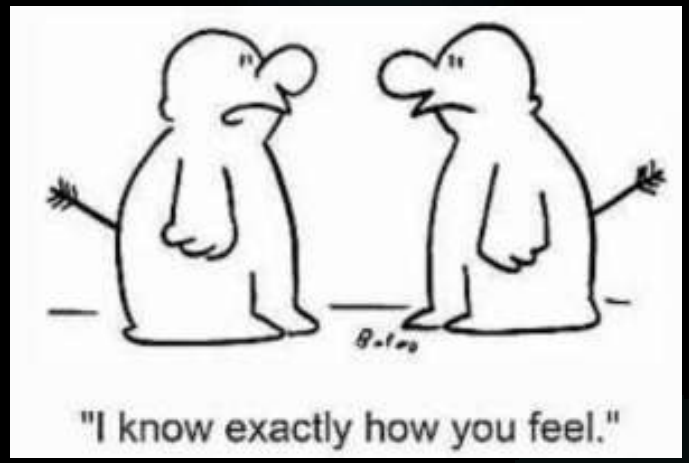
- **Background:** The WHILL Model A is a mobility device meant to give wheelchair users a sleek alternative to standard products, which often lack aesthetic appeal and thereby reinforce stereotypes of weakness or helplessness.
- **Problem:** While the WHILL has built-in lights that are designed into the rear wheel cover, they are insufficient to provide adequate visibility (to see and be seen) at night.
- **Aim:** Explore designs that will enhance the night time visibility of the WHILL and thereby increase user safety.
- **Design Criteria:** The design should:
  - not alter or permanently deface or damage the physical structure or operation of WHILL
  - integrate well with WHILL's appearance
  - provide forward illumination (like a car's headlights)
  - enhance both side and rear visibility
  - automatically operate based on sensed ambient lighting
  - include a manual override
  - optionally include a light show mode
- **Links:**
  - Whill
  - Ashley's Passion to Redefine Accessibility
  - Whill's back light
- **Contact:**
  - Whill contact
  - User contact

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
  - Experts & health care professionals

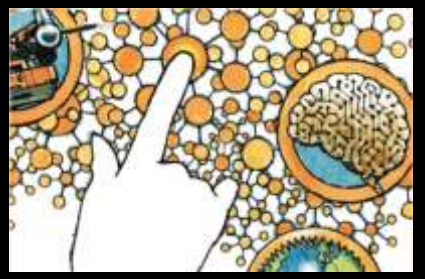
AbleData
Tools & Technologies to Enhance Life

The Design Process
Understand the Problem



- Often 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



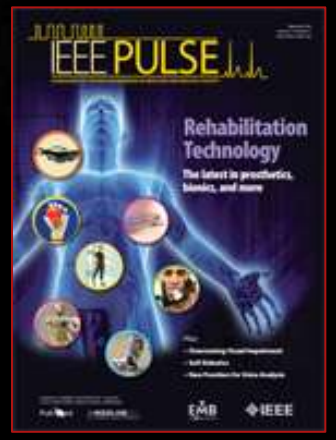
- *"While a user may have a good handle on The Problem, he/she may not fully appreciate the benefits and limitations of technology."*

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

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?
- You may not want to reinvent what already exists or has already been tried

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

AbleData
Your Source for Assistive Technology Information

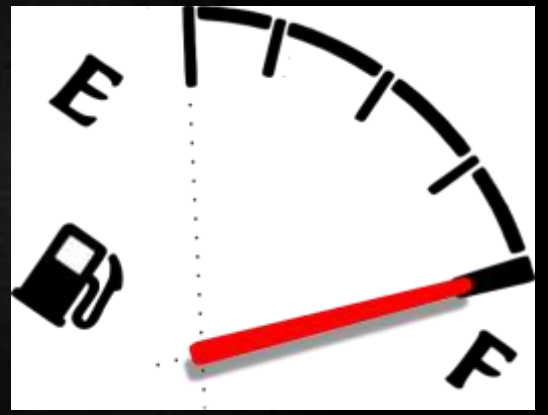
The Design Process
Understand the Problem

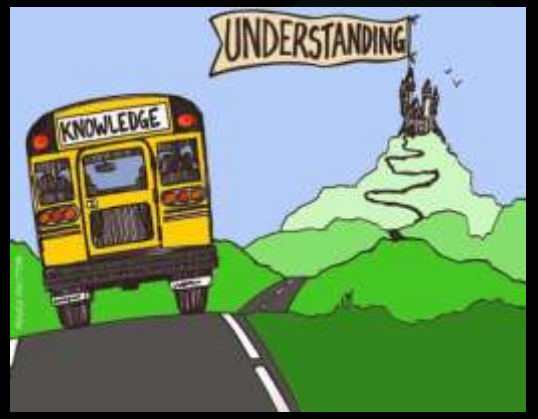
- Determine why current "solutions" don't work
  - Important to find limitations of current products:
    - High cost, weight, reliability, etc
    - Ineffectiveness
    - Non-compliance or non-use
    - Poor aesthetics, functionality, durability, fit
    - Does not take advantage of current technology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

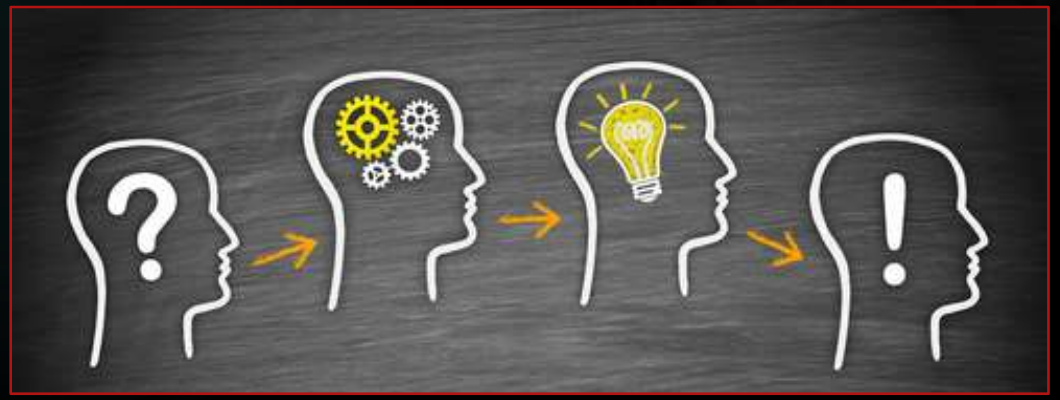
"The old shoe is more comfortable."
Barbara (age 92)

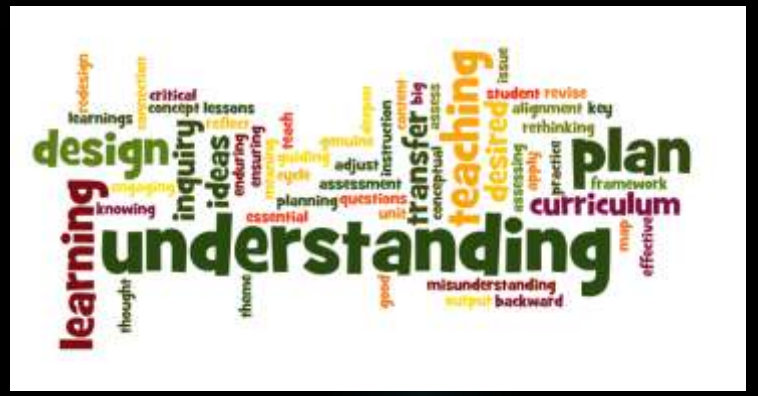
The Design Process
Judge the Need

"Judge what is needed from a full understanding of the problem."



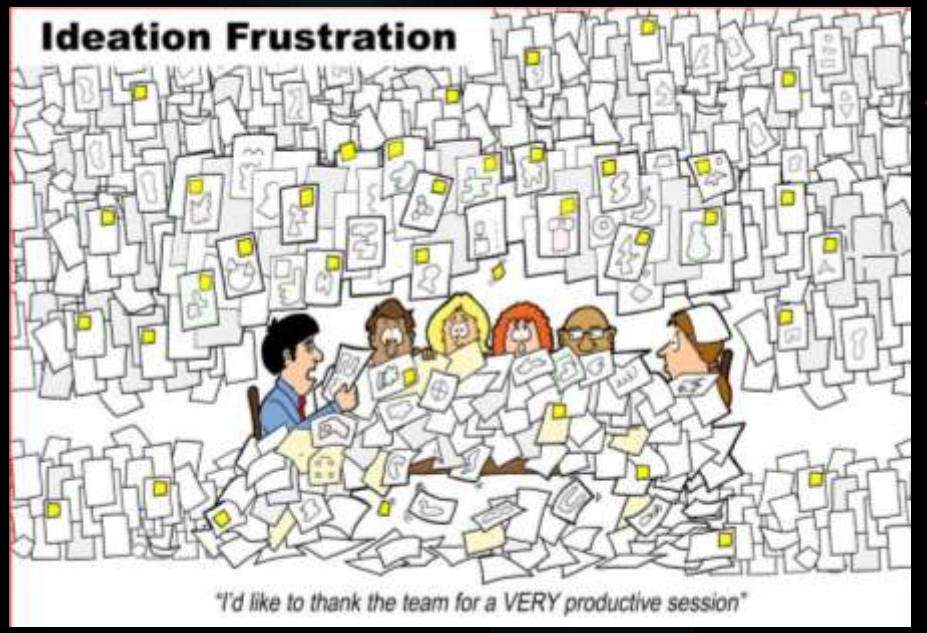


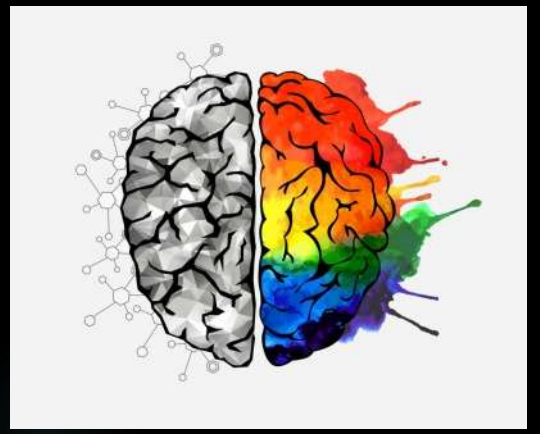




The Design Process
Brainstorming

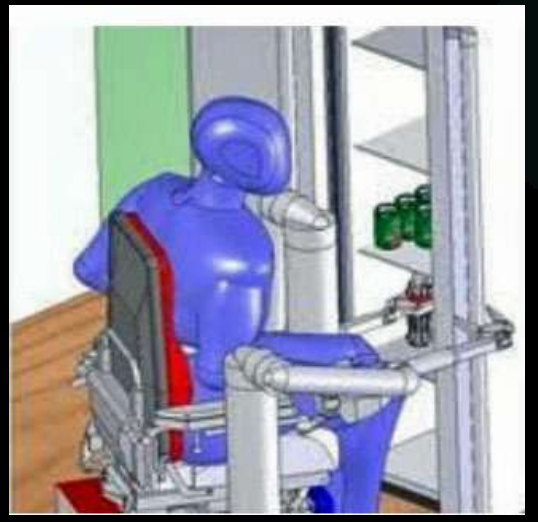
- Idea Generation - also know as "Ideation"
  - Morphological charts
  - Brainstorming
  - Other techniques
- Develop multiple preliminary ideas, concepts
- Don't get stuck on your original idea - Anchor Effect





The Design Process
Survey Technology

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

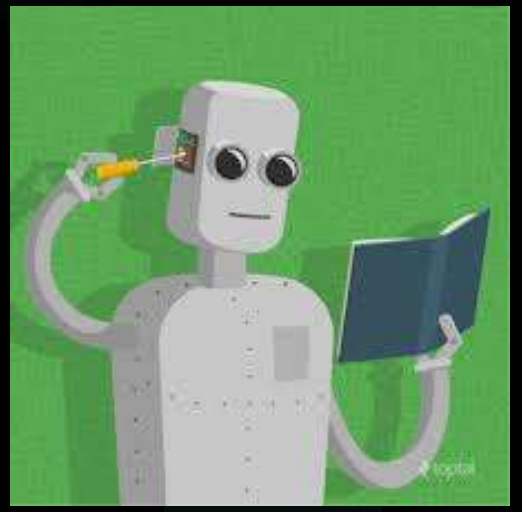


How to interact with users

- Observe the problem / challenge firsthand
- 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
  - PRL and Room 36 (equipment and TAs)
  - Person who suggested project
  - Course resource people
  - Classmates
  - 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
- 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 16th

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

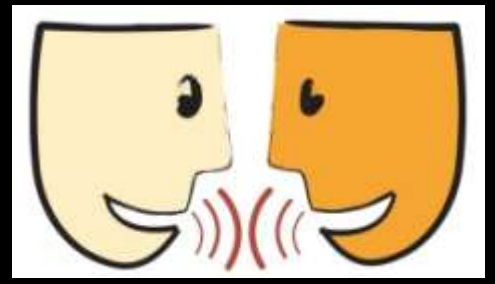
Creating Assistive Technologies - Understanding the Problem

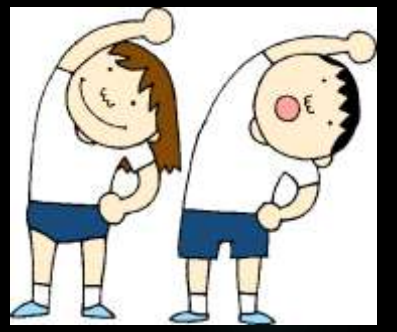
Gayle Curtis - UX Design Consultant

Short Break

Break Activities

- Sign attendance sheet
- Grab a cookie
- Stand up and stretch
- Take a bio-break
- Text message, web-surf, email
- Talk with classmates
- Reflect on what was presented in class





Short Break


THANK YOU FOR
YOUR ATTENTION.
memegenerator.es