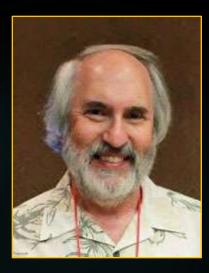
January 15, 2019 Needfinding and Assistive Technologies - Gayle Curtis

ENGR110/210 Perspectives in Assistive Technology



David L. Jaffe, MS Instructor



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 ۲

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Sign Up to Meet with Dave







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
- I 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
- I 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 Individual Projects

- 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

Tulsi Trisha Stella

Team Project Selection Procedure

- Browse to <u>Project Preferences</u>
- Or suggest a student-defined project
- Make sure the project your are interested in is <u>available</u>
- Contact project suggestor for more information & access to users
- Refer to <u>Student / Project Preference Matrix</u>
- Contact other students who have similar project interests
- Verify their desire and availability to work on the project
- Once a team of three is formed, email me with your project selection, team members, and team name - due this Friday

Student / Project	- Annual Contraction	1000				The state	241-64	110		-		100			Children of	101/00	-	-		×	
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Available Projects

- Abby's Wheelchair
- Simultaneous Operation
- Harness for Nathan
- WHILL Recharging
- Magical Bridge with Jay
- Magical Bridge with Olenka
- Elbow Lifter
- Pick Me Up



- Wheelchair Dancing
- Instrumented Wheelchair
- Get a Grip
- Clean House
- ▶ Within Reach
- Creative Expression
- Designing Your Afterlife
- Student-defined projects

Team Project Selection Policies

Form a team of three

- There are 27 students enrolled in Team Projects, so there will be exactly 9 teams
- The Magical Bridge Playground supports two teams - one with Jay, one with Olenka
- Projects are reserved on a "first-to-submit" basis





Team Project Selection Policies

Ok for the two Magical Bridge Playground teams to share background tasks

- Driving to the facility
- Interviewing project suggestors



Team Project Selection Policies

Since there is no guarantee that other students will have the same project interests or that your preferred projects will still be available, you should be prepared to:

- convince others to work with you on one of your selected projects
- consider working with another student on a project he/she has chosen
- keep an open mind



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!

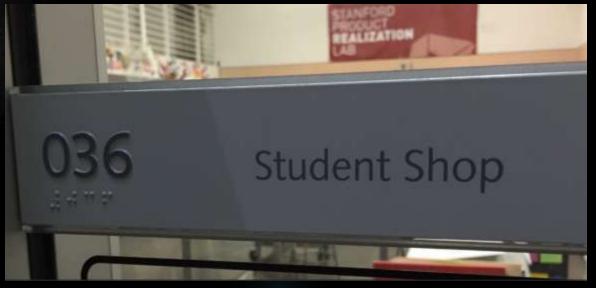




Miscellany



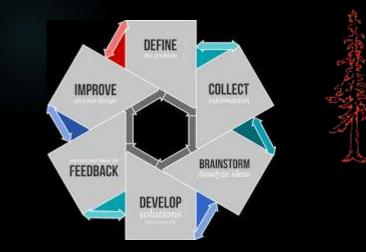
- 1. Weblinks, videos, and photos linked from lecture webpages
- 2. <u>Anonymous Suggestion Box</u> for comments and rhetorical questions
- 3. Sign up for PRL Safety Orientation & Shop passes
- 4. Last bits:
 - I have difficulty remembering names
 - I am on your team
 - I am on your side
 - I want to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



The Hide-Away Lap Tray

The First Team with No Name

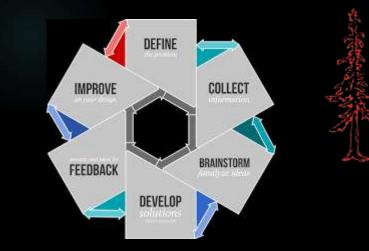
- ▶ Tita Kanjanapas
- Ashley Lau
- Lynee Turek-Hankins



Elevator Button Pusher

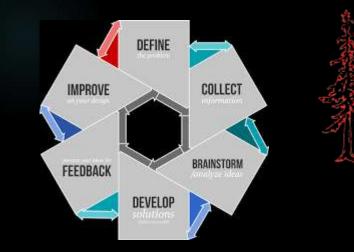
The Second Team with No Name

- ► Lindsie Jeffries
- Jessica Hsueh
- Jenny Park



Lap Extender

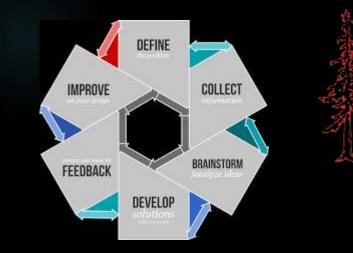
- ► The PRL Tray-Iblazers
 - Andrea Banuet
 - Marissa Luna
 - Annie Sinclair



Lap Tray for Danny

Travola

- Arkira Chantaratananond
- Tony Hua
- Jenny Kim



- WHILL Recharging
- Mean Machine
 - Jack Barber
 - Ryan Dudzinski
 - Cameron Scarlett

Form your Project Teams this week

Your Project

- Your Team Name
 - Student 1
 - Student 2
 - Student 3

Other Items

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







Questions?





Design Process



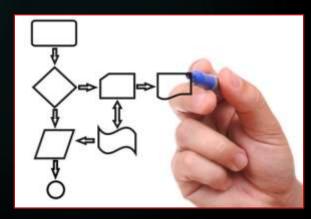






A process is a step-by-step plan of action employed by makers, designers, or engineers to achieve a goal.

Using a structured process increases the chances of success.

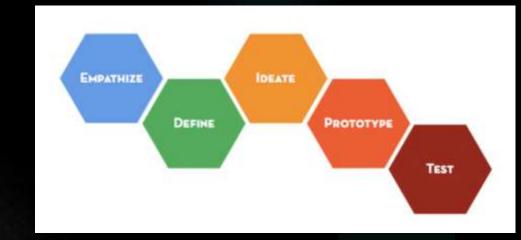






Design Processes

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

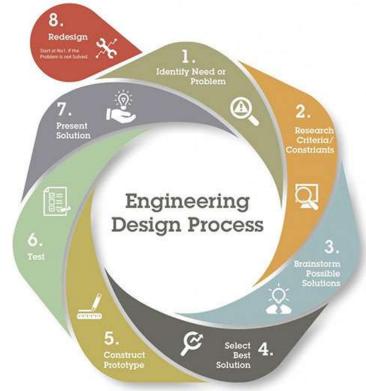




The Engineering Design Process Activities

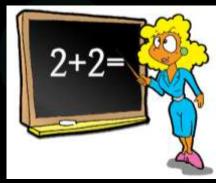
- The Problem (5 sub-activities)
- Brainstorming
- Selecting Design Concepts
- Prototyping (5 sub-activities)
- Communication (4 sub-activities)
- Role of the User

DESIGN SQUAD









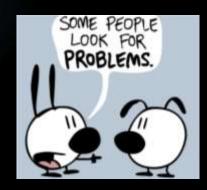


The Design Process The Problem

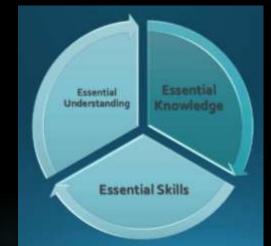
- 1. Search for the Problem
- 2. Identify the Problem
- 3. Describe the Problem
- 4. Understand the Problem
- 5. Determine the Need













The Design Process Search for the Problem

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











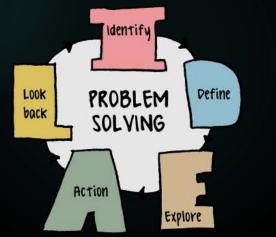
"My team has created a very innovative solution, but we're still looking for a problem to go with it."

The Design Process Identify the Problem

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







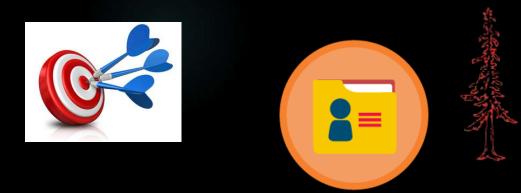








The Design Process The Problem Statement



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

WHAT PROBLEM ARE WE TRYING TO SOLVE?









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:
 - ► <u>Whill</u>
 - Ashley's Passion to Redefine Accessibility
 - Whill's back light
- Contact:
 - Whill contact
 - User contact



- 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











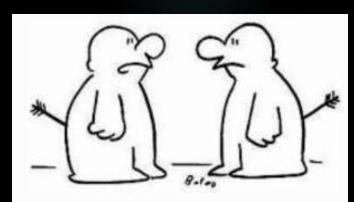


- Often called "Empathy"
- Find out as much as you can
- User's specific background and situation
- Review information on the disability condition
- Solicit the perspectives of people with disabilities and older adults, family members, friends, health care professionals, colleagues, researchers, engineers,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









"I know exactly how you feel."





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











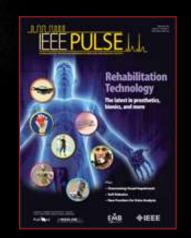


Research current solutions

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



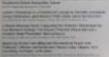






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Research current solutions

- 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." Dave





- 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." Dave

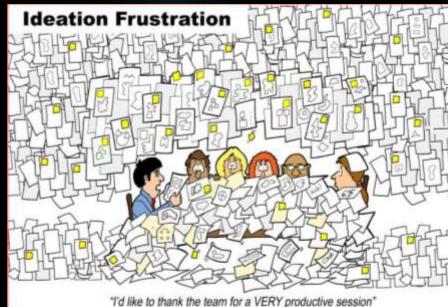


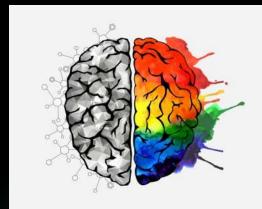


The Design Process Brainstorming

- 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

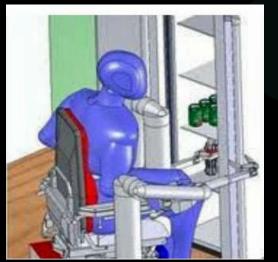


Seek out technology - including existing products - that could be brought to bear on the problem











How to interact with users

- Observe the problem / challenge firsthand
- Encourage them to tell a story
- Understand <u>what</u> a solution should do, but not <u>how</u> 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

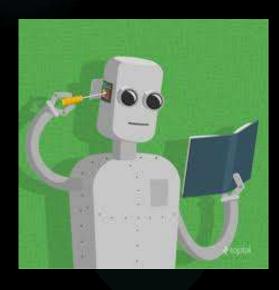
Does not include:

- 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







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." Dave











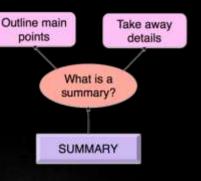






SUMMARY

- 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











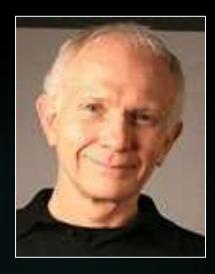
Thursday, January 17th



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



Needfinding and Assistive Technologies

Gayle Curtis - UX Design Consultant

Short Break

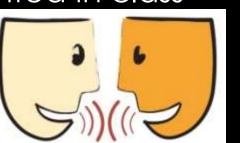


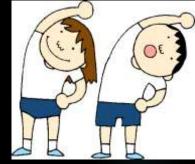


Break Activities



- 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





