CS/PSYC 6755
Human-Computer Interaction
Foundations and Design
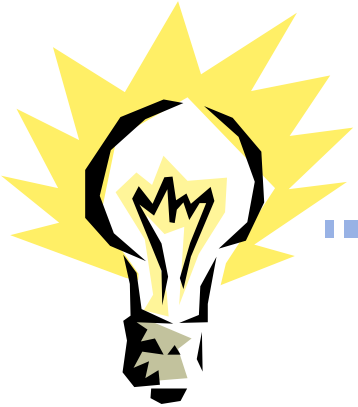
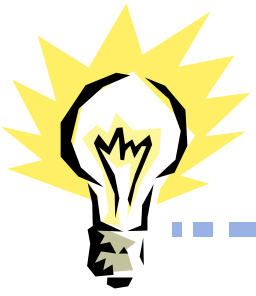Fall 2019

Bruce Walker

bruce.walker@psych.gatech.edu
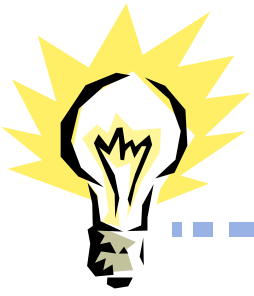
http://sonify.psych.gatech.edu/~walkerb/classes/ms-hci/

Agenda

- Introductions
  - Me
  - You

- Administrative stuff…

- HCI Overview
  - Objectives
  - Principles

Introductions

- Instructor
  - Bruce Walker
  - Psychology & Computing
  - GVU

- HCI - Alternative Interfaces
  - Sonification & Auditory Interfaces
  - Alternative Interaction Styles
  - Engineering Psychology & Human Factors
  - Assistive Technology

- Formative experiences…
  - Grad School Decisions "To Boldly Go…"
  - NASA, IBM, Consulting, Startups

Introductions

- ➢ Teaching Assistants
  - ❖ Keenan May
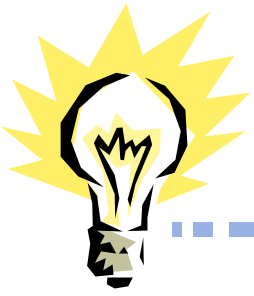   - kmay @ gatech.edu

  - ❖ Nadia Fereydooni
    - nadia.fereydooni @ gatech.edu
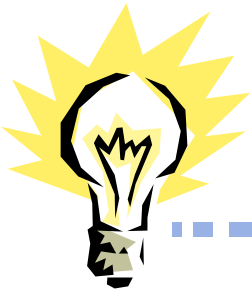
  - ❖ Megan Shepherd
    - mshepherd35 @ gatech.edu

Introductions

➢ Your turn

  ❖ Demographics:

- Males __   Females __
- <18 __   18-23 __   24-29 __   >30 __
- English __   Spanish __ Other language __
- Years Computer use:
  <1 __   1-4 __   5-8 __   9-12 __ >12 __
- ??

Course Information

➢ Text Books

- ❖ ***Interaction Design: Beyond Human - Computer Interaction (4th ed.)*, *by Jenny Preece, Yvonne Rogers, Helen Sharp,. Wiley, 2015***.

- ❖ *Understanding Your Users: A Practical Guide to User Requirements Methods, Tools, and Techniques (2nd ed.), by Kathy Baxter, Catherine Courage, & Kelly Caine. Elsevier, 2015.*

- ❖ *Measuring the User Experience: Collecting, Analyzing, and Presenting Usability Metrics (Second Edition)* (2nd ed.), by Thomas Tullis & William (Bill) Albert. Waltham, MA: Morgan Kaufmann/Elsevier. 2013.

➢ Web

- ❖ http://sonify.psych.gatech.edu/~walkerb/classes/ms-hci/index.html
- ❖ Also via T-square
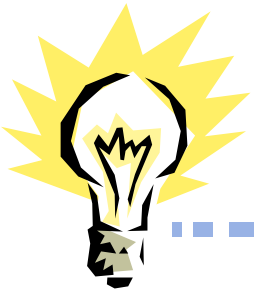- ❖ Syllabus & Class Info
- ❖ Schedule
- ❖ Assignments
- ❖ Wiki
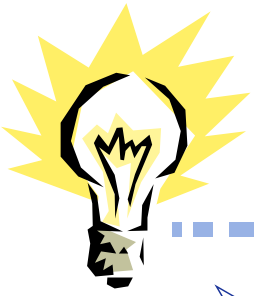
Course Information

➢ Grading
- ❖ Group project, 4 parts (40%)
  - • More to come next time…
- ❖ Mid-term exam (20%)
- ❖ Final exam (20%)
- ❖ Homeworks (10% total)
  - • A couple weeks to do each one, likely 2 in total
- ❖ Participation (10% total)
  - • Class involvement and peer review
  - • Note that your participation in the project is factored into your project grade, not this separate participation score

- ❖ Comment on letter grade vs. points total

Resources
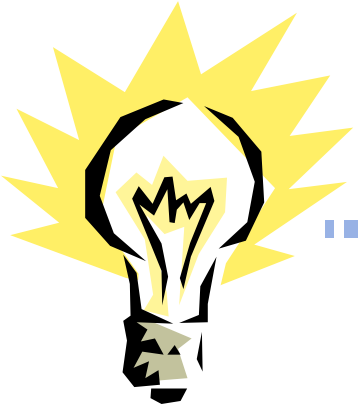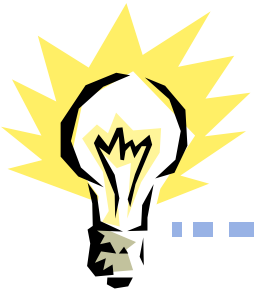
- Previous courses, courses elsewhere, info on the web, …
  - Content, lectures, projects, …
- Books
- Web sites
- Standards documents
- Go further
  - Move beyond lectures & book
  - Further courses
 - Step into research

HCI and Evidence-Based Design

Here we go...

HCI What? HCI Why?

➢ What happens when a human and a computer system interact to perform a task?

  ❖ task - write document, calculate budget, solve equation, learn about Iran, drive home, make a reservation, land a plane…

➢ Why is this important?

1. Computer systems affect every person
2. Safety, satisfaction, utility is critical
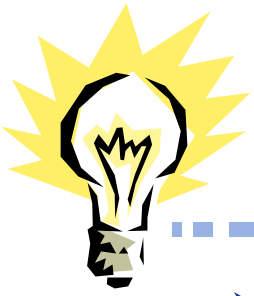3. Product success depends on ease of use
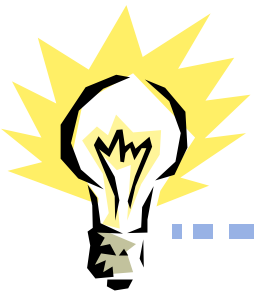
Interfaces in the World

➢ Not just computers!

  ❖ GPS

  ❖ Mouse

  ❖ Phone

  ❖ Copier

  ❖ Car

  ❖ Plane cockpit

  ❖ Airline reservation

  ❖ Air traffic control

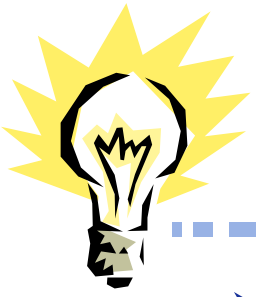 ❖ Home control

Thought Provoker #1

➢ Steering wheel head scratcher...
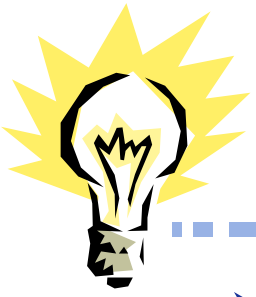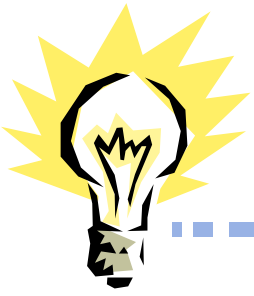
➢ Gotta see the details…

Thought Provoker #1

> The answer…? The issues…??
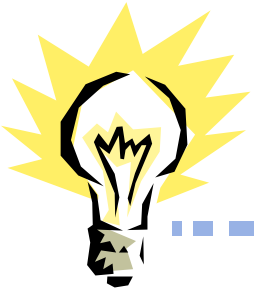
OMG! Head Exploding!

➢ Issues of…

  ❖ Design

  ❖ Internationalization

  ❖ Supply Chain

  ❖ Costs

  ❖ Standards

  ❖ Documentation

  ❖ Training

  ❖ …etc., etc., etc.…
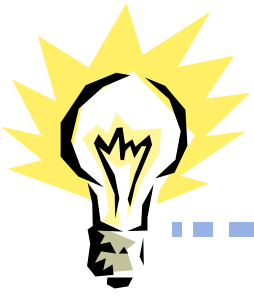
Goals of HCI

➤ Allow users to carry out tasks

  ❖ Safely

  ❖ Effectively

  ❖ Efficiently

  ❖ Enjoyably

Usability

➢ Crucial issue in this area!

➢ Combination of
  ❖ Ease of learning
  ❖ High speed of user task performance
  ❖ Low user error rate
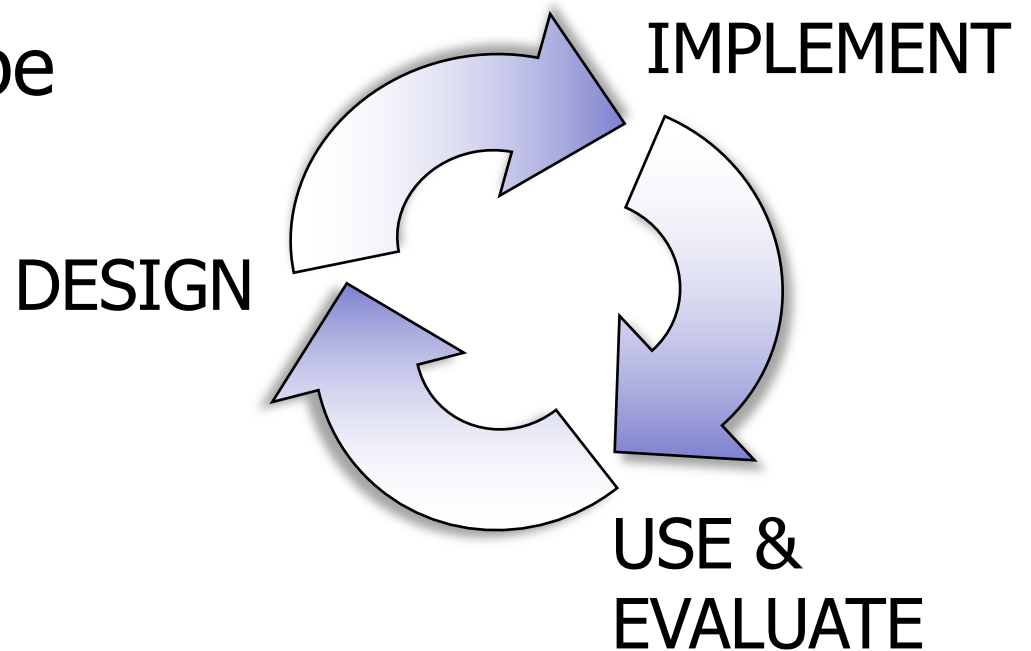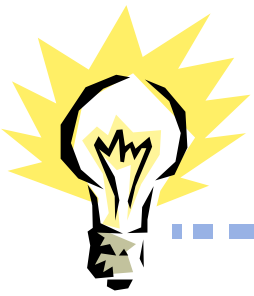 ❖ Subjective user satisfaction
  ❖ User retention over time

Evidence-Based Design Process

➤ Tao of User-Centered Design

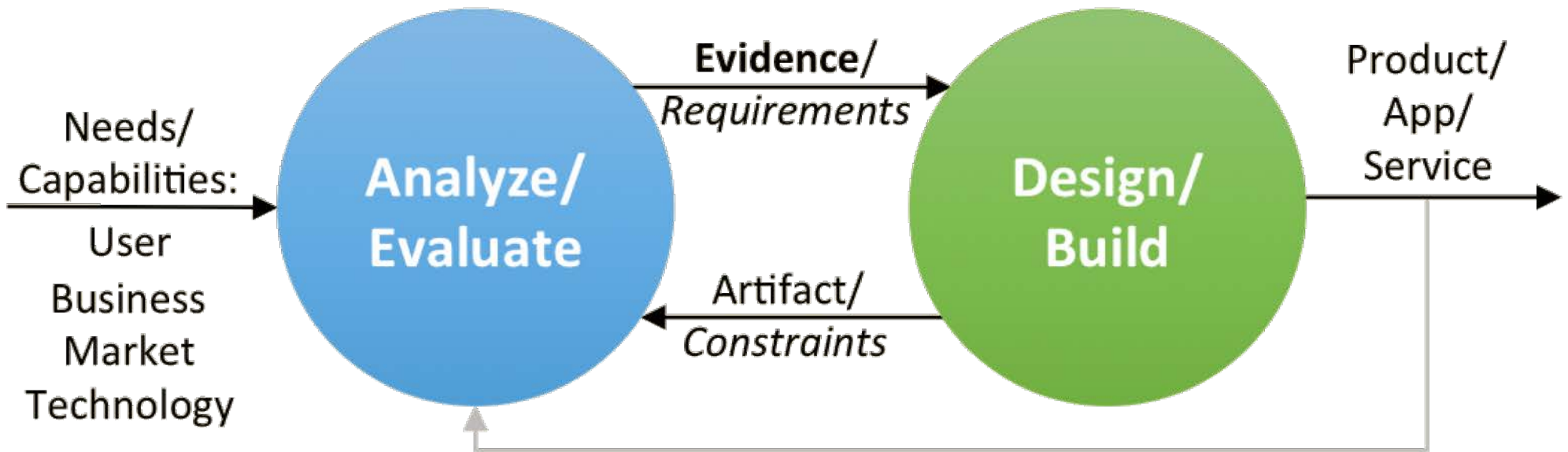- ❖ Analyze user's goals & tasks
- ❖ Create design alternatives
- ❖ Evaluate options
- ❖ Implement prototype
- ❖ Test
- ❖ Refine

IMPLEMENT

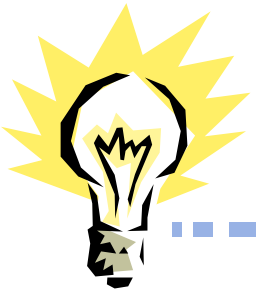DESIGN

USE & EVALUATE

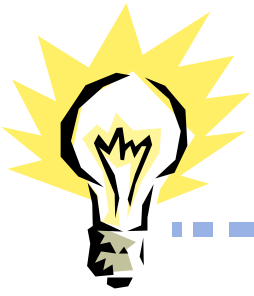# Evidence-Based Design in HCI

Above All Else...

➢ Know the User!

    ❖ Physical & cognitive abilities (& special needs)

    ❖ Personality & culture, context

    ❖ Knowledge & skills

    ❖ Motivation, Wants, Needs

    ❖ Etcetera, etcetera!!

➢ Two Fatal Mistakes:

1. Assume all users are alike

2. Assume all users are like the designer

Design Evaluation

➢ "Looks good to me" isn't good enough!

➢ Both subjective and objective metrics

➢ Some things we can measure

  ❖ Time to learn

  ❖ Speed of performance

  ❖ Rate of errors by user

  ❖ Retention over time

 ❖ Subjective satisfaction

Course Overview

- Interdisciplinary teams
- The UCD Process and philosophy
- Know your user!
- Evaluate an existing system
    (without involving users)
- Design for success
- Prototype & Express your creativity
- Evaluate your design (with/without users)
- Special topics
    - Ethics, InfoVis, Ubicomp, Agents, Audio
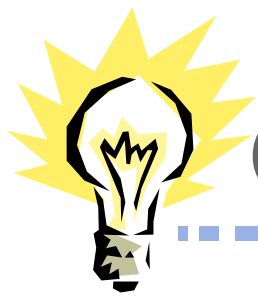
Connections to Research Methods

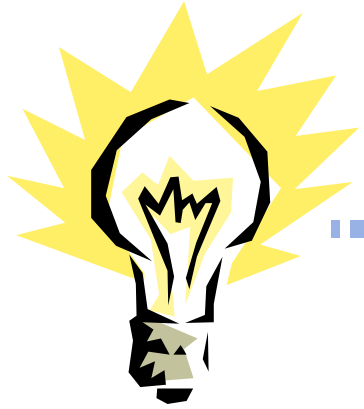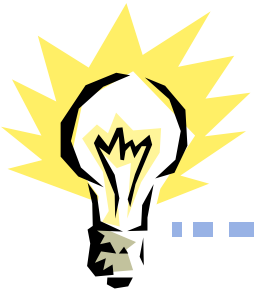|	Needs Analysis	Design & Prototype	Evaluation
Research Methods for HCI	40%	20%	40%
HCI Foundations	25%	50%	25%
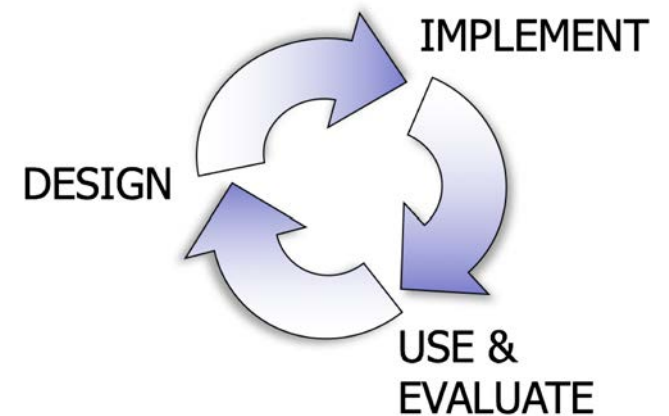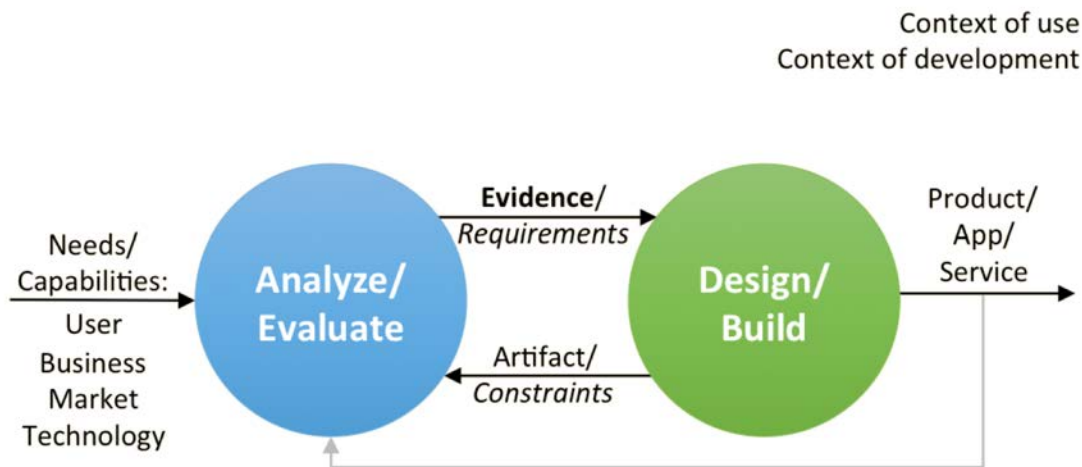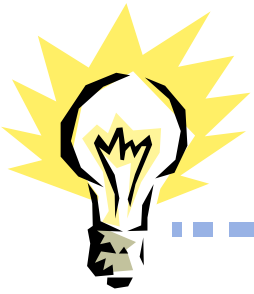
Upcoming

- ➤ History & Frameworks of HCI

- ➤ Project info

- ➤ User Centered Design

- ➤ Start reading...
  - ❖ ID book *(note order of chapters on Schedule)*
  - ❖ UYU book *(note order of chapters on Schedule)*
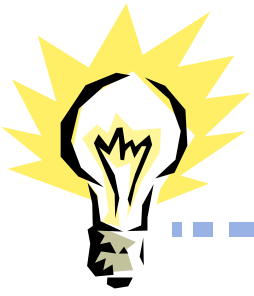 - ❖ DOET *(if you want)*

Group Project

Semester-long team effort

Group Project

➢ Design and evaluate an interface

  ❖ D0 - Team formation & topic choice

  ❖ D1 - Understand the problem space

  ❖ D2 - Exploring the design space

  ❖ D3 – Prototype and evaluation plan

  ❖ D4 – (Discount) Evaluation

➢ Main 4 parts worth ~10% each

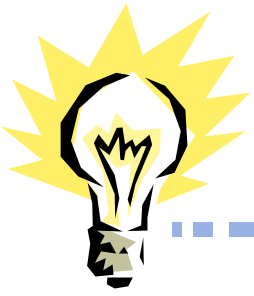➢ Individual grade adjusted based on participation

Group Project Details

➢ Part 0 – Team and Topic

  ❖ Identify team & general topic

  ❖ Suggestion: Pick a population and pick a technology; check out intersection

➢ Part 1 - Understanding the problem

  ❖ Describe tasks, users, environment, social context

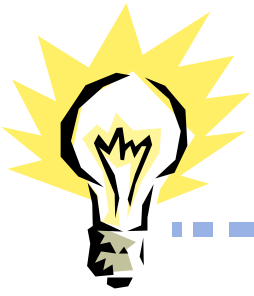 ❖ What are <u>implications</u> for design?

Group Project Details

➢ Part 2 - Design alternatives
  - ❖ Storyboards, mock-ups for multiple different designs
  - ❖ Explore, push boundaries of design space
  - ❖ Explain decisions

➢ Part 3 - System prototype & eval plan
  - ❖ More detailed prototype (semi-working ok)
 - ❖ Plan for conducting full evaluation

Group Project Details

➢ Part 4 – (Discount) Evaluation

- ❖ Conduct evaluation with example users
- ❖ Feedback from classmates
- ❖ Analyze results of feedback
- ❖ Characterize what's working and what's not
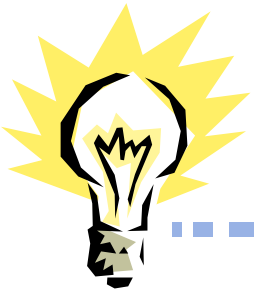- ❖ Iterate on prototype

Presentations

➢ Review/Feedback Panels (2 x 1 hour)

  ❖ Panels of 2nd year students

  ❖ Review your project at the early stages

  ❖ Feedback, not solutions, from the panel

➢ Poster sessions

  ❖ End of P2 and P4
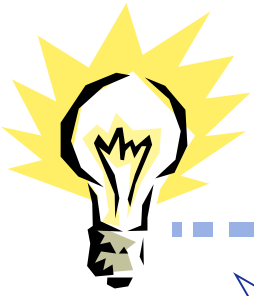
Project Teams

- 4 people
  - You decide (or I will!) by THIS FRIDAY
  - Diverse/balanced is best!
  - Consider schedules
  - Use the Online Team Forming Tool (Canvas)
- Cool team name for P0
- Decide on a (tentative) user population and a (tentative) task domain for those users
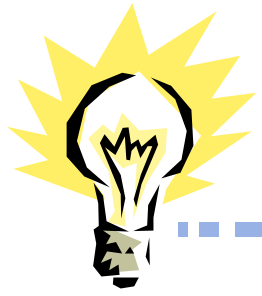- Team Contract!

Project Topics

➢ Semester theme:

"On The Go"

❖ ?? What does this mean ??

➢ General Topic:
   ❖ By **next** Friday ("P0 due")
   ❖ Indicate team and topic on Canvas WIKI

➢ Real "client" seems cool; but use caution

➢ Instructor or TA can serve as client

What Makes a Good Project

- ➢ Typically:
  - ❖ Access to/knowledge of domain experts & users
  - ❖ "Real" clients
  - ❖ Interesting human issues
  - ❖ Rich domain for design

- ➢ Theme has a LOT of range for topics
- ➢ Consider how it meshes with project in Research Methods class