


Human-Computer Interaction CS5340 – HCI – Round 3


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<http://bit.ly/neu-hci-spring-12>



Team Projects


Need to get from here to proposals in one week.



Team Project Guidelines

- Your project MUST
 - Have a substantial UI
 - Be interactive
 - Work robustly
 - Contribute to health or health research
 - Solve a real-world problem
 - Be targeted for and tested with older adults


Why?



Team Project Guidelines


- Your project SHOULD
 - Be creative
 - Be original
 - Be non-obvious
 - Have a "wow" factor
- Allow you, at the end of this course, to leapfrog your peers with an amazing demo!

Why?




Team Project Constraints

- Team: 3-4 members, ideally multi-disciplinary
- Focus: Health Application for (or used by) older adult users
- Context: Senior center, home, etc.
- Platform: Your choosing
- Input/output/sensing: Your choosing




Team Project Categories

- App for older adults in senior center (to facilitate goals/tasks you identify)
- "Serious game" for older adults to generate food nutrition database
- App for older adults that meets guidelines for an available app competition (e.g., [http://www.healthcareapp.com/2011/01/28/healthcare-app-competition.html](#))
(caveats)




Team Formation – Part 1

- By EOD Saturday
 - Revise your best project idea based on Stephen's comments on Ind. Assignment 2
 - Edit/post your best idea on Piazza
- EOD Sat – EOD Mon
 - Network using Piazza to form teams
 - Must have 3-4 people on a team
 - Read team assignment #1 carefully




Team Formation – Part 2

- By EOD Mon
 - Team should send Stephen and Zeeshan...
 - Names of team members
 - Preliminary idea title, problem being solved, paragraph description
 - Stephen will send quick feedback on idea
 - May need to tweak teams
 - Thu: turn in Team Assignment #1




Proposal

- Create a separate web page for your project (to link assignments to)
- One page proposal (linked to proj page)
- Email Zeeshan
 - URL for project page
 - Names of members
- *I may ask for revisions*




Observations on ideas so far

- Watch out for generalizations about "older adults"
- Focus on solving a *real problem*
- HCI is not just about the interface ... Challenges...
 - Context
 - Organizations (and limitations)
 - Databases




Observations on ideas so far

- Tracking's not fun
- Monitoring's not fun/desired
- No hospital systems
- Scope (you need to build it!)
- Scope (it must have complexity)
- Novelty (where's the "wow" factor)




Homework - Brainstorming

- You each have 1 minute to give the "elevator pitch" for your leading idea.
- If time
 - Why you're interested
 - Relevant skills
 - What you're looking for in a teammate




Prep a few minutes

- I'll be timing... Cut off at 1 minute!
- Name
- Problem
- Idea
- Your special skills




1 Minute Project Madness

- Name
- Problem
- Idea
- Your special skills




Individual Homework 1

- Zeeshan will send grades in a few days
- Observations
 - Follow instructions carefully!
 - Show evidence of doing readings (big difference between those that apply ideas from reading and those that don't)




Individual Homework 1

- Observations (continued)
 - Get beyond the obvious
 - If it is "easy to use" ... What principles from the text make it so?
 - Don't be sloppy with writing/formatting
 - Notes – what I'm looking for
 - Post online
 - Hand in in class
 - Grades range from A to C-




Great example...




Interaction Models

Dix Ch 3



Some definitions

- Domain
 - Defines an area of expertise and knowledge in some real-world activity.
 - Consists of concepts that highlight important aspects.
- Tasks manipulate concepts
- Goal is desired output from a task
- Intention is a specific action required to meet a goal




Norman's Interaction Framework

1. user establishes the goal
2. formulates intention
3. specifies actions at interface
4. executes action
5. perceives system state
6. interprets system state
7. evaluates system state with respect to goal

Gulf of execution
user's formulation of actions
≠ actions allowed by the system

Gulf of evaluation
user's expectations about system state
≠ presentation of state by system



Norman's Interaction Framework

1. user establishes the goal
2. formulates intention
3. specifies actions at interface
4. executes action
5. perceives system state
6. interprets system state
7. evaluates system state with respect to goal

Linkages!
What breaks when you have context
(e.g. interruptions, multi-tasking)

Slip vs. Mistake

- Slip
 - Error in executing action
- Mistake
 - Error in formulating intention & action

(Understanding the difference is important ... Changes what you need to do to fix it)

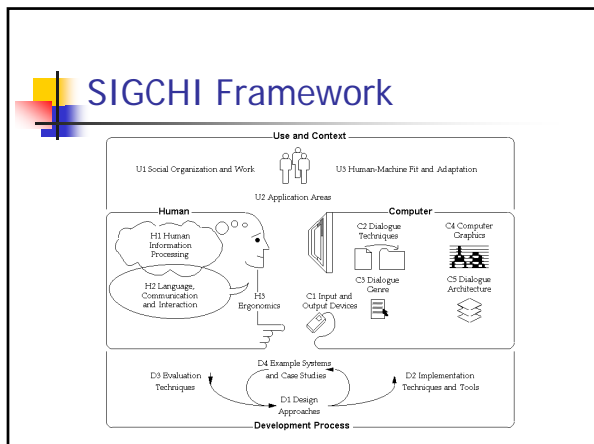
Abowd and Beale's Framework

```
graph TD; S[S system] -- presentation --> O[output]; S -- performance --> I[input]; U[user] -- observation --> O; U -- articulation --> I;
```

- Try to fix Normal model (Which only from user perspective, not systems communication through interface)


Light switch challenge

- Why can this be so frustrating in a new home?
 - Goal is clear
 - Can't articulate in an input language
- How might you fix it?



- ### Ergonomics, aka Human Factors
- Study of the physical characteristics of the interaction
 - Arrangement of controls and displays
 - Physical environment
 - Health issues
 - Use of color (red/yellow/green)
 - Constraints & guidelines for HCI


- ### Organizing controls
- Functional
 - Sequential
 - Frequency
- (All in relation to user's position)
- Thought exercise:
- Stove
 - Remote control



Interaction Styles


- Command line
- Menu-driven
- NL
- Transaction-oriented forms
- Spreadsheets
- WIMP

- + Search box



Command line

- Powerful
- Flexible
- Difficult to learn
- Relies on memory



Natural Language

- Dix 2004: "... It seems unlikely that a general language interface will be available for some time"

- Siri as an interface
 - Pros?
 - Fundamental limitations?



WIMP: Windows

Areas of the screen that behave as if they were independent terminals

- can contain text or graphics
- can be moved or resized
- can overlap and obscure each other, or can be laid out next to one another (tiled)
- *scrollbars* allow the user to move the contents of the window up and down or from side to side
- *title bars* describe the name of the window

WIMP: Pointers

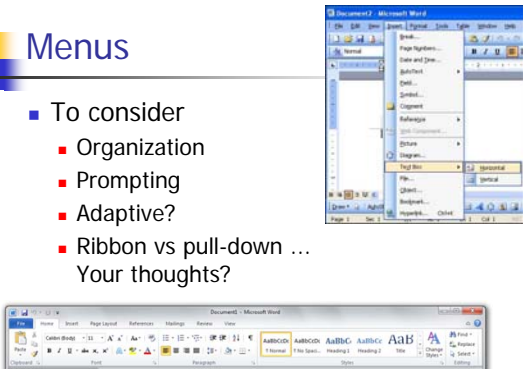
- Often used to indicate *modes*
 - (Be careful with modes ... Why?)

WIMP: Menu

- Presents a choice of operations available at a given time
 - Recognition easier than recall
- Too many items -> inefficient
 - Cascading menus
- Main
 - Placed at top of screen (Mac) or each window (Windows)
- Pop-up


Menu

- To consider
 - Organization
 - Prompting
 - Adaptive?
 - Ribbon vs pull-down ...
Your thoughts?



Touch?

- Is WIMP dying?




Example analysis

Eind F3


- Prompt (no reliance memory)
- Incremental learning
- Add an icon to improve

- But ... Dishonest
 - Breaks mental model



Interactivity!

- “When looking at an interface, it is easy to focus on the visually distinct parts (the buttons, menus, text areas) but the **dynamics**, the way they react to a user’s actions, are less obvious”
 - (e.g., speech input vs. interaction)
- Every selection of every widget should be **deliberate**



Context!

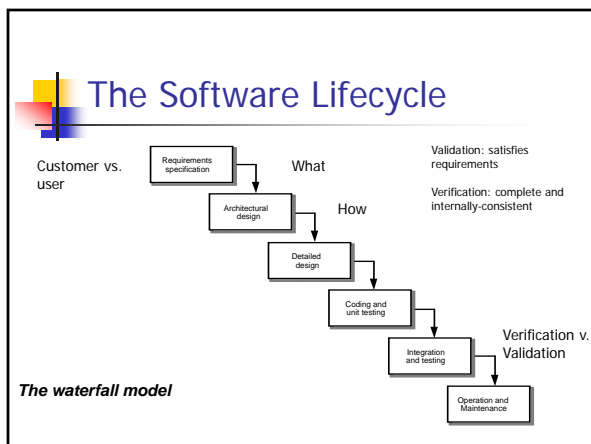
- People and relationships (bank)
- Users must be motivated (fear, allegiance, ambition, self-satisfaction) (get feedback; not slow/buggy)
- Match (job) expectations
- Or...
 - Rejected
 - Resented
 - Adapted

Engagement

- *Wanting*
- Flow
- Responds to personal values
(beware of disconnects between cost/reward)
- Zone of proximal development
- E.g. Shopping
 - "not about an efficient financial transaction, it is an experience"
 -

User-Centered Design

Dix Ch 6



Why doesn't this work for UIs?

Requirements specification
Architectural design
Detailed design
Coding and unit testing
Integration and testing
Operation and Maintenance

People are insanely complicated.
Cannot determine all requirements from the start
(which results in 50% designer's time spent on code for UI)

Lifecycle for UIs

Requirements specification
Architectural design
Detailed design
Implementation and unit testing
Integration and testing
Operation and Maintenance

User-Centered Design

- Try lots of stuff. See how it plays with the users.
 - Involve representative users in all stages of the development process.
 - Minimize the cost of and commitment to prototypes.
 - Users often can't tell you which alternative is "better" – have to test and measure.

TASK-Centered Design

- Focus on what people need to accomplish

Usability Engineering

The process by which we achieve "good enough" usability.
How do we know when we're there?

Usability Engineering

- Must define usability attributes (multi-dimensional)
- Must define specific measures for each
- Must define "good enough" (goal) levels for each
 - If appropriate, current & ideal levels for each
- Example attributes (measures?)
 - Learnability
 - Efficiency
 - Memorability
 - Low error rate
 - Subjectively pleasing

Usability Metrics

- See tables 6.1-6.4
- Very specific actions in specific situations

Usability Engineering

How do we remember what we've tried/learned before?

Design rationale capture.
(process vs. structure-oriented)


Usability Engineering

- Evaluation Methodologies:
 - inspection methods
 - qualitative methods (interviews, questionnaires)
 - observation in the field
 - controlled experiments (same environment & task with 2 alternative designs)




First Step: Requirements & Specifications

- Know your user
 - Knowledge about people in general (human factors)
 - Very, very specific knowledge about users and work environment (ethnography)



Iterative design

- Beware of ...
 - Early commitment ... Design inertia may make it difficult to recover, even in the face of overwhelming evidence
 - Understand reasons for problems, not just detecting symptoms (and patching)




Ethnography

The art and science of describing a group or culture.

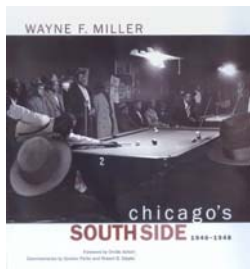
Ethnography

- Invented in 1915 by Bronislaw Malinowski
 - Start of fieldwork in anthropology
 - Purpose: to become intimately familiar with a way of life by living it ("emic" perspective)
 - Method: use multiple sources of info
 - "Things are not what they seem."
 - People can't always tell you what they do.
 - To make authoritative claims about a culture you must have been there, done that.



Ethnography

- 30's-60's focus on ordinary life
- "Chicago sociology"
- Studies of cat houses, insane asylums, jazz clubs, wine alleys, public toilets, race tracks, etc.




Ethnography

- Reporter: Seeks out the unusual
- Ethnography:
 - Seeks out the usual, routine lives of people
 - Open minded
 - Avoid method in search of problem
 - Conducted in native environment
 - Difficult!

Ethnography

- Formally – the analysis, interpretation and writeup of all information to form a holistic description.
- “Triangulation” – checking one source against another
- Be aware of your own biases & preconceptions



Ethnography

- “Triangulation” – checking one source against another
 - Older adults – how might you do that?
- Be aware of your own biases & preconceptions
 - Older adults – what might they be?




Ethnography

- Some fieldwork methods
 - Observation
 - 6 months – 1 year (not!)
 - Interviews
 - Formally structured
 - Semistructured
 - Informal
 - Grand tour questions
“What were your overall impressions”




Getting started

- Getting in
 - Best to have an advocate
 - Possible to do it if you don't
- Timeline
 - Best if long time
 - Possible to learn from short exposure
- Looking for hidden patterns!



What experience brings

- "Savor the informant's every word"
- Sensitivity to timing and tone
- Reading body language
- Seeing the invisible
- Interpersonal interviewing strategies
- Good asking strategy
- Ability to exploit silence
- Skilled use of repeated questions



Progression

- Inquiry
 - General -> specific
- Questions
 - Open-ended -> closed-ended

Critical sensitivity


- To unique culture of environment
- To group's values
- To respect for person
- To person's time
 - Glances at watch
 - Looks
- To not talking, but listening
- To having person feel in control

Ethnomethodology

- Branch of sociology founded by Harold Garfinkel in 60's-70's
- How people make sense of the social world by studying everyday interactions
- One branch: "conversation analysis" (Harvey Sacks)
 - Lucy Suchman applied this methodology to human-Xerox machine interaction
 - These are extraordinarily detailed analyses!


Ethnography Exercise

- You have been asked by a fast food restaurant owner to use computers to help improve their product/service.




Ethnography Exercise

- You have been asked to make a proposal for how computers might be used to improve a senior center




Ethnography Exercise

- You have been asked by an airline to propose how technology might be used to improve service for passengers with special needs.




Ethnography

- Vs. Steve Jobs




Homework I3: Ethnography

- You have been hired to use computer interface technology to improve the lives of older adults.
- Use concepts from Ethnography reading to identify problems where HCI might make an impact
 - Find a location
 - Pick a location from Stephen's list, OR
 - Propose a location to Stephen where older adults spend significant time
 - You may have to travel to a different part of the city!
 - Schedule a time
 - No more than two students at a location at one time!
 - You must observe for a **2.5 hour chunk of time**
 - This is NOT an assignment you do in pairs. Do NOT go with a friend
 - Be sure to "check in" with someone (e.g., receptionist, instructor) to avoid looking suspicious
 - Zeeshan will coordinate for the locations Stephen identified



Homework I3: Ethnography


- Assess the situation. Find your optimal location.
 - A place where there are multiple older adults (eating area, class, workspace, etc.)
 - A place where you will not be in the way
- Observe. Identify problems HCI might solve.
- Interview. Try to interview at least one person (and optimally 2-3), but
 - You must ask them if OK (say you're doing a class project)
 - You need to be VERY cognizant of the impression you make
 - Do not ask them to volunteer medical information
 - Read body language carefully
 - Do not hold someone hostage
 - Thank them for their generosity



Research Paper Assignments


Via email Friday

(I am still missing some picks ...
Get them in or risk getting assigned a paper you don't want)



Next Week

- Read
 - Dix Ch 13 & 15
 - Hawthorne paper ("Possible implications...")
 - Older adult research papers
- Start working on learning widgets for team's programming language
 - Optional: Intro to Java Swing (link on schedule page)
- I3: Ethnography!
- T1: Finalize team projects!



Research Papers: Ethnography

- Odom et al., Teenagers and Their Virtual Possessions: Design Opportunities and Issues, CHI 2011
 - Presented by Nanda Kishore Bhat
- Swan and Taylor, Notes on Fridge Surfaces, CHI 2005
- Unruh et al., Transforming Clinic Environments into Information Workspaces for Patients, CHI 2010
- Hinman and Matovu, Opportunities and Challenges for Mobile-based Financial Services in Rural Uganda, CHI 2010
