INTRODUCTION TO HCI DESIGN PROCESS

CPSC 544 FUNDAMENTALS IN DESIGNING INTERACTIVE COMPUTATION TECHNOLOGY FOR PEOPLE (HUMAN COMPUTER INTERACTION)

WEEK 2

© Joanna McGrenere and Leila Aflatoony
Includes slides from Karon MacLean and Jessica Dawson
TODAY

• Brief overview of the course, and who it’s for
• Introduction to Human-Computer Interaction
• Ethics of working with participants
COURSE COMPONENTS

Lectures

Participation
  • Attendance, classroom activities, discussions, peer review,

Researcher journal
  • Pre class preparation on readings

Project deliverables
  • Milestones and interim-milestones (most team-based)
  • build on one another

Research proposal
  • Propose research methods and techniques for a potential research project
## TENTATIVE GRADING SCHEME

<table>
<thead>
<tr>
<th>component</th>
<th>weight</th>
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</thead>
<tbody>
<tr>
<td>Participation</td>
<td>15%</td>
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<tr>
<td>Researcher Journal</td>
<td>15%</td>
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<tr>
<td>Lightweight Project</td>
<td>45%</td>
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<tr>
<td>Research Proposal</td>
<td>25%</td>
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</tbody>
</table>

**Total:** 100%
COURSE COMMUNICATION

Website:
  • Particularly for schedule / prep information

Discussion group (Piazza)
  • for anything relevant to larger group, including questions

Reflection (Evernote)
  • Researcher Journal

Instructor confidential:
  Personal (illness, etc.) - email
WHAT KIND OF A CLASS IS THIS?

• research-focused
• project based and interactive: hands-on
• group-oriented: team based learning practices
• many strange and unfamiliar new skills
• much less coding than other CS courses
• heavy demands on your ingenuity and your people skills
DUE BY NOW...

TCPS2

- 17 certificates are in
- Others, need to be done by the end of the day

Researcher journals

- You should all see my “JM” comments at bottom or Reading #3
- If you are not seeing those comments, it means that we are not seeing your RJ -> come see me after class
- Much improved from last class, please (re-)read my piazza post with tips and examples if you are not getting “good”
- Questions?
ICEBREAKER [5-10 MIN]

State your...

- Name, department
- Other background [e.g., if your background is different than your current department]
- One thing you hope to get out of this class

... all in 20 seconds or less. 😊
DESIGN THINKING (RE-CAP)

- Empathize
- Define
- Ideate
- Prototype
- Test

d.school, stanford
AN ITERATIVE PROCESS

1. Empathize
2. Define
3. Ideate
4. Prototype
5. Test

Diagram illustrates an iterative process with a cyclical flow from Test to Define to Empathize and back to Test.
HUMAN-CENTERED DESIGN (HCD)
‘DESIGNING FOR PEOPLE’

Is a design framework that develops solutions to problems by involving the human perspective in all steps of the problem-solving process.

(Is Wikipedia)

Is the process of ensuring that people’s needs are met, that the resulting product is understandable and usable, that it accomplishes the desired tasks, and that the experience of use is positive and enjoyable.

(Norman, The design of everyday things)
DESIGN THINKING VS. HCD?

• Differences are not clear cut
• Conceptually very similar
• Design Thinking comes from a design tradition and can apply to any design (not specific to interactive technologies)
• HCD comes out of a more technology-centered tradition (first user-centered design)
• Design Thinking has a stronger emphasis on solving the right problem and ideating than HCD
• Can be confusing: Norman calls Design Thinking to be a Human-Centered Design Process
USER INVOLVEMENT IN DIFFERENT DESIGN APPROACHES

Information about user   Information from user   Decision from user   Design by users

Conceptual Design   User-centered Design   Human-centered Design   Participatory Design   Co-creation   Co-design
THE DOUBLE-DIAMOND MODEL OF DESIGN

- Finding the Right Problem
- Finding the Right Solution

Alternatives

Divergence
Convergence
Divergence
Convergence

Time
DISCUSSION ON DESIGN THINKING ACTIVITY AND NORMAN READINGS [15 MIN]

What the heck did we actually do last class???

Get into pairs and take turns (2 min each) answering:

• What surprised you? or
• What you disagreed with?
ACTIVITY 1: [10 MIN]
WHAT’S A HUMAN? ....A
COMPUTER? ... AN INTERACTION?
IN HCI, THINK ABOUT WHAT’S MEANT BY...

Human
Computer
Interaction

draw and label examples for each on your worksheet
feel free to talk to your neighbour
stuck?
just draw the first example that come to mind!
WHAT’S A COMPUTER?

... that is, what does it look like to a user?

monitor & keyboard
PDA
mobile phone
inside of your car
the fridge
your dog’s collar
your child’s bracelet
jewelry and clothing
your home’s brain
the WWW
WHO DOES HCI?
IT’S A MULTIDISCIPLINARY AREA...

on the purely machine side:
  • computer graphics
  • operating systems
  • programming languages
  • development environments
  • networking
  • software engineering
  • usability and user experience engineers

and increasingly...
  • industrial & product design
  • digital media processing
  • robotics
WHO DOES HCI?

on the human side:

psychology and kinesiology
  • cognitive, perceptual and motor behavior
  • human capabilities to use and learn machines

sociology and anthropology
  • group and cultural behavior

art and graphic + tactile design
  • visual design principles and aesthetics
    • layout, color, icon selection, feel, etc.
WHAT MAKES IT HCI?

where they come together, e.g.:

• the **joint performance** of tasks by humans and machines
• the **structure of communication** between human / computer, and human/human mediated by computers
HCI DESIGN PROCESS
HCI PROCESS

stages of design

design stages have different goals

evaluation tools to support those goals

identifying stakeholders
WHERE DOES THE HCI PROCESS START?

HCI starts with understanding the problems that users are having;

→ identifying human activities needing better support
then designing a system that provides what they really need
→ specifying usability; utility; user experience
and deploying it for usefulness
WHY DO WE NEED A PROCESS?

human activity needing better support

? usable and useful interactive system that addresses this

How do you get from problem to solution?

A map would help.
PROCESS STAGES AND THEIR GOALS

pre design: understand the problem
early design: explore design space
mid design: develop the chosen approach
late design: integrate and start to deploy
always: evaluate and prototype
User Interface Design Process: Evolving Iterations

**Understand USERS:**
- who they are
- their key tasks

**Understand DESIGN:**
- design space and risks
- choose design approach

**REFINE Design:**
- by element
- considering task
- varied contexts

**MATERIALS / METHODS**

**GOALS**

**EXAMINE existing:**
- user tasks &
- objectives
- contexts
- interfaces

**Make use of:**
- requirements
- task analysis
- real & virtualized users
- technology options
- company IP

**Evaluate w/**:
- observation
- many kinds
- ethnography
- interviews, questionnaires
- task analysis

**Evaluate w/**:
- usability testing –
- controlled, uncontrolled
- heuristic evaluation

**MID DESIGN**

**LATE DESIGN**

**CONFIRM & debug:**
- performance in real use

**PRODUCTS**

**PRE DESIGN**
- user and task descriptions
- design requirements

**EARLY DESIGN**
- throw-away prototypes
- design direction
- risk analysis

**FIELD testing**

**med/high fidelity prototyping methods**

**Release!**
ITERATION: THE MOST KEY FEATURE

Why do we have to iterate so much in HCI design?

Because – it’s hard to predict or perfectly model:

- people – diversity in abilities, needs, motivations …
- contexts of use
- *how* they want to do their task/activity
- how they will view your interface

→ *the designer’s own progressive understanding of issues*

Designing for people is not exactly like building a bridge!
ROLE OF “EVALUATION” IN STAGES

at all stages, we must connect our design progress to user’s and task needs and contexts

many ways of doing this

HCI has classically called this “evaluation” (any involvement of the user/human)

evaluation techniques/methods: tools in a toolkit
each tool has strengths/weaknesses, and a cost to use

CRUCIAL: know your tools and choose effectively
ROADMAP TO EVALUATION TYPES

pre-design
- Ethnography
- observation, interviews, focus groups
- questionnaires, surveys

early design
- interviews, focus groups, observation
- questionnaires, surveys
- contextual inquiry & work modeling
- task analysis, task / cognitive walkthroughs
- participatory design
- heuristic evaluation

mid-late design
- observation, interviews, questionnaires
  using advanced prototypes
- heuristic evaluation
- formal performance / usability testing

→ evaluation material (prototype) evolves →
SOME TECHNIQUES ARE UBIQUITOUS...

**interviews, observation, questionnaires:**

- valuable throughout design process

**BUT — they may be executed differently.**

- **early:** interview/observe for **understanding**
- **later:** input on your design approach and details

**what’s the difference? what’s the same?**
SETTING GOALS

for any design or understanding activity, it is critical to set goals before you start.

• start with the design-stage goals

• what do you need to learn next?

• choose a strategy (e.g. evaluation type, users)

• implement the strategy – access users, build prototype, design study

• assess outcome with respect to your goals.
WHO ARE THE STAKEHOLDERS?

stakeholder = anyone who has some reason to care about the interface

• can be lots of them!
• needs may conflict

user: convenience, functionality, ...

boss: price, worker efficiency

developer: ease of development - deadlines, budget

manufacturer: cost of production

advertiser: visibility

... more
HOW TO FIGURE OUT WHO YOUR STAKEHOLDERS ARE:

- who will ask for it?
- who will use it?
- who will decide whether to use it (or if someone else will use it?)
- who will pay for it?
- who has to make (design / build) it?
- who has to make a profit from it?
- who will otherwise make your life miserable if they don’t like it?
- ???
WHO ARE THE STAKEHOLDERS FOR...

- child’s toy (2 year-old vs 12 year-old)
- office product in big company / university department where compatibility matters (e.g. email program)
- big-ticket family item (e.g. a new minivan)
- air Canada vs translink website
BOWING TO REALITY

what makes it hard to follow the “ideal” process?

• deadlines
• budget
• access to appropriate users
• involvement late in design cycle
• valuation of HCI input by other parts of the organization

what do you do then?
Technology-centered vs. user-centered design

DIFFERENT ATTITUDES TOWARD DESIGN
ATTITUDES TOWARDS DESIGN

natural to design for all kinds of reasons …

technology-centered design

• design decisions are guided by technology

prevalent attitude in real world because . . .

• technology is fun!

• making novel things is engaging – for the designer

• If it seems like it should work well – or looks cool – people often buy it, too.
ATTITUDES TOWARDS DESIGN

Technology- (or curiosity-driven) design:

• can be the basis of radical innovation that eventually will change peoples’ lives.

• Not necessarily a bad thing.

The problem?

• risk of leaving out real people, who have real problems right now.
TRY: GOOGLE "WEARABLE PHONE"
cool!
but - what would it actually be like to use these?
SEGWAY: what is it for?
SPECTRUM OF ATTITUDES TOWARDS DESIGN

attitude of technology–centered design
- progress made by technological advances
- goal is to show off gadgets and inventions

attitude of designer-centered design
- progress made by considering designers’ intuition
- imagining what the user will do and feel

attitude of user-centered design
- progress made by incorporating the users into the process
- empirical studies integrated early into the design + users as part of the development team
ON DECK...

Thursday’s class...
1. Readings (as posted) and researcher journals
2. Review the project description on the course website.

Next Tuesday’s class:
1. Review HCI course ethics materials

...
WE’LL SEE THIS PICTURE MANY TIMES

You’ll have time to get to know it.

Key features:

• iteration - both within and between stages
• stage evolution - in goals and methods
• methods – used throughout, or stage-specific
understand the problem

problem = “human activity needing support”

• do users really have the problem you think they do? is it an important problem for them?

• who are the users? who cares? what non-users are involved in the problem and its potential solution?

• what are your users like? how varied are they? expertise, abilities, priorities, special needs, constraints, ….

• what is the task? What are they really trying to do, and what is getting in the way?

• What properties must a solution have?

→ REQUIREMENTS
PROCESS STAGES / GOALS: EARLY DESIGN QUESTIONS

explore design space

- have you considered all relevant approaches?
- what are the ‘metrics’ that you should be considering as you compare approaches? feasibility, price, complexity, functionality, fit to company focus/intellectual property, …
- what are the high-risk elements of your likely approach, and can you address them?

at this stage - don’t invest effort or love. Be quick, dirty, no attachment. Love interferes with your judgment!

→ CHosen design approach
process stages / goals: mid design questions

develop / confirm chosen approach; reduce risk

• are there major “elements” of your design that can be advanced separately? e.g. layout and flow, look-and-feel, technical interface implementation

• what are the major questions / uncertainties / risks associated with each design element? **focus on these. minimize time on problems you know you can solve.**

• what user input will you need to verify your design progress? when, where; how much will it cost and can you afford it?

• what prototypes do you need to support problem solving, including getting user input on your design?

→ design elements confirmed & mocked-up
PROCESS STAGES / GOALS: LATE DESIGN QUESTIONS

integrate and field-test

there shouldn’t be a lot of questions at this stage if you did the earlier stages right.

- integrate the different design elements
- final delivery platform
- put systems in real users’ hands in real contexts for longer durations
- fine-tune, debug

RELEASEABLE SYSTEM!