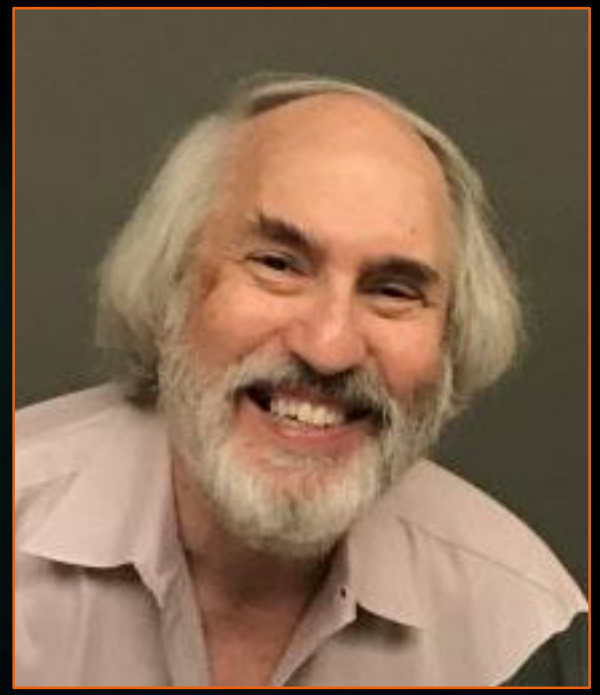
January 14, 2021

Project Pitch Day

ENGR110/210
Perspectives in Assistive Technology



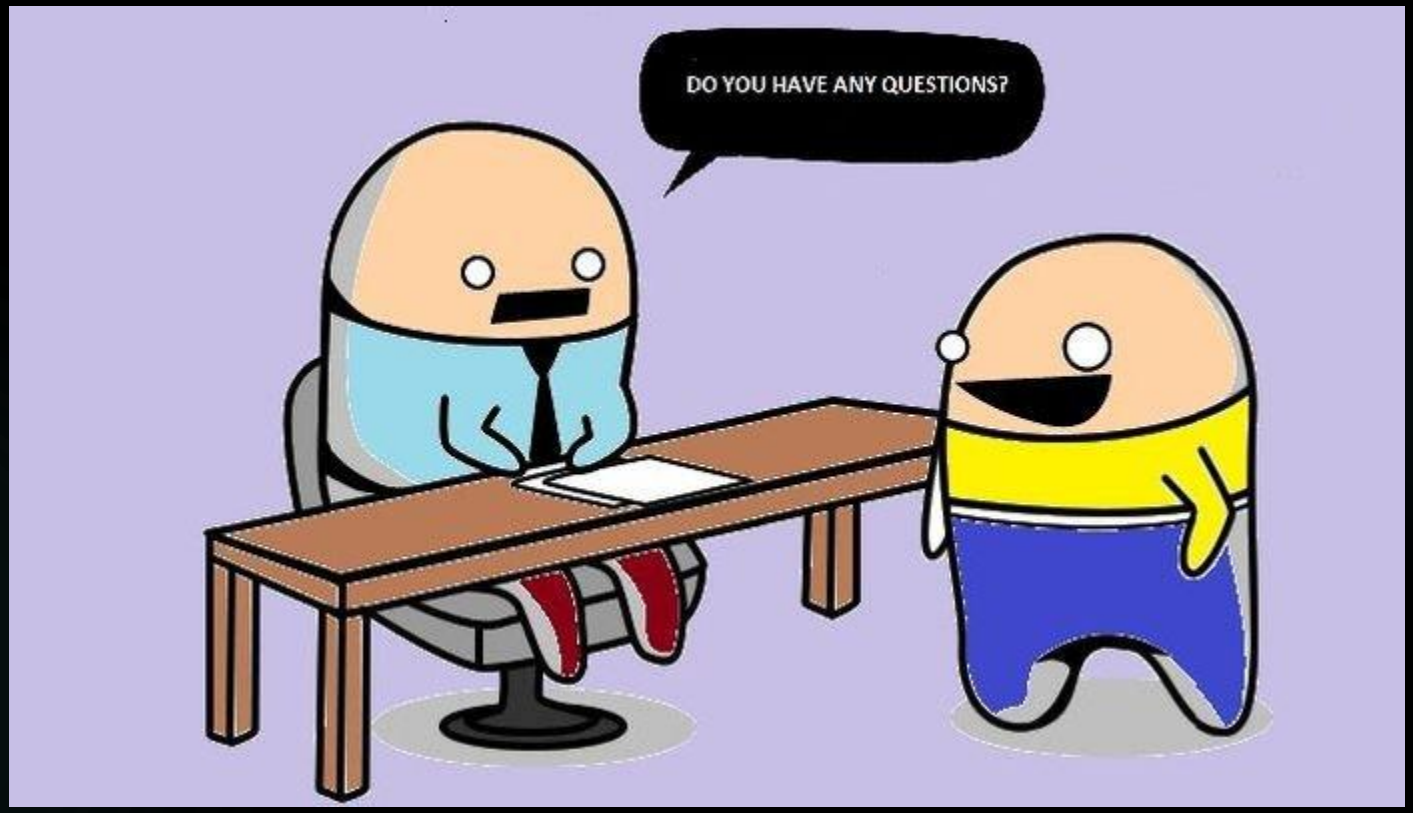
David L. Jaffe, MS

Instructor

15

Years

Do You Have Any Questions?



Thanks to:

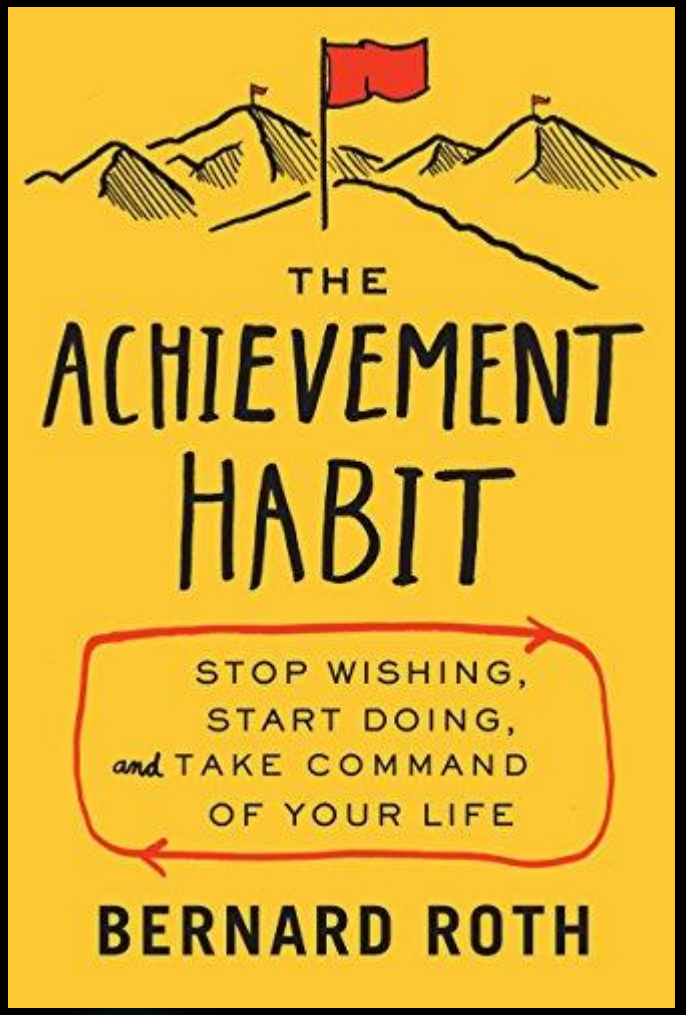
- Students:
  - Enrolling and participating in the course
  - Filling out lecture evaluations and comments
- Haas Center for Public Service
  - Funding
- Community members
  - Participating and "adding to the conversation"
- Project suggestors
  - Suggesting great projects
  - Working with students

Suggestor

actor, adjudicator, adjustor, advisor, alienator, animator, aviator, capacitor, competitor, consolidator, creator, defector, dictator, director, discriminator, doctor, eliminator, estimator, evaluator, fabricator, facilitator, innovator, instructor, interrogator, investigator, liberator, orator, perpetrator, predecessor, predictor, procrastinator, proctor, professor, renovator, resistor, sponsor, **suggestor**, suitor, supervisor, tailor, traitor, visitor

Missing a required class session

1. Let me know (beforehand, if possible) by email
2. Do not provide a reason
3. Make up the missed class session promptly



Enrolled Student Attendance List

- It is important to verify your attendance at every class session
- Fill out Google Form
- All enrolled students: Please sign this list in every class session to confirm your attendance.
- Auditing students: Please sign this list in every class session to get credit for your attendance.

Candidate Projects

- For students taking the course for two credits
- Follow along on the class session webpage
- Use Google Form to indicate your project choice
- Ok for two students working on same project to share "Understanding the Problem" and "Brainstorming" tasks, but each student must pursue a different solution, present individually, and report individually>

Tuesday, January 19th

Creating Assistive Technologies - Understanding the Problem

Gayle Curtis - UX Design Consultant

Leftovers from Tuesday

1. Persistent vegetative state - loss of higher brain functions
2. Course website - http://engr110.stanford.edu
   Syllabus
   Lecture Schedule

Terry Schiavo

3. Moses' disability: In a test of baby Moses' capability to destroy the kingdom of Pharaoh, angel Gabriel guided Moses' hand to pick up live coal, which he took up and put in his mouth. This burned his tongue, causing him difficulty in speaking, but saved his life.

Today's Agenda

1. Introduction of Course Resource People
2. Considerations for Project Selection
3. Brief break
4. Project Pitches
5. Open Zoom Question Time

Course Resource People

- Matteo Zallio, PhD
- Deborah E. Kenney, MS, OTR/L

- Douglas F. Schwandt, MS
- Jules Sherman

Project Selection

For those working on a project:

- Read project descriptions on course website
- Fill out Project Preferences Form during / after pitches
- Talk to project presenters after the pitches

Considerations for Project Selection

Course load

- Can you spend the time working on a project? Courses like ME103, ME203, ME210, ME218, ME310, and BioE141are very demanding.
- Are you a TA or CA?
- Do you have athletic practices?

Fabrication skills

- Have you built anything before?

Available tools

Project Preferences

- Email Dave with selected project, name by Tuesday, January 19th

- Prepare to "hit the ground running" by:
  - Connecting with your Project Suggestor

Why you may want to

If you have enrolled for two units, you may want to consider taking the course for one unit or waiting until next year if:

Take it twice!

1. You are not graduating, or
2. If you have limited fabrication experience, or
3. If you are already taking a project course like ME112, ME203, ME210, ME218, ME310, BioE141, or …
4. If you have to miss lectures or field trips, or
5. You are not able to devote 4 hours per week to your project.

Project Selection

For those working on 2 credit unit projects:

- Pursue project pitched by suggestor
- Research an assistive technology topic
- Work on a CAD design of an assistive technology device
- Fabricate a functional prototype
- Build an appearance model
- Create a work of art
- Engage in an aftermarket aesthetic design
- Engage in an aftermarket functionality / usability design
- Optionally pair with another student for Understanding the Problem and Brainstorming
- Meet with Dave for suggestions and approval

Short Break

- Fill out Google Forms Attendance Sheet
- Hand in your Student Signup Form from Tuesday if you haven't already

Projects Pitched by Suggestor

- Projects with Abby:
  - Improved Pooper Scooper
  - Sewing Machine Needle Threading Project
  - Camping Cot Project
  - Alert Project
  - Cutting vegetables for cooks with one arm
  - Cutting boards for cooks who are blind or those with limited arm / hand mobility

- Projects with Olenka at the Magical Bridge Playground:
  - Accessible & Inclusive Playground Attractions

Team Projects Pitched by Suggestor

- Project with Austin:
  - Cutting Knife for Austin
- Project with Danny & Stanford:
  - Wearable Storage Pack for Danny
- Project with Reg at the National Children's Hospital:
  - Identifying Emotional State Project
- Project with Tilly:
  - Cell Phone Holder for Wheelchair

Projects from Previous Years

- Assistive Technology Maker Space Projects (2020)
- Assistive Technology Pop-Up Shop (2019)
- LiveWell RERC 2021 Student App Challenge (2020)
- Simple Games for Children with Austim (2017)
- Durable Medical Equipment Projects (2017)
- User Survey of Power Wheelchair Desirable Feature and Capabilities (2016)
- Projects employing inexpensive voice-recognition technology (2014)
- Household Tasks Project
- Shower / Bathtub / Sink / Toilet Cleaning Project
- Projects Suggested by the Ideation Workshop Senior User Insights Panel

Assistive Technology Maker Space Projects

- Problem: "I am supporting schools that have Maker Spaces, but they lack meaningful, real-world, open-ended challenges for students to do in them. The schools need inspirational challenges and basic support resources (background on the problem, design constraints, and success criteria)."
- Aim: Design and document four example Maker Space projects for schools to offer. These projects should focus on assistive technology and involve the design, fabrication, and testing of a prototype device or tool that benefits a person with a disability or an older adult.

Greg Brown

Report on an Advance in Assistive Technology

- Neural implants, brain-computer interfaces
- Prosthetics and orthotics
- Robotics
- Mobility products
- Software products
- Accessibility solutions

Report on Applications of Assistive Technology

- Learning for grade school students with disabilities
- Web access for individuals with disabilities and older adults
- Mobility for wheelchair users
- Speech generation for individuals who are non-vocal
- Activities of daily living for older adults

Report on a Local Disability or Aging Organization

- AnewVista
- Avenidas
- Bay Area Association of Disabled Sailors
- Bay Area Outreach & Recreation Program (BORP)
- Lighthouse for the Blind and Visually Impaired
- Magical Bridge Playground
- Senior Planet
- Silicon Valley Independent Living Center
- Stanford Office of Accessible Education
- United Cerebral Palsy of the North Bay
- VA Palo Alto Health Care System - Recreation Therapy
- Vista Center for the Blind and Visually Impaired

Project Options

- Pursue a CAD design of an assistive technology device
- Fabricate a functional prototype
- Fabricate an "appearance model" of an assistive technology device
- Create a work of art
- Engage in an aftermarket aesthetic design
- Engage in an aftermarket functionality / usability design

Projects Suggested by Dave

- Creative Expression
- Designing Your Afterlife
- COVID-related Projects
- Student-defined Projects

On deck: Abby

Projects with Abby

- Improved Pooper Scooper - Explore designs for a device that will allow Abby to effectively clean up after her service dog while remaining active in the community
- Sewing Machine Needle Threading Project - Explore designs that facilitates threading of the needle
- Camping Cot Project - Explore designs for a camping cot that Abby will find to be easy to assemble and disassemble independently.
- Alert Project - Explore designs to alert people in Abby's path.
- Cutting vegetables for cooks with one arm
- Cutting boards for cooks who are blind or those with limited arm / hand mobility

On deck: Olenka

Abby's Background

- "I am mobility impaired, 4'11" tall, and only able to lift 10 pounds. I am very active in advocacy and social justice issues, especially focusing on individuals with disabilities. I speak at national conventions for many organizations."

- Challenges to address:
  - Improved Pooper Scooper
  - Sewing Machine Needle Threading Project
  - Camping Cot
  - Alert
  - Cutting vegetables
  - Cutting board

Pooper Scooper Project

- Explore designs for a device that will allow Abby to effectively clean up after their service dog while remaining active in their community.

Sewing Machine Needle Threading Project

- Explore designs for a device that facilitates threading of the needle.

Camping Cot Project

Here are the parts of the camping cot, with the bed shown on the right. Explore designs for a camping cot that Abby will find to be easy to assemble and disassemble independently.

Play video

Alert Project

Explore designs to alert people in Abby's path.

Play video

Cutting Projects

- Cutting vegetables for cooks with one arm
- Cutting board for cooks who are blind or those with limited arm / hand mobility

Projects with Olenka at the Magical Bridge Playground

- Accessible and Inclusive Playground Attractions - Explore designs to improve access to and navigation around the playground, as well as to create new play and educational experiences incorporating multiple senses, actions, and outcomes for all playground users and visitors, especially those with visual impairments and diminished fine motor skills.

On deck: Austin

Magical Bridge Playground

Magical Bridge Playground founder, Olenka Villarreal often says, "The playground is a child's first classroom.“

Introducing children as early as possible to the variety of people in their community is our best hope for removing social and physical barriers.

How it Happened

It all started with a mom, two daughters, and a playground need

Determined to create the kind of outdoor space that both her disabled and non-disabled daughters (and all their friends!) would love, Olenka Villarreal mobilized a team of volunteers to fulfill a dream to create such a place.

In 2015, Magical Bridge Playground opened to great enthusiasm

Since then, the success of the playground has inspired an awareness that today's parks leave far too many behind.

With long-time friend and team member, Jill Asher, Olenka created Magical Bridge Foundation as a non-profit organization in 2016

The foundation is beginning to extend its reach beyond the Bay Area and continues to bring the joy of play, kindness and new friendships to as many families as possible.

ADA “Accessibility” Just Isn’t Enough

- Not a single public playground has been designed with everyone’s unique play needs in mind.
- ADA standards do not meet the needs of many living with a disability.

Magical Bridge Playground, Palo Alto

Seven Unique Zones: Playhouse & Tree Deck, Slide Mound, Spinning Zone, Picnic & Performance Area, Swinging & Swaying Zone;,Music Zone, and Tot Play Zone

The Playhouse is two stories and the Tree Deck has two bridges including a "rope" bridge. The entire structure is wheelchair accessible.

Playground features are a mix of custom designed equipment and off-the-shelf technology often applied in unique ways.

Seven years of research went into this playground design.

MAGICAL BRIDGE
REDWOOD CITY, CA

- Construction MAGIC is underway at Red Morton Park in Redwood City! Magical Bridge Playground in Redwood City will welcome and serve visitors of all abilities and disabilities in San Mateo County and beyond! We plan to complete construction and open to the public in Summer 2019.

- Magical Bridge Playground Projects are also underway in Morgan Hill, Mountain View, and Sunnyvale.

Be Part of the Magic - Join Us!

MAGICAL BRIDGE®
FOUNDATION

Olenka Villarreal
olenka@magicalbridge.org

Projects with Austin

- Explore designs that would enable Austin to independently perform cooking activities relating to food preparation.

On deck: Danny & Stanford

Project with Danny & Stanford

- Meet Danny & Stanford
- Cerebral Palsy & Cortical Vision Impairment

On deck: Reggie from Children's National Hospital

Wearable Storage Pack for Danny

- Explore designs for a wearable storage pack that would enable Danny to independently and safely store his phone, wheelchair gloves, and other miscellaneous objects.

Smile and the World Will Smile Back

Identifying Emotional State Project

- Children's National Hospital – Reggie
- Explore designs for ways that clinicians can get updated on a patients' daily emotional state as awareness of their mindset may improve social interaction, medical treatments, and clinicians' safety.

On deck: Tilly

Children's National Psychiatry Unit Bio-design Project

Reginald E. Bannerman, RN MSN, MBA, RN, NE-BC
Director of Nursing & Service, Psychiatry
Inpatient Child & Adolescent Psychiatry
Department of Psychiatry & Behavioral Science
Children's National , Washington, DC

Jules Sherman, MFA
Stanford d.school, Lecturer

Children's National Hospital, Washington DC

- 328 beds for children admitted to the hospital
- 28 beds CNH inpatient psychiatry
  - usually 85-90% full

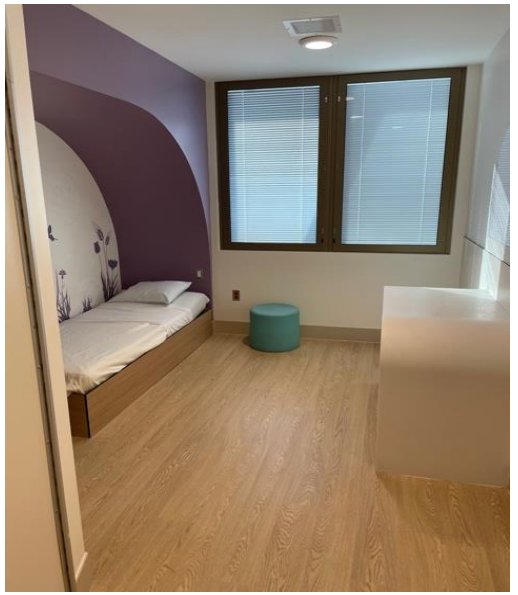
- Number of inpatient psychiatry admissions each year = 1200
- Age range 4-17years old (4-17yo)
- Top 5 diagnosis (major depression, ADHD req inpatient stay, suicide, psychosis, bipolar)
- Average length of stay (5-7days, max could be 2mos)

Inpatient Psych Room

What do the patients have access to in their room?

No personal items no phone, ipad, no music

- Single patient room
- Before COVID– 2hrs/day of family only visitation
- Can make phone calls on a central phone that is monitored
- Safety precautions in the room
- Video monitoring of hallways, and activity rooms
- No cameras inside room - for privacy and confidentially



Current state

- Every morning community meeting ask all the patients “How are you feeling”
  - Patients must answer verbally in front of the group
  - Hard to build trust
  - Hard to have teenagers open up
  - Might be a better time of day for them to participate in therapy

Also need a shared mental model for staff to understand the state of mind of each patient before approaching them to help with safety

Example from the ER

When patients are waiting to be transferred from the emergency room to the psychiatry unit, the names are highlighted in different colors in the medical record so the staff knows which patients are more labile than others.

G.B. MRN DOB 01/2/2004 XX y male presents with aggression. Boarding.

J.B. MRN DOB 2/09/2010 XXyo F presents with depression,

B.R. MRN DOB 01/01/2003 XX y female presents with aggression.

Identifying Emotional State Project

Background: Sometimes children have difficulty expressing how they are feeling in real-time and in person. Clinicians would prefer / like to be aware of their daily emotional needs prior to interacting with them.

Aim: Explore designs for ways that clinicians can get updated on a patients' daily emotional state as awareness of their mindset may improve social interaction, medical treatments, and clinicians' safety.

A way to be aware of pediatric psychiatric patients' mood prior to interacting with them to help clinicians have a safer approach and interaction

Design Criteria:

- No video or audio monitoring of the patients' rooms is allowed
- Be mindful of the limitations within a patients' rooms (slide #3)
- Solutions involving technology are sought rather than suggestions regarding clinician / patient interactions

Cell Phone Holder for Wheelchair

- Tilly is an international student from the United Kingdom and is a junior studying Political Science and Communication. Shortly following her first birthday, Tilly was diagnosed with a neuromuscular condition called Spinal Muscular Atrophy (Type II), meaning she is a full-time power wheelchair user and relies on physical support with all aspects of daily life. However, since the age of 12 she aspired to cross the Atlantic and attend university in California, and her participation in the Sutton Trust US Programme for low-income, high-achieving students brought her to Stanford. She is a passionate advocate for people with disabilities, so far raising in excess of $7 million to ensure that young people can access the best wheelchairs to help them achieve their goals, and on campus she serves as the ASSU Co-Director of Disability Advocacy.

On deck: Dave

Dave's Suggested Projects

- Creative Expression
- Designing Your Afterlife
- Student-Defined Team Projects

Creative Expression

- Creative Expression - Dave

- Explore ways to enhance creative expression for people with disabilities. This could include the creation of new activities or fabrication of new tools.

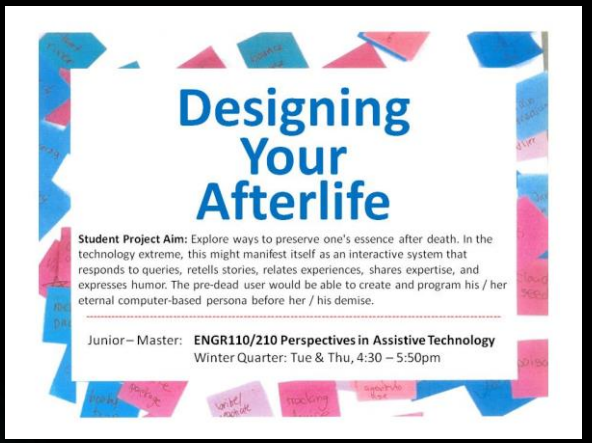
Creative Expression using an Instrumented Wheelchair

- Explore ways to enhance creative expression for people with disabilities, especially those who use wheelchairs. This could include the creation of new activities or fabrication of new tools.

Designing Your Afterlife

- Designing Your Afterlife - Dave

- Explore ways to preserve one's essence after death. In the technology extreme, this might manifest itself as an interactive system that responds to queries, retells stories, relates experiences, shares expertise, and expresses humor. The pre-dead user would be able to create and program his / her eternal computer-based persona before her / his demise.



Student-defined Team Projects

- Student-defined Projects - Dave

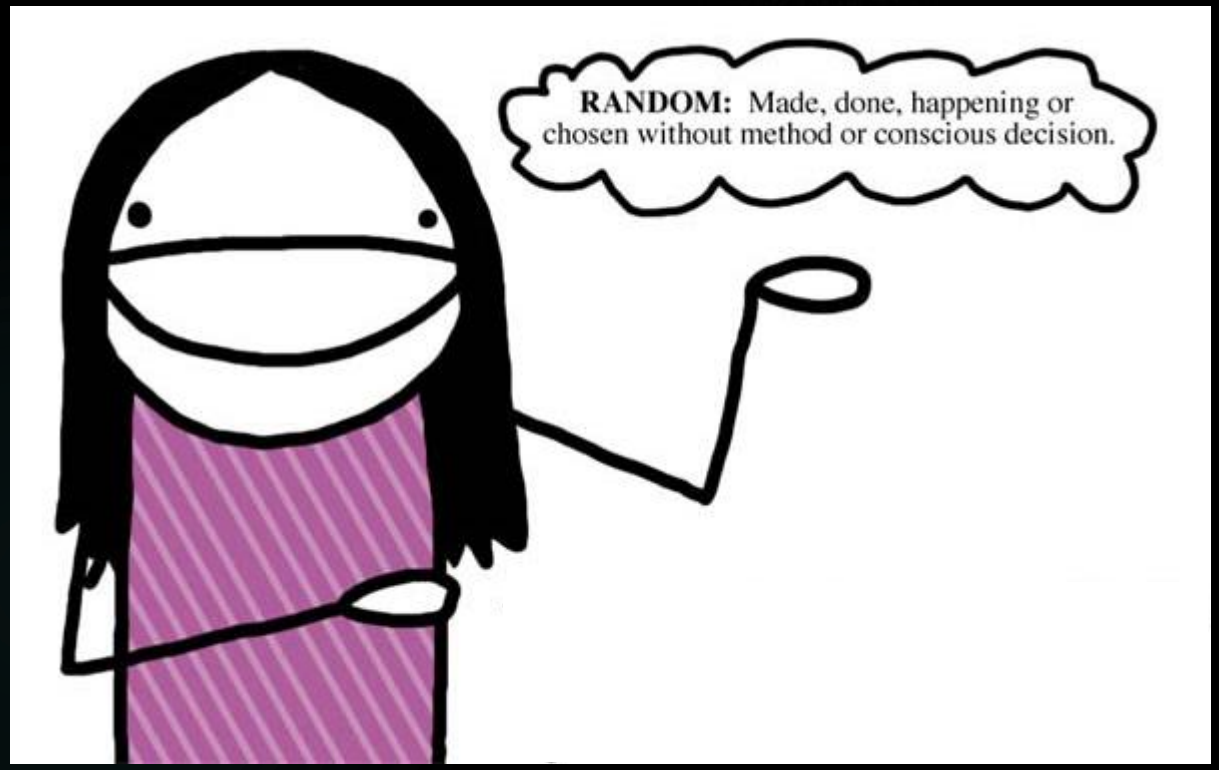
- Interview, observe, and discuss assistive technology problems with an individual with a disability or older adult. Address their desire to participate in one of the following activities by designing an adaptation to an existing device / tool or creating a new, more useful one:
  - Activities of daily living
  - Sports and exercise
  - Leisure activities and hobbies

Open Question Time and Non-Random Access

Who is working on projects?

Get more info from project suggestor

Identify others interested in same projects



Leave this Zoom and connect with Suggestors' Zoom to get more information on projects, return here when done

What are your project preferences?

Rank your top choices

Hand in your Project Preference Sheet!

Have course questions? Ask Dave

See Dave if you want to work on a project that he suggested