Design to “bridge the gulfs”

Goals

How easy is it to ...?

Evaluate the need/ability to affect the state

Understand what the system state is/should be

Understand what should be done

Interpret data to understand what's happening

Perform the desired actions

Get information about what's happening

The World

KEY – UNDERSTANDING WHAT PEOPLE ARE DOING, WHY, WHERE, AND UNDER WHAT CONDITIONS ...

HF in the project life cycle

IST

CET

BET

POST AUDIT

Pre-IST

Conceptualization

Conversion

Execution

• Identify behaviors, perceptions, beliefs and attitudes
• Develop user experience map
• Identify user types / styles of use
• Develop process maps and/or user models and interaction styles
• Investigate habits and practices
• Culture & Lifestyle
• Identify unmet latent needs/desires
• Benchmarking

• HF design requirements
• Design guidance / recommendation
• Professional assessment
• Concept evaluation
• Benchmarking

• Design guidance
• Professional assessment
• Product evaluation
• Benchmarking

• Field testing
• Follow up research
• Benchmarking
For large-scale system acquisition

Contextual Inquiry (Field Study +)

- A fact-based approach to understanding the reality of users’ goals, processes, and tasks.
- Puts systems designers directly in the “world” of the user to see, hear, feel, taste, smell, and better understand:
  - the goals of the user
  - the activities and specific behaviors users engage in to achieve those goals
  - the places in which they occur
  - the tools, supplies, etc. that are used
  - the artifacts in the environment and their meanings
  - etc.
- Provides rich, context-specific data from which to develop a shared understanding of users that will guide design.
### C.I. vs Field Study

<table>
<thead>
<tr>
<th>Field Study</th>
<th>Contextual Inquiry</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Typical Focus</strong></td>
<td>Interactions of people, environments, tools, and artifacts in specific workplaces or doing specific types of work, with emphasis on communication &amp; cultural aspects.</td>
</tr>
<tr>
<td>(Traditionally) operators, their activities, tools, information requirements, decision making, work environment, etc., with emphasis on specific tasks or goals.</td>
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<tr>
<td><strong>Typical Approach</strong></td>
<td>Researcher is a participant and the operator is considered a partner in the process. Questions may be asked during observations, with follow-up interviews as well.</td>
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<tr>
<td>Researcher is an observer who tries not to interfere with task performance. Follow-up interviews are used to gather more info.</td>
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<tr>
<td><strong>Typical Product</strong></td>
<td>Flow models, cultural models, physical models, sequence models, and artifact models.</td>
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<tr>
<td>Task analyses, physical models, information flow models.</td>
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</tbody>
</table>

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### The C. I. process


- Design the research
- Recruit participants
- Collect data
  - interview (video taping optional)
    - introduction
    - initial interview
    - contextual interview
    - wrap-up
- research notes
- artifacts
- “homework”, prework, etc. if applicable
- Analyze video, notes, visuals, artifacts, etc.
- Synthesize results
Designing contextual studies:
general approach

- What will you be investigating?
  - specific activities, problems, etc.
  - environments
  - target population

- Equipment & supplies
  - notepad and pencil/pen are minimum requirement, but usually sufficient
  - video or audio tape optional
  - pros and cons …

- Script
  - what questions will you ask in the interview(s)?
  - are there specific tasks or problems you want to be sure to observe?
  - what follow-up do you anticipate?

- Prework / Homework
  - ‘depth’ questions you’d like participants to answer before or after the interview
  - not always necessary, but can give broader perspective of the workplace, goals, attitudes, etc.

NOTE: This applies to all field studies, not just CI.

Your turn …

- Divide up into groups of 3. Two of you will be a product development team interested in developing aids and/or training methods to improve classroom interactions (teaching, note-taking, question and answer, etc.) One will be the student you are studying.

- The two members of the development team should develop a general statement of the purpose and approach you will be using to investigate classroom interaction; specifically:
  - What are you investigating?
  - What specific questions and/or observations do you want to be sure to include?
  - Ideally, what equipment, supplies, or “pre-work”, would help you in your study?
Recruiting for a study

- **Number**
  - depends on the process you’re studying, the target population, etc.
  - typically 10-20, but can be less for smaller, more focused design problems
  - recruit at the high end of your target sample size to cover ‘drop-outs’

- **Diverse, representative sample, considering (as appropriate for the process you are supporting):**
  - age range
  - male/female mix
  - type of work, workplace, etc.
  - Ethnic heritage

- **Once removed from interviewer (friend of a friend) or more**
  - familiarity breeds too much shared understanding

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Interview techniques: Getting started (5-10 min.)

**DO:**
- Come to the study prepared:
  - equipment in place and ready to go
  - notes, pen, other materials accessible
  - right hand free to shake hands at the door!
- Set the participant at ease:
  - introduce yourselves and remind them why you and they are there
  - use equipment setup time to “break the ice”
- Select initial interview site
  - in proximity to “work location” or starting point, if possible
  - room for participant and interviewer to sit comfortably
  - ask participant where they are most comfortable
- Maintain a polite, professional demeanor
  - “set the tone” for the next 2 hours

**DON'T:**
- Jump
- Show up at the door with video “rolling”
- Fall into the “buddy trap”
  - get distracted by side conversations
  - ask questions about personal matters not related to the study
  - tell "your" story instead of hearing his/hers
- Presume or demand
Interview techniques: the initial interview

DO:
- Think “broad part of the funnel”
  - start with broad understanding of goals, motives, priorities, etc.
  - get “big picture” understanding of their viewpoint
  - ask for opinions about “tools” and equipment typically used
- Listen for and note things you will want to observe and ask about during the contextual interview
- Ask open-ended questions
- Follow up on interesting points, but maintain pace and direction of the interview
- At the end of this phase, move the interview to the “workspace”

DON’T:
- Lose sight of the purpose and direction of the interview
  - by allowing broad motivational discussions to veer into side issues
  - “gently but firmly” guide the conversation back on course
- Delve into details of what and how
  - these should be addressed in the contextual interview
- Ask leading questions
  - “Suggest an answer” or finish the sentence for them
- Suggest judgement of the goals, motivations, activities, etc. (either of the participant or anyone else.)

Your turn …
- The product development team members should think of a minimum of 2 and a maximum of 5 questions to ask the student, instructor, or both as part of the initial interview.

- Test the questions with the student and/or instructor. Make notes of the response. Also, note any improvements you would make to your questions and/or any additional questions you would like to ask.
Interview Techniques: Contextual Interview / Observation

**DO:**
- Watch and listen more than talk and ask.
  - Provide occasional feedback ("okay," "I see," etc.) to let the participant know you're listening
- Use questions sparingly to gain clarification, understand "why" something is done the way it is, or to guide the participant's comments
- Questions, when warranted, should be open-ended and clear
  - "I noticed you ___. Why is/was that?"
  - "What do you mean by '____'?
  - "Tell me what that is for. Tell me what you're doing now." (sparingly)

**DON'T:**
- Interrupt the flow unnecessarily.
  - Ask yourself, "Can this question wait until she/he's finished with this?"
- On the other hand, some questions HAVE to be asked in context—it's a judgement call!
- Ask leading questions.
  - "The reason you're doing that because ____?"
  - "Many people ___. Do you feel the same way?"
  - "When you say 'sometimes', you mean about once a month, right?"

**DO:**
- Take notes, make sketches, write down questions you want to delve into in detail at the end
  - Note what is happening, your interpretation, your immediate thoughts, etc.
  - ALWAYS keep your attention on the participant and her/his activities
- Pay close attention to key artifacts in the environment:
  - Videotape or photograph individual and groups of items
  - If there are "disposable" items, ask if you can take them with you

**DON'T:**
- Finish the sentence or suggest an answer
  - It is not necessary to fill all silences
- Imply judgement in questions or responses
  - "You don't do THAT, do you?"
  - "Aren't you afraid of ____?"
  - "Don't you hate it when ____?"
Your turn …

- For the next few minutes, I will take on the role of an instructor in Probability and Statistics course. The “students” in the room should take on the role of students in that course and take notes, ask questions, etc. as they would in a class. The product development team will observe the actions of the students and instructor with the goal of being able to develop detailed models (i.e., detailed explanations of the actions, questions, answers, and other interactions).

Interview Techniques: The Wrap-Up

**DO:**
- Ask any remaining questions you have about the goals, activities, methods, tools, etc.
- Summarize key points you heard during the interview, giving the participant a chance to respond, elaborate, correct your interpretation, etc.
- Thank the participant for taking the time and allowing you to learn about his/her activities.
- Be sure to take all notes, supplies, equipment, etc., when you leave.

**DON'T:**
- Overstay your welcome.
- Leave any trash behind when you leave.
Usability testing

“Usability”: the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use.

(ISO 9241-11)

• Purpose of usability testing:
  • evaluate users’ experience with the interface
  • identify specific problems in the interface or interaction that interfere with users’ ability to achieve goals
  • obtain feedback from users regarding the look and feel of the interface

Designing a usability test

• Study participants
  • representative users of the system
  • articulate, willing and able to express opinions
  • for simple usability study, 4-8 users is sufficient (Nielsen recommends 5)
    • better to have sequential studies with small sample size

• Facilitator / moderator
  • objective
  • knowledgeable about the product
  • sets the tone, asks questions

• Observer
  • records what is said and done
  • may or may not ask a question
Types of usability tests

- Paper prototype / mockup
  - early in development, allowing for changes to design before extensive coding / engineering effort and cost
  - after interaction developed, but before interface design & coding
  - for physical devices, use full-scale mockup of relevant interface items (controls, displays, etc.)
- low-fidelity simulation
  - each page on the interface printed on a single sheet, including all relevant information & possible actions
  - facilitator provides the ‘action,’ changing the pages based on participant selections
  - for physical devices, provide a means of indicating control actions and their results.

Examples of paper prototype / mockup testing

- Web site / computer interface
Examples of paper prototype / mockup testing

- Microwave control interface

![Microwave control interface](image)

- Car dash interface

![Car dash interface](image)
Types of usability tests

- Hi-fidelity prototypes / simulation
  - later in development, but before production (still time to change the design, but at a higher cost.)

- Product
  - fully manufactured product (yours or a competitor’s)
  - provides information for next revision
  - can be used for benchmarking
    - one or more competitor products (may or may not include yours)
    - identify good and bad design choices

Preparation

- Facilitator brings to the test:
  - Usability test procedures
  - The ‘script’ (i.e., set of questions and tasks)
  - Logging sheet for the observer
  - Any relevant information for the participant (e.g., compensation, confidentiality agreement, etc.)

- Prepare the site
  - arrange physical space
  - ensure that no ‘history’ remains of any previous activity
    - clear cache or history
    - paper prototype clean and in starting order
    - settings back to default
General format of a usability test

- **Introduction**
  - introduce yourself and anyone else in the room
  - make the participant feel welcome and comfortable, let them know how long it will take, etc.
  - emphasize that you are evaluating the *interface* or *device*, not their ability to use it
  - describe the setting (if necessary), the interface / device (in general terms), give any other pertinent info, etc.
  - ask if the participant has any questions before you begin

- **Background questions**
  - specifics about experience level
  - how they currently accomplish the task you are supporting
  - what devices, artifacts, etc. are they using now
  - etc.

- **Scenario(s)**
  - a specific objective is described
  - participant selects controls, enters information, navigates through display, etc.
  - 'new' or 'next' objective is described
  - repeat as necessary

- **Conclusion & debriefing**
  - general questions about the use and usefulness of the interface
    - overall, what was their impression?
    - what did they expect to see but didn’t?
    - what caused confusion, difficulty, discomfort, etc.?
    - note: focus on what the participant experienced
    - ‘What would you use the xxx feature for?’ not ‘Is xxx a useful feature?’
    - what 3 things would they tell the designers of the device if they could?
General format of a usability test

- Conclusion & debriefing (concl.)
  - go over any problems with the device, ask follow-up questions
  - if there are left-over misconceptions about how to achieve an objective, clear them up now (if appropriate)
  - ‘Anything else?’
  - finish up any paperwork, final reminders, etc.

General format of a usability test

- Facilitator’s role
  - prompt participant to describe decisions, actions, etc. (‘What are you looking for now?’, ‘Why did you choose that?’, ‘What do you think should happen now?’), but don’t rush the participant
  - provide hints and guidance if participant becomes lost
  - answer questions with a question (e.g., if asked ‘What does this do?’, respond with ‘What do you think it should do?’ or ‘What does it look like to you?’ or ‘What would you like it to do?’)
  - DO NOT take on the role of designer or advocate of the interface