

## Overview of the Design Process

Avoid Bad Design, Use UCD



## Good Design (reminder!)

“Every designer wants to build a high-quality interactive system that is admired by colleagues, celebrated by users, circulated widely, and imitated frequently.” (Shneiderman, 1992, p.7)

*...and anything goes!...*

Fall 2004 PSYCH / CS 6750



## The Good...




Fall 2004 PSYCH / CS 6750



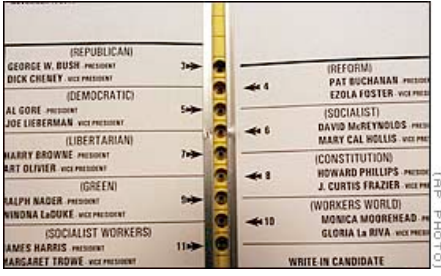
## The Good...



Fall 2004 PSYCH / CS 6750



## The Bad...



(REPUBLICAN)				(REFORM)
GEORGE W. BUSH PRESIDENT	3	→	←	PAT BUCHANAN PRESIDENT
DICK CHENY VICE PRESIDENT				EZOLA FOSTER VICE PRES
(DEMOCRATIC)				(SOCIALIST)
AL GORE PRESIDENT	5	→	←	DAVID McREYNOLDS PRES
JOE LIBERMAN VICE PRESIDENT				MARY CAL HOLLIS VICE PRES
(LIBERTARIAN)				(CONSTITUTION)
HARRY BROWNE PRESIDENT	7	→	←	HOWARD PHILLIPS PRESIDENT
ART OLIVIER VICE PRESIDENT				J. CURTIS FRAZIER VICE PRES
(GREEN)				(WORKERS WORLD)
RALPH NADER PRESIDENT	9	→	←	MONICA MOOREHEAD PRES
WYNONA LADUKE VICE PRESIDENT				GLORIA LA RIVA VICE PRES
(SOCIALIST WORKERS)				WRITE-IN CANDIDATE
AMES HARRIS PRESIDENT	11	→	←	
MARGARET TROWE VICE PRESIDENT				

Fall 2004 PSYCH / CS 6750



## The Bad...





Fall 2004 PSYCH / CS 6750

 **The Bad...**





Fall 2004 PSYCH / CS 6750

 **The Ugly...**



Fall 2004 PSYCH / CS 6750

 **The Ugly...**



Fall 2004 PSYCH / CS 6750

 **The (really) Ugly...**




Fall 2004 PSYCH / CS 6750

 **What The...???**




Fall 2004

 **But What Makes it Good?!**


- Functionality
- Speed & efficiency
- Reliability, security, data integrity
- Standardization, consistency
- **USABILITY !**

Fall 2004 PSYCH / CS 6750

 **Good Design Is Not...**


- ⊗ **NOT just applying checklists and guidelines**
  - ❖ These can help, but USD is a whole philosophy
- ⊗ **NOT using oneself as the model user**
  - ❖ Know your real users; recognize variation in humans
- ⊗ **NOT just common sense**
  - ❖ Knowing how to design a fire alarm so it will be heard over background noise is not something we all know.
  - ❖ The HF specialist knows where or how to get the information needed to answer design questions

Fall 2004 PSYCH / CS 6750

 **UCD: A Philosophy**


*...The human user of any system is the focus of the design process. Planning and implementation is done with the user in mind, and the system is made to fit the user, not the other way around....*

Fall 2004 PSYCH / CS 6750

 **“Good Design” Means**


- Systems are built for **humans**; must be designed for the user
- Recognize individual differences; appreciate design implications of these **human factors**
- Recognize the design of things, procedures, etc., influences human behavior and well-being
- Emphasize empirical data & evaluation
- Rely on the scientific method
- Things, procedures, environments, and people do not exist in isolation

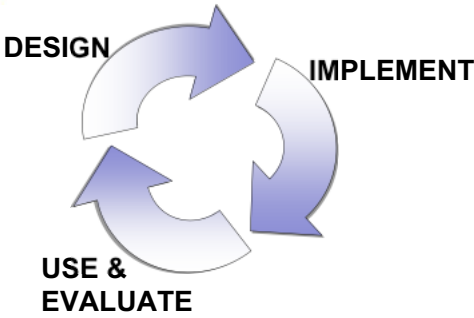
Fall 2004 PSYCH / CS 6750

 **User Centered Design**


- A way to force yourself to identify and consider the relevant human factors in your design
- Helps reduce the number of decisions made out of the blue, and helps focus design activities
- Helps document and defend decisions that may be reviewed later

Fall 2004 PSYCH / CS 6750

 **The Tao of UCD**



Fall 2004 PSYCH / CS 6750

 **UCD: 9 Step Overview**

1. Define the Context
2. Describe the User
3. Task Analysis
4. Function Allocation
5. System Layout / Basic Design
6. Mockups & Prototypes
7. Usability Testing
8. *Iterative* Test & Redesign
9. Updates & Maintenance

Fall 2004 PSYCH / CS 6750

## Design Implications

➤ At each stage, consider how the details of your discovery process affect your design

Fact	Implications
Users 16-80 yrs	Range of text sizes Range of grip strength
Some French speakers	Multilingual interface
Astronaut users	Extensive training available
Military context	Aesthetics less of an issue Ruggedness is critical

Fall 2004 PSYCH / CS 6750

## 1. Define the Context

➤ Context: the "type" of uses, applications

- ❖ Life critical systems, applications
- ❖ Industrial, commercial, military, scientific, consumer
- ❖ Office, home, entertainment
- ❖ Exploratory, creative, cooperative

➤ Market

➤ Customer (not the same as the User)

...Design Impacts?...

Fall 2004 PSYCH / CS 6750

## 2. Describe the User (!!)

➤ Physical attributes  
(age, gender, size, reach, visual angles, etc...)

➤ Physical work places  
(table height, sound levels, lighting, software version...)

➤ Perceptual abilities  
(hearing, vision, heat sensitivity...)

➤ Cognitive abilities  
(memory span, reading level, musical training, math...)

➤ Personality and social traits  
(likes, dislikes, preferences, patience...)

➤ Cultural and international diversity  
(languages, dialog box flow, symbols...)

➤ Special populations, (dis)abilities

Fall 2004 PSYCH / CS 6750

## 3. Task Analysis

➤ Talk to and observe **users** (NOT customers) doing what they do

➤ List each and every TASK

➤ Break tasks down into STEPS

★ ABSTRACT into standard tasks  
(monitor, diagnose, predict, control, inspect, transmit, receive, decide, calculate, store, choose, operate, etc.)

Fall 2004 PSYCH / CS 6750

## 3. Task Analysis

➤ Talk to and observe **users** doing what they do; find out what they want/need to do

➤ Explore the **PROBLEM SPACE**

➤ List each and every TASK

★ ABSTRACT into standard tasks


Much more next week...

Fall 2004 PSYCH / CS 6750


## Reminder: UCD 9 Steps

1. Define the Context
2. Describe the User
3. Task Analysis
4. Function Allocation
5. System Layout / Basic Design
6. Mockups & Prototypes
7. Usability Testing
8. Iterative Test & Redesign
9. Updates & Maintenance

} PROJECT PART 1




Fall 2004 PSYCH / CS 6750



## Project (P1)

- Part 1 - Understanding the problem
  - ❖ Discovery process
  - ❖ In UCD terms, determine **Context, Domain, Users, Tasks**, and their design implications
  - ❖ **Who is it, what do they need to do, and where?**
  - ❖ Interpretive evaluation of current interface, if it exists
  - ❖ Establish objectives, requirements for (re)design
- Set up project Web space (see previous years)


Fall 2004 PSYCH / CS 6750



## 4. Function Allocation

- Consider the whole system!
- Decide who or what is best suited to perform each task (or each step)
  - ❖ e.g., system remembers login id, and reminds the user, but user remembers the password
- Base this on knowledge of system hardware, software, human users' abilities, culture, communications protocols, privacy, etc.
- Allocation constraints: Effectiveness; Cognitive/affective; Cost; Mandatory  
*...Don't forget the design implications!...*


Fall 2004 PSYCH / CS 6750



## 5. System Layout / Basic Design

- Summary of the components and their basic design
- Cross-check with any Requirements Documents; Human Factors refs; Hardware specs; Budgets; Laws (ADA); etc.
- Ensure that the system will support the design and comply with constraints
- (Verification and Validation, in the language of software engineering)


Fall 2004 PSYCH / CS 6750



## 6. Mockups & Prototypes

- "Informed Brainstorming"
- RAPIDLY mock up the user interfaces for testing with real people
- Pen and paper or whiteboard to start
- Iterate, iterate, iterate!!
- Increasingly functional & veridical
- List audio & visual details at same levels of detail in the prototypes
  - ❖ (i.e. don't forget either of them)


Fall 2004 PSYCH / CS 6750



## 7. Usability Testing

- Get real (or representative) users to do what they do, using the prototypes
- Subjective and objective feedback. Sometimes users "want" features that actually yield poor performance
- Video tape, lots of notes
- Be rigorous wherever possible (stats, etc.)
- Feedback into the iterative evaluation & redesign of the system
- "Discount" usability testing can be very effective, using fewer subjects, more rapid results


Fall 2004 PSYCH / CS 6750



## Aside: IRB Training

- IRB: Institutional Review Board
  - ❖ Oversees ethics and scientific integrity
  - ❖ Ensures protection of Human Participants in research projects
  - ❖ <http://www.osp.gatech.edu/compliance/humans/humans.htm>
- Required Online TRAINING:
  - ❖ [http://www.osp.gatech.edu/compliance/humans/irb\\_training.doc](http://www.osp.gatech.edu/compliance/humans/irb_training.doc)
  - ❖ <http://jaguar.ir.miami.edu/~citireg/forms/citi.jsp>
  - ❖ <http://www.courses.miami.edu/bin/common/courses.pl>
- **Assignment: Complete training and hand in a copy of the completion form**


Fall 2004 PSYCH / CS 6750



## 8. Iterative Test & Redesign

- Repeat cycles of testing and reworking the system, subject to cost/time constraints
- Focus on Functionality First !
- Plan for several versions during development


Fall 2004 PSYCH / CS 6750



## 9. Updates & Maintenance

- In-the-field feedback, telemetry, user data, logs, surveys, etc.
- Analyze and make iterative redesign/test recommendations
- Updates and maintenance plan as part of the design!
  - ❖ (design it so it can be fixed or updated)

Fall 2004 PSYCH / CS 6750




## UCD: 9 Step Overview

1. Define the Context
2. Describe the User
3. Task Analysis
4. Function Allocation
5. System Layout & Basic Design
6. Mockups & Prototypes
7. Usability Testing
8. Iterative Test & Redesign
9. Updates & Maintenance

*Design Implications?!!*


Fall 2004 PSYCH / CS 6750



## UCD: Focusing Your Efforts

- There are real-world constraints
- Cutting out steps is not the way to economize!
- Optimize the efficiency of each step
- *Here:* Focus on the context and the user, to get the most value for the time spent

Fall 2004 PSYCH / CS 6750




## Concepts, Principles, Guidelines

- Remember...
  - ❖ No "cookbooks" (sorry!)
  - ❖ No simple, universal checklists
  - ❖ Think from perspective of user
  - ❖ There are many concepts, principles, and guidelines to help you
  - ❖ Focus on higher level principles that apply across situations, display types, etc.

*...and (almost) anything goes...*

Fall 2004 PSYCH / CS 6750



## Homework

- Observe users interacting with an "everyday thing" (see DOET)
  - ❖ Gas pump
- Predict where/how it will be easy or difficult to use
- Determine where problems (or lack of problems) occur, and consider what aspects of the design are interacting with the abilities, attributes, etc. of the users
- See web page for more details
  - ❖ Groups should **not** overlap your project groups
- Due next Thursday at start of class

Fall 2004 PSYCH / CS 6750