

L01 Introduction

- What is HCI:
 - Narrow sense: optimise performance with human tasks and interaction
 - Broader sense: shifting tasks from one side to another & re-define the interaction in between
- Design life cycle: Design, prototype, evaluate,
- Design process:
 - Acceptance: set motivation
 - Analysis: understand users and tasks
 - Definition: appropriate level of detail
 - Ideation: brainstorming aim for quantity
 - Idea selection: define importance of each idea, rank ideas according to your criteria, pick top N
 - Implementation: scale up low -> high fidelity
 - Evaluation: wizard of oz, walk through prototype design
- Fidelity levels:
 - Low-fidelity: quick, cheap, dirty
 - sketches, paper models, foam core, ...
 - Medium fidelity: slower, more expensive
 - Flash, Javascript, AJAX,...
 - High fidelity: slowest, most expensive
 - the full interface
 - e.g. site maps -> storyboards -> schematics -> mock-ups
- Waterfall Model
 - Process: (Initialisation)->Application description->(Analysis)->Requirements Specification->(Design)->System Design->(Implementation)->Product
 - Disadvantage: no feedback, high cost of fixing errors

L03 Interview

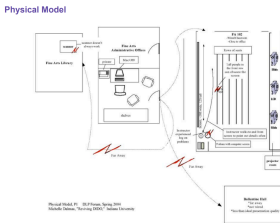
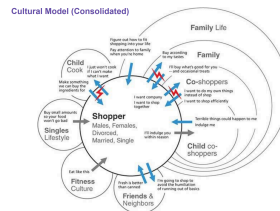
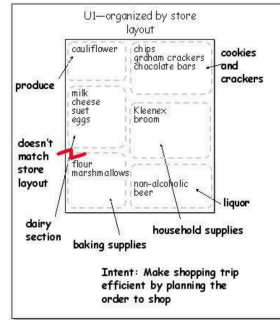
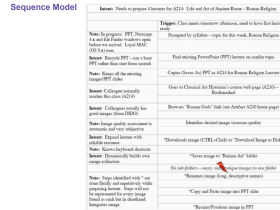
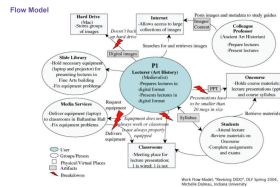
- Interview process:
 - Interview (first)
 - Dig deeper (second)
 - Capture findings: needs & insights(feelings&world-view)
 - Define problem statement: A needs a way to B(user's need) because/but...(insights)
 - Sketch radical ways to meet the needs
 - Share your solutions and capture feedbacks
 - Reflect&generate a new solution
 - Build your solution
 - Share your solution and get feedback

L04 Contextual Inquiries (Analysis&Empathise)

- Design from data
 - Find user data: the right needs and potential needs
 - Represent user data: documents
 - Share user data: make sure everyone is on the same page
 - Respond to the complete picture: don't create new problems while solving the old ones
 - Designing from data is still a creative leap: data shows problems, not solutions
- Good design data:
 - Realistic
 - Detailed (collect as much details as possible in a short amount of time)
 - Insightful (understand the reasons behind phenomena)

- Easy to learn and do (for both researchers and customers)
- Contextual inquiry basics
 - Go where the user works
 - Observe the user as he works
 - Talk to the user about the work
- One interaction model, four principles
 - One model: apprentice(interviewer)/master(interviewee) model
 - Realistic and detailed, support information flow
 - Four principles:
 - Go where the work is to get the best data
 - Gather ongoing experience rather than summary
 - Avoid summary data by watching the work unfold
 - Gather concrete data rather than abstract data
 - Avoid abstractions by returning to real artefacts and events
 - span time by retrospective accounts
 - Span time by replaying past events in detail
 - Tendency to skip details and give summary
 - Look for holes
 - Ask questions to all in the holes
 - Use artefacts to provide context
 - If story has not yet ended, go back to a story in the past that did end
 - Partnership
 - Interviewer should create a partnership, not just and apprenticeship.
 - Alternate between watching and probing withdrawal and return.
 - Let the user get an understanding of what you are looking for.
 - People interrupt themselves to reveal insights and design ideas, answer unasked questions
 - People haven't had others pay so much attention to them
 - Interpretation
 - Assignment of meaning to observation
 - Good facts are only starting points; designs are built on interpretation of facts
 - Chain of reasoning:
 - Fact: the observable events
 - Hypothesis: an initial interpretation of meaning or intent
 - Implication for design
 - Design idea is realisation of implication
 - Design is built upon interpretation of facts
 - Share interpretations with users to validate
 - Instead of asking open ended questions, give users a start point
 - Users fine-tune interpretations
 - Focus
 - Advantage: Focus let the interviewer sees more; Focus guides the interview
 - Focus defines the point of view
 - Focus reveals detail, allows us to see what we might miss otherwise
 - Clear focus steers a conversation
 - Everyone in the team should have the same entering focus
 - User should understand your focus
 - Disadvantage:
 - Focus conceals the unexpected
 - Start with a focus and then expand
 - Principles of Contextual Inquiry
 - Master apprentice model
 - Context
 - Partnership
 - Interpretation
 - Focus

CS3240 Interaction Design



- Contextual interview structure:
 - The conventional interview
 - The transition
 - The contextual interview proper
 - The wrap up
- Tasks:
 - Normal tasks
 - Intermittent tasks
 - Uninterruptible/extremely focused tasks
 - Try to do two rounds of interviews - one before, and one just after the task
 - Video tape/take notes and interpret with user
 - Plan discussion breaks where possible

- Extremely long tasks
 - Interview users in different stages
 - Do an in-depth retrospective account
 - Use artefacts to ground the discussion
 - Try your hand at teaching
- Internal tasks
 - Ongoing observation with lots of interruption
- Whom to interview
 - Interview users whose work is as different as possible
 - There is no "average user"
 - Seek out variability

L05 Interpretation & Affinity Diagram

- Roles:
 - Interviewer(s):
 - Describes things as they happened
 - Do a retrospective account with the interviewer
 - Is interrupted all the time — have notes handy
 - Two work modellers
 - One for flow and culture
 - Other for sequence
 - Artifacts are put up and annotated as they come
 - Interviewer draws the physical model
 - Write while you listen, don't slow down the meeting to capture data
 - Group watches for correctness
 - Don't filter - interviewer already did
 - Work models keep the team true to what really happened
 - If formal process exists, but is different, color it green
 - Graphic models of work
 - Flow models:
 - Depicts relationships between various individuals in work environment
 - Rare that one person does everything
 - Sequence models:
 - Work is divided up into steps
 - Captures steps and the intention behind steps
 - Artifact models:
 - People use and modify things
 - Understanding how and why reveals characteristics and break
 - Cultural models:
 - Expectations, desires, policies influence work
 - Physical models:
 - People adapt their environment so they can accomplish work
 - Notes contents:
 - Key observations
 - User statements
 - Breakdowns
 - Insights
 - Design ideas
 - Questions and ambiguities
 - Notes are used later to build the affinity
 - Building a shared understanding
 - Better data
 - Written record
 - Effective cross-functional cooperation
 - Multiple perspectives on the problem
 - Development of a shared perspective
 - True involvement in the data
 - Better use of time
 - Running the Interpretation Session
 - Interpret interviews within 48 hours
 - Same day-only notes
 - Next day - annotate notes from tapes

- More than 48 hours - transcribe notes from tapes
- Capture demographics in a separate file
 - Keep them private
- Keep a brisk pace
 - It can get a bit chaotic, but if everyone is paying attention to everything, that's OK
 - Be non-judgemental - don't evaluate ideas
 - Capture top insights at the end and keep building the top insights list
- Models, notes, top insights and design ideas are the first deliverables
- Team Makeup
 - Get wide buy-in and cross-fertilisation
 - Try to make the process work
 - Try to accommodate everyone in the team for the first meeting but not more than 12 people
 - Large teams should break-up into teams of 4-6 for subsequent meetings
 - Rotate people among teams
- The sharing session
 - Share if there are other sub-teams
 - Present the work models, update if new findings come
- Recorder should add any new notes
- Sharing is active, it's not a presentation
- Affinity Diagram
 - Why consolidate?
 - The challenge is to designer a population, but meet the needs of the individual.
 - See the work as a whole to invent systems that support the work coherently
 - Manage differences, contradictions
 - Avoid point solutions, see the big picture, plan products to address coherent work practice.
 - Expand the scope of a product, grow product offerings to support related work
- How to consolidate?
 - Inductive reasoning is key to seeing the pattern
 - Reveal the user's story by seeing the pattern behind the instance.
 - Variation exists within a structure - it isn't random
 - Remember, many conclusions are possible
 - Arguments are never binging but may be cogent
- Affinity diagrams
 - Create a bottom-up hierarchy of notes
 - Key observations
 - User statements
 - Breakdowns
 - Insights
 - Design ideas
 - Questions and ambiguities
 - Goals
 - Summarise, prioritise, find trends, patterns,
 - Find the rules of the world
 - Push knowledge up the hierarchy
 - Make data more presentable
 - Explain differences, contradictions
 - Generate new knowledge
 - More DIs, more concepts
 - Help make design decision
 - What matters?
 - How should we respond?
 - Involve people with the data
 - Tips
 - Bottom up, don't start with pre-defined categories
 - No justification needed, but
 - Relevant to project focus,
 - Same/opposite

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<ul style="list-style-type: none">3.Ask how this could be relevant to design4.Go into meaning of notes to see if they go together5.Check meaning with interviewers	<ul style="list-style-type: none">3.Focus on general ideas instead of details: use thick markers, limit the amount of space, time yourself4.Transform into Digital form	<ul style="list-style-type: none">4.query techniques(interviews and questionnaires)5.continuous evaluation(user feedback and field studies)	<ul style="list-style-type: none">– Post-Interview & Questionnaire– Debrief	<ul style="list-style-type: none">4.Arrange the overall design5.Determine detailed arrangement for each participant
<ul style="list-style-type: none">3.Don't be afraid to break up the affinity<ul style="list-style-type: none">1.When notes can be grouped in different ways, choose the grouping that gives more new ideas4.Give a name to represent a group<ul style="list-style-type: none">1.Summarize rather than give a heading5.Use direct, immediate language<ul style="list-style-type: none">1.As if the user was talking to the designer6.Labels become the meaning that we design from<ul style="list-style-type: none">1.Try to push the knowledge up in the hierarchy2.Group to higher orders of hierarchy3.Generate new knowledge: challenge entering assumptions4.Build affinity at the end all at once	<ul style="list-style-type: none">5.Rapid prototyping<ul style="list-style-type: none">1.Explore the design space<ul style="list-style-type: none">1.Quantity vs Quality:<ul style="list-style-type: none">1.Parallel vs serial, serial wins2.Why: more diverse2.Deal with things that are hard to predict<ul style="list-style-type: none">1.Wizard of oz: an operator plays the role of computer, often combined with mock-ups, paper prototypes...2.3.Communicate6.Manage risk<ul style="list-style-type: none">1.Start with what you know the least about<ul style="list-style-type: none">1.Formulate the question you need answered2.Choose a method that'll give you feedback3.Digest what you've learned, make changes4.Move on to the next thing you're worried about7.Tips<ul style="list-style-type: none">1.Start with your questions2.Should not be retired to complete3.Should be easy to change4.Gets to retire5.If possible, try define your research questions first6.All prototyping methods are good7.Maximum feedback for minimum effort	<ul style="list-style-type: none">4.Usability Heuristics<ul style="list-style-type: none">1.Pros and cons<ul style="list-style-type: none">1.Easy and inexpensive: no need users, catch many design flaws2.More difficult than it seems: not a simple checklist, cannot assess how well the interface will address user goals2.Original Heuristics<ul style="list-style-type: none">1.H1-1: Simple and natural dialog2.H1-2: Speak the users' language3.H1-3: Minimize users' memory load4.H1-4: Consistency5.H1-5: Feedback6.H1-6: Clearly marked exits7.H1-7: Shortcuts8.H1-8: Precise & constructive error messages9.H1-9: Prevent errors10.H1-10: Help and documentation3.Revised Heuristics<ul style="list-style-type: none">1.H2-1: Visibility of system status2.H2-2: Match system and real world3.H2-3: User control and freedom4.H2-4: Consistency and standards5.H2-5: Error prevention6.H2-6: Recognition rather than recall7.H2-7: Flexibility and efficiency of user8.H2-8: Aesthetic and minimalist design9.H2-9: Help users recognize, diagnose and recover from errors10.H2-10: Help and documentation4.Phases of Heuristic evaluation<ul style="list-style-type: none">1.Pre-evaluation training2.Evaluation<ul style="list-style-type: none">1.Individual evaluate interface then aggregate results2.work in 2 passes: overview-> details3.Each evaluator produces list of problems3.Severity rating: don't agree that is a usability problem(0)<<cosmetic(1) << minor(2) << major (3)<< catastrophic(4)4.Debriefing:<ul style="list-style-type: none">1.Discuss outcome2.Suggest solutions3.Assess difficulty to fix	<ul style="list-style-type: none">L10 Quantitative Evaluation<ul style="list-style-type: none">1.The 5 step Approach to Experiment design<ul style="list-style-type: none">1.Define the research question<ul style="list-style-type: none">1.Start with a general question and change it to a specific one(5W1H)!!!Target user!!!2.Define target population3.Define tasks4.Define measures<ul style="list-style-type: none">1.Speed2.Accuracy3.Learnability5.Define factors2.Determine variables<ul style="list-style-type: none">1.Scenario of use2.Input device3.Background of the user(demographic)3.Arrange conditions4.Decide blocks and trials5.Set instruction and procedures2. Types of variables<ul style="list-style-type: none">1.Independent variable (IV)<ul style="list-style-type: none">1.Factors that are manipulated in the experiment – Have multiple levels2.Types:<ul style="list-style-type: none">1.Primary<ul style="list-style-type: none">1.The most important independent variable(s) that you want to investigate2.Secondary<ul style="list-style-type: none">1.The other interesting factors you want to manipulate in the experiment.2.They help to answer the main question in a richer way.2.Dependent variable (DV)<ul style="list-style-type: none">1.Factors which are measured3.Control variable<ul style="list-style-type: none">1.Attributes that will be fixed throughout experiment2.Confound – attribute that varied and was not accounted for<ul style="list-style-type: none">1.Problem: Confound rather than IV could have caused change in DVs3.Confounds make it difficult/impossible to draw conclusions4.Random variable<ul style="list-style-type: none">1.Attributes that are randomly sampled – Increases generalizability3. Within subject design vs between subject design<ul style="list-style-type: none">1.Within subject design<ul style="list-style-type: none">1.Control order effect using counter-balancing<ul style="list-style-type: none">1.E.g., we assume the transferring effect between (A after B) and (B after A) are both 102.Participant 1: A followed by B (A B) Participant 2: B followed by A (B A) factorial2.Control order effect using partial counter-balancing: latin square:2.Within vs between:<ul style="list-style-type: none">1.Method1:use a lot of participants, randomly assign them to each technique (between-subject design) Drawback: costly2.Method2: use the same participant to test both techniques (within-subject design) Drawback: practice effect3.Steps for Arranging Conditions for Within-Subject Design<ul style="list-style-type: none">1.List all Independent Variables and their levels2.Decide counter-balancing strategy for each variable3.Determine the minimum No. of participants	<ul style="list-style-type: none">4. Trials and block<ul style="list-style-type: none">1.Trial<ul style="list-style-type: none">1.A single repetition of a single condition/cell2.Each trial in a condition is treated as equivalent with each other3.Typically you want to have at least 3 trials per condition to increase reliability4.The number of trials is determined by the sample space2.Block<ul style="list-style-type: none">1.An entire section of the experiment2.Repeated to analyze learning3.Determine Blocks and Trials<ul style="list-style-type: none">1.estimate the time for each trial (typically at least 3 trials per condition)2.estimate the time for each block3.balance the trial sand blocks so that the main part of the experiment is within 45 minutes4.combine with the condition arrangement5. Conducting the experiemnt<ul style="list-style-type: none">1.Before the experiment<ul style="list-style-type: none">1.Have them read and sign the consent form2.Explain the goal of the experiment<ul style="list-style-type: none">• In a way accessible to users• Be careful about the demand characteristic2.Participants biased towards experimenter's hypothesis – Answer questions2.During the experiment – Stay neutral<ul style="list-style-type: none">1.Never indicate displeasure with users performance3.After the experiment<ul style="list-style-type: none">1.Dig deeper to interesting events you observed during the experiment2.Debrief users<ul style="list-style-type: none">Inform users about the goal of the experimentAnswer any questions they have6.
L7 Brainstorming				
<ul style="list-style-type: none">1.Creativity and Dissent<ul style="list-style-type: none">1.Authentic dissenter can enhance group creativity2. Opinion needn't be right but they can free the group from stagnate thinking3.The originality of the minority stimulates the majority2.Brainstorming<ul style="list-style-type: none">1.Personal desires drive changes and innovation2.Aim for quantity hope for quality				
L8 Storyboarding and Rapid Prototyping				
<ul style="list-style-type: none">1.Design & Prototyping<ul style="list-style-type: none">1.Scenario, storyboard, video2.Design Sketch, Screenshot3.Paper, cardboard, foam mockups, wizard of oz4.Interactive Prototypes2.Way to present a scenario<ul style="list-style-type: none">1.Text paragraph<ul style="list-style-type: none">1.Agents/Actors2.Setting3.Goals/Objectives4.Actions/Events2. Storyboard (comic book)<ul style="list-style-type: none">1.Quick2.Versatile3.Powerful3.Video3. Storyboard procedure<ul style="list-style-type: none">1.Decide what to include<ul style="list-style-type: none">1.Users2.System3.Brainstorm in team4.Actor & artefacts & key events5.Draw2.Build the storyboard<ul style="list-style-type: none">1.Key frames(sentence description, drawing)2.Draw user(s), important artifacts, key events3.Use as little text as possible3.Feedback & Iteration4.Guidelines and tips<ul style="list-style-type: none">1.Focus on the point<ul style="list-style-type: none">1.Use the minimal level of detail required to communicate the features of the system2.Constraint yourself using paper and pencil	L9 Qualitative Evaluation <ul style="list-style-type: none">1.Naturalistic approach<ul style="list-style-type: none">1.real life: problems:<ul style="list-style-type: none">1.hard to arrange and do2.time consuming3.may not generalise2.Usability engineering approach<ul style="list-style-type: none">1.Problem:<ul style="list-style-type: none">1.non-typical users2.non-typical tasks3.different physical environment4.different social context2.Partial solution<ul style="list-style-type: none">1.user real users2.task-centered system design tasks3.environment similar to real situation3.Discount usability evaluation<ul style="list-style-type: none">1.Low cost methods to gather usability problem<ul style="list-style-type: none">1.Qualitative:<ul style="list-style-type: none">1.Observe interactions2.gather explanations3.produces description4.anecdotes, transcripts, problem areas, critical incidents2.Quantitative:<ul style="list-style-type: none">1.count, log, measure user actions2.speed, error rate, counts of activities2.Methods<ul style="list-style-type: none">1.Inspection<ul style="list-style-type: none">1.Designer tries the system2.benefits: catch major problems early3.problem: not reliable, not valid, intuitions can be wrong4.methods: task centered walkthroughs , heuristic evaluation2.extracting the conceptual model3.direct observation<ul style="list-style-type: none">1.think aloud2.constructive interaction3.Retrospective Think aloud			L11 Graphic Design