

Approaching The Design Problem

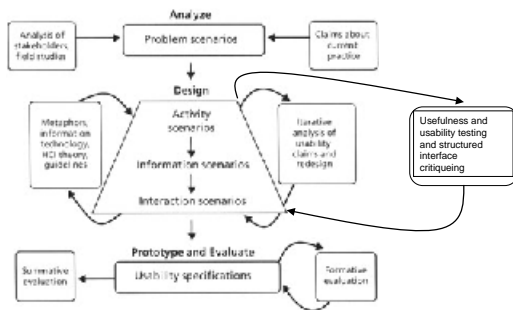
Hour 1: Design and the Design Problem

Hour 2: Working Well in a Group

Design and The Design Problem

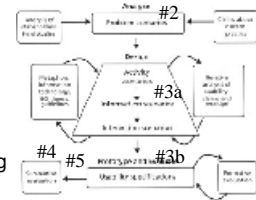
- A design method
- Project stages
- The design problem
- Past design problems and sample solutions
- Thoughts about design
- Brainstorming

Design Method



Design Method and Design Project

- Teams of four or five



- Assignment 1a: Brainstorming
- Assignment 1b: Proposal
- Assignment 2: Requirements analysis
- Assignment 3a: Activity design; information design
- Assignment 3b: Interaction design; prototyping
- Assignment 4: Usefulness and usability evaluation
- Assignment 5: Oral presentation

Project Stages

- Stage 1a — Brainstorming ideas
- Stage 1b — Group formation; brief description of idea
- Stage 2 — Requirements analysis based on work with users; description of current practice via "Day in the Life" "Problem Scenario"
- Stage 3a — Design of functionality (activity design) and information display; description of proposed usage via "Day in the Life" "Activity Design Scenario"
- Stage 3b — Interaction design; design and construction of system prototype illustrating its functionality and look-and-feel
- Stage 4 — Usefulness and usability evaluation of prototype; review and synthesis of entire experience

This Year's Design Problem (Review)

- Design with wearable computers
- Heuristics
 - Needs
 - Jobs
 - Tasks and activities
 - Spaces
 - Vehicles, furniture, appliances
 - Devices, tools, instruments
 - Parts of the body
 - Items of clothing, accessories
 - Modalities for sensing and affecting the world
 - Individuals, groups, organizations
 - Computers and technology

Solving Design Problems

- Apple Computer Student Design Project Competition
- Begun in 1992 and run through 1995 by S. Joy Mountford, Manager, Human Interface Group, Apple Computer
- Roughly 10 universities participated each year — Toronto most regular participant through 1995, along with CMU

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Some Past Design Problems

- Design a family of 3 scalable computers with consistent look-&-feel useful for some application (Apple 1992)
- Design an adaptive interface useful for some application (Apple 1993)
- Design an educational application for some handheld device connected to the Internet (Apple 1994)
- Bridge the gulf between the physical world and the virtual world (Apple 1995)
- Design interfaces for sound, music, speech (Interval 1995)
- Design interfaces for “atypical users” (recent 318S)
- Design for senior citizens (Fall 2002)

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Apple 1992 Design Problem & One Solution

- Design a family of at least 3 scalable computers with consistent look-and-feel & useful in application domain
- A Toronto winner — The Apple Scholar
 - Integrated family: Notepad (+Scribe), Studybook, Librarian
 - Practicality in 2-3 years (although still ahead of it's time)
 - Understanding users & user needs — Designers were students
- *** VIDEO highlights***
 - Statement of need/problem and statement of solution
 - “Problem Scenario”
 - Activity Design Scenario
 - Design process

QuickTime™ and a Screen Video decompressor are needed to see this picture.

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Apple 1993 Design Problem & One Solution

- Design an adaptive interface useful in some application
- Toronto winner — GloBall
 - A ball that responds to the actions of the children who use it
 - Wizard of Oz prototyping
- *** VIDEO highlights***
 - “Problem Scenario” (thin)
 - “Activity Design Scenario”
 - User testing results



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Apple 1994 Design Problem & One Solution

- The problem — Design an educational application of “hand-held” computers connected to the Internet
- Toronto winner — Project Galen
 - A system for peripatetic nurses, e.g., Royal Victorian Nurses
 - Assists in home patient care and patient education
- Video of presentation at Apple unavailable
 - Understanding users and their needs
 - “Day in the life” demonstration of the system
 - User interviews and user testing

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Apple 1995 Design Problem & One Solution

- The problem — Bridging the gulf between the physical and the electronic worlds
- Toronto winner — Project Footprint
 - Electronic guide for the Royal Botanical Gardens
 - Device that displays information (a virtual explanatory signs) when it is near physical objects, i.e., plants, trees, etc.
- *** VIDEO of Apple presentation highlights***
 - Needs analysis, understanding environment
 - Some “Activity Design Scenario”
 - User testing
 - Hardware design prototyping

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Thoughts about Design (1)

- Design requires brainstorming and creative insights
- Design is conscious, can be done systematically
- Design keeps human concerns at the center
 - Design involves a conversation with your users
- Design involves a conversation with your materials
- Design involves interaction between these two conversations
 - Design is infinitely improvable, i.e., design must be iterative

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Thoughts About Design (2)

- Design has social consequences
- Design is a social activity and occurs in a context such as that of an organization or a society
- Design should involve contributions from many disciplines
 - Computer science
 - Domain expertise
 - Behavioural science — psychology, sociology, anthropology
 - Design disciplines — graphic design, industrial design, animation, cinematography, video, music

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Brainstorming

- Idea generation methods to get started — think about...
 - What users do
 - What problems users encounter
 - What users want or need
- Think about capabilities of new computational media
- Throw out ideas and then...
 - Play with them
 - Constructively criticize them
 - Modify them
 - Combine them
 - Etc., etc., etc.

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Questions and Discussion

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Class Discussion

- *Recall a class with a group project ... or a team project at your place of employment ...*
- *What made the group successful?*
- *What were the major problems encountered?*

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Break

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Working Well in a Group (Second Hour)

- Typical group problems
- Group formation
- Arranging, attending, and managing meetings
- Brainstorming
- Achieving open communication
- Dealing with interpersonal conflicts
- Dealing with difficult people
- Interacting non-defensively

- Some material in these notes adapted from Lil Blume, with thanks

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Typical Problems (small sample)

- 30%: Difficulty contacting group members
- 25%: Failure of some to do what they've promised
- 30%: Feeling that you had to take leadership role to get anything done
- 20%: Failure to divide tasks fairly
- 25%: Insufficient brainstorming
- 25%: Misunderstandings due to poor expression / poor listening
- 25%: Difficulty accepting feedback from others

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Discussion

- *Anything that we've missed?*

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Group Formation

- Harnessing complementary skills
 - Writing, research, technology, programming, behavioural science background, art or design background, domain expertise
 - Form includes information on expertise
- Ensuring compatible goals
 - Expectations for the course, e.g., grade
 - Work styles, e.g., slow and steady progress vs. last-minute all-nighters
- Forestalling difficulties in contacting members
 - One of the biggest problem in the past

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Arranging and Attending Meetings

- Contacting people and arranging meetings
 - Form included with Assignment 1b includes complete contact info for all team members
 - Stay in touch every day
 - Inform team if you need to go out of touch
- Attending meetings
 - All have obligation to attend, unless agreed otherwise
 - Arrange next meeting at current meeting

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Managing meetings (1)

- Ensuring that meetings accomplish something in a reasonable amount of time
- You may want to structure meetings with specific roles, including leader or facilitator, scribe, and timer
 - Try to rotate roles
- Facilitator must have absolutely clear purpose for the meeting, most communicate this to all

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Managing meetings (2)

- Keep meetings as brief as possible
- Record results of meetings, follow-up required, and responsibilities
- Leaders and followers ... both OK roles
- If someone screws up, do whatever damage repair is needed and move on

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Brainstorming

- Techniques
 - Give everyone a chance to suggest ideas
 - Disallow criticism during initial phase
 - Encourage freewheeling ... no idea too crazy
 - Encourage quantity and variety of ideas
 - Encourage combinations and improvements
 - Do not follow any suggestion too rigidly
 - Have one group member take notes
- Brainstorming required to choose basic idea, also for all aspects of the design throughout the term

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Open Communications

- Making suggestions — no idea too crazy
- Understanding suggestions that aren't clear
 - "I'm not sure I understand could you please explain it again"
 - "Could you draw me a picture?"
 - "So you're saying Do I understand it correctly?"
- Dealing with suggestions that have been ignored
 - "I can see your point but let me repeat my idea perhaps you can tell me why it won't work"
 - "I really won't feel right going ahead with that unless we consider my idea as well"

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Understanding Interpersonal Conflicts

- What is the other person trying to say?
- What do I not know about this situation?
- Do we still have a shared goal? What is it?
- Are my expectations realistic?
- Am I presenting my concerns clearly? If not, how can I do so?

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Resolving Interpersonal Conflicts

- State your opinion or your concerns as clearly and assertively as possible
- For example, if there is a behaviour you find problematic:
 - Explain what it is
 - Offer your interpretation of the behaviour, giving the other person the benefit of the doubt
 - Explain the consequences of the behaviour
 - State your goal clearly, for example, a request to change the behaviour

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Varieties of Difficult People

- The tank
 - The sniper
 - The grenade
 - The know-it-all
 - The think-they-know-it-all
 - The yes person
 - The maybe person
 - The nothing person
 - The no person
 - The whiner
- } Class:
Describe
some of these

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Dealing with Difficult People

- Listen carefully and try to understand
- Process what you've heard and try to reach a deeper understanding
- Assume the best, give the benefit of the doubt
- Formulate your response thoughtfully
- Speak carefully to be understood
- Try to avoid putting people on the defensive

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Examples of Defense-Provoking Statements

- You're doing that wrong.
- It's your fault.
- You're an idiot.
- If only you had listened to me in the first place.
- How did you ever make it to third year?
- You should ... (when advice not requested)
- We're going to ... (when other person not consulted)

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Defensive Responses

- Quit harrasing me.
- It's not my fault.
- It's late because I had three other assignments due.
- I would have done it if you hadn't changed the rules.
- Do it yourself, then.
- Results when this happens
 - First person can get defensive ...
 - Well it's not my fault.
 - But you're always late.
 - As I said, thanks to you we're screwed.
 - A spiral of heightened emotions and negative feelings.

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Non-Defensive Responses

- Paraphrase: You wanted this an hour ago, eh?
- Clarify: Are you concerned about content or format?
- Agree: You're right. I've been slow.
- Name the behaviour: You're yelling. Do you mean to?
- Bottom line
 - Don't make defense-provoking statements: Name the situation, instead of calling a team member a name
 - If you are attacked, try to respond non-defensively; responding defensively will just make matters worse.

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Summary: Effective Group Process

- Complementary expertise
- Shared goals and values
- Clear statements of expectations and commitments
- Open and honest communication, especially in times of stress and difficulty
- Agreed-upon method(s) for and commitment to timely decision making
- Recognize conflict and try to deal with it promptly
- Some people will be difficult; you will have to cope
- Defense-provoking statements and defensive responses make matters worse

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Questions and Discussion

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