Topic 5: Data Gathering (Part 2)

SECV2113 Human-Computer Interaction

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Aims

- Discuss how to plan and run successful data gathering sessions.
- Enable you to plan and run an interview.
- Enable you to design a simple questionnaire.
- Enable you to plan and carry out an observation.

01 ISSUES AND CAPTURING DATA CHALLENGES

02 INTERVIEWS

03 QUESTIONNAIRES

04 OBSERVATION

05 PUTTING THE TECHNIQUES TO WORK

ISSUES AND CAPTURING DATA CHALLENGES

Six Key Issues

1. Setting goals
   - Decide how to analyze data once collected
2. Identifying participants
   - Decide from whom to gather data
   - Determine how many participants are needed
3. Relationship with participants
   - Clear and professional
   - Informed consent when appropriate
4. Ethical considerations of collection and storage
   - Data collection is easy with today's lightweight devices
   - Personal data is protected by regulations, consent is needed
   - Storage of data must be secure
5. Triangulation
   - Investigate phenomena from more than one perspective
   - Collect data from different sources, with different investigators, using different theoretical frameworks and different techniques
6. Pilot studies
   - Small trial of main study

Capturing Data

- Notes, audio, video, and photographs can be used individually or in combination:
  - Notes plus photographs
  - Audio plus photographs
  - Video

- Different challenges and advantages with each type of data recording

INTERVIEWS

Interviews

- **Unstructured:** Not directed by a script. Rich but not replicable.
- **Structured:** Tightly scripted, often like a questionnaire. Replicable but may lack richness.
- **Semi-structured:** Guided by a script, but interesting issues can be explored in more depth. Can provide a good balance between richness and replicability.
- **Focus groups:** A group interview

Interviews Questions

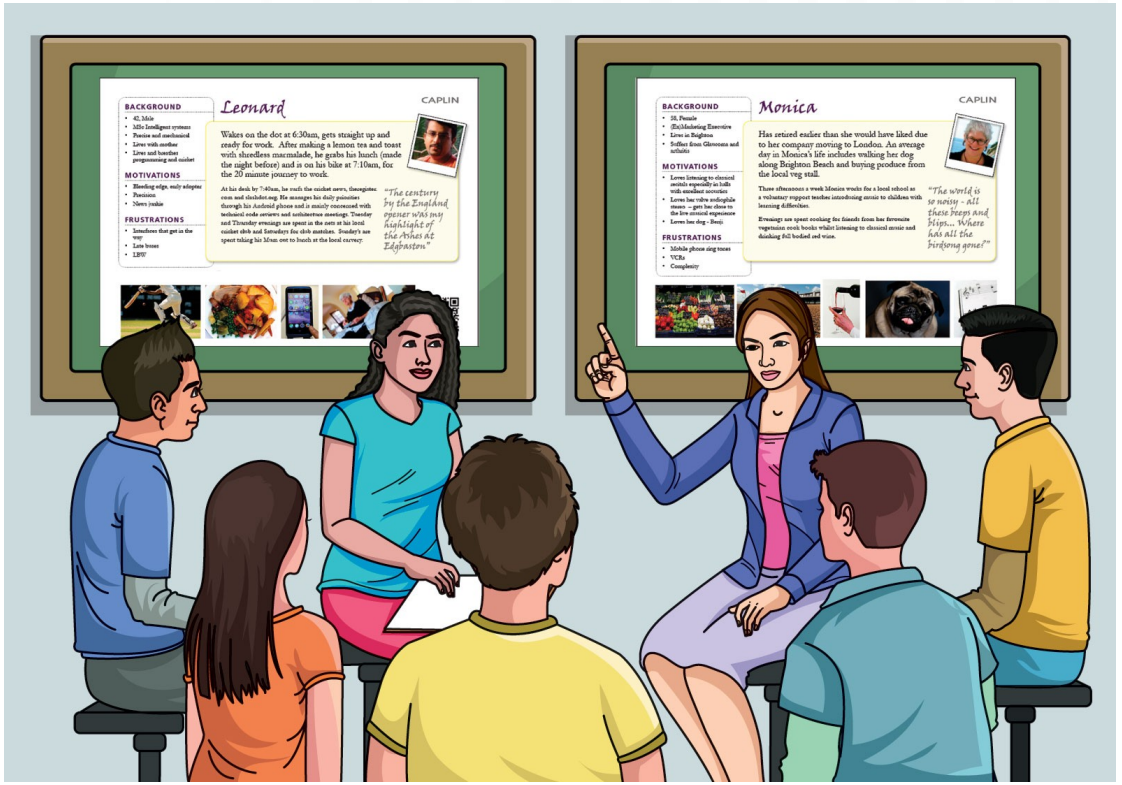
- Two types:
  - ‘Closed questions’ have a predetermined answer format, for example, ‘yes’ or ‘no’
  - ‘Open questions’ do not have a predetermined format
- Closed questions are easier to analyse
- Avoid:
  - Long questions
  - Compound sentences — split them into two
  - Jargon and language that the interviewee may not understand
  - Leading questions that make assumptions, for example, why do you like …?
  - Unconscious biases, for instance, gender stereotypes

Running the Interviews

- **Introduction:** Introduce yourself, explain the goals of the interview, reassure about the ethical issues, ask to record, and present the informed consent form.
- **Warm-up:** Make first questions easy and non-threatening.
- **Main body:** Present questions in a logical order
- **A cooling-off period:** Include a few easy questions to defuse tension at the end
- **Closure:** Thank interviewee, signal the end, for example, switch recorder off.

Enriching the Interview Process

- **Props:** Devices for prompting interviewee, for example, use personas, prototypes or scenarios



QUESTIONNAIRES

Questionnaires

- Questions can be closed or open
- Closed questions are easier to analyze, and may be distributed and analyzed by computer
- Disseminated online so can be administered to large populations
- Sampling can be a problem when the size of a population is unknown as is common in online evaluations

Questionnaire Design

- The impact of a question can be influenced by question order.
- Different versions of the questionnaire may be needed for different populations.
- Provide clear instructions on how to complete the questionnaire.
- Consider whether the questionnaire is too long
- If the questionnaire is long consider allowing participants to opt out at certain stages.
- Think about layout and pacing.

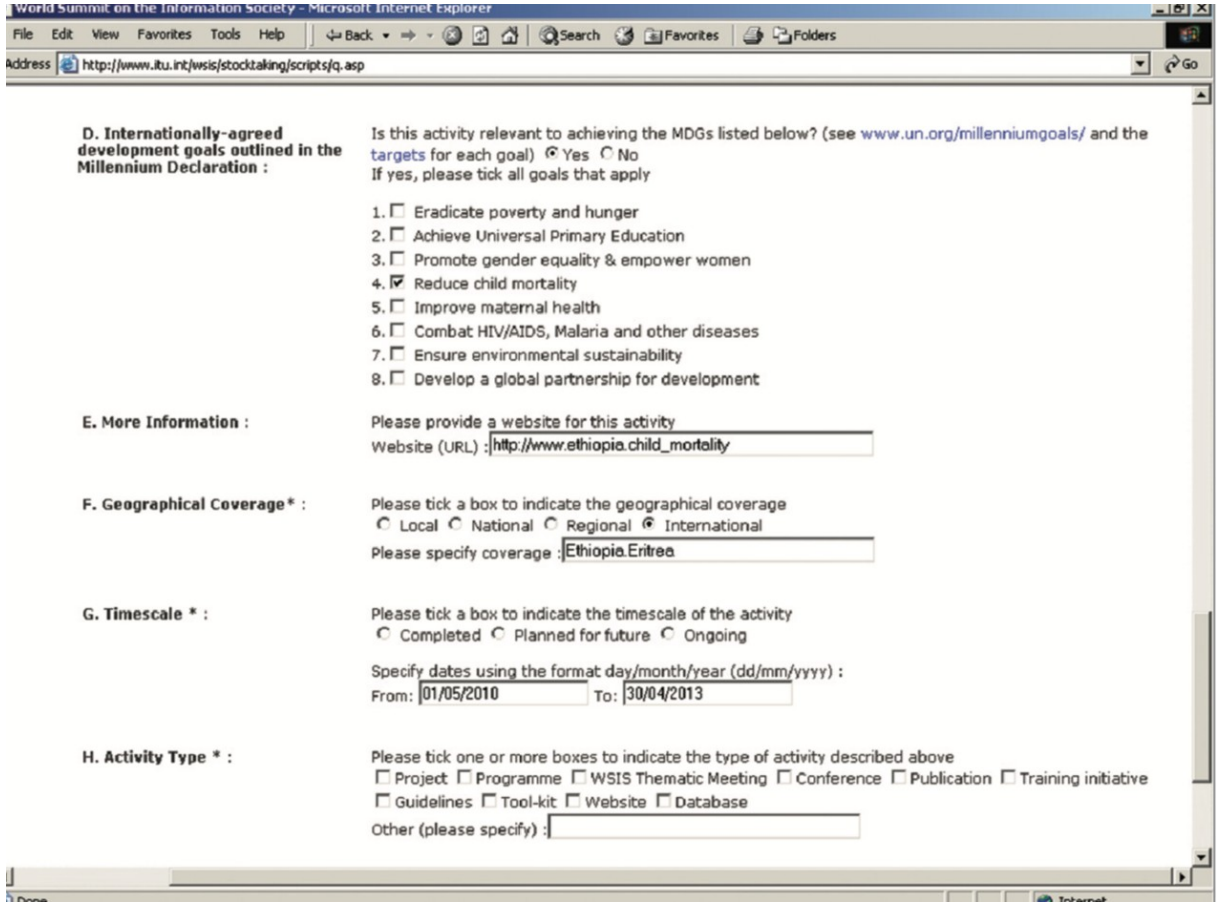
Question and Response Format

- Closed-ended responses with predefined list:
  - radio buttons (single response)
  - check boxes (multiple responses)
- Rating scales
  - Likert scales
  - Semantic differential scales
  - 3, 5, 7 or more points
- Open-ended responses

Encouraging a Good Response

- Make the purpose of study clear
- Promise anonymity
- Design the questionnaire carefully and run a pilot study
- Offer a short version for those who do not have time to complete a long questionnaire
- Follow-up with prompting messages
- Provide an incentive, e.g. voucher
- 40% response rate is generally acceptable but much lower rates are common

Example Web-based Questionnaire



Questionnaire showing check boxes, radio boxes, and pull-down menus

Administering Questionnaires

- Plan the timeline
- Design offline
- Program/complete online template
- Test the survey to make sure that it behaves as you would expect
- Test it with a group that will not be part of the survey to check that the questions are clear
- Recruit participants

OBSERVATION

Observation

- Direct observation in the wild
  - Structuring frameworks
  - Degree of participation (passive or participant)
  - Ethnography
- Direct observation in controlled environments
  - The Think-aloud technique
- Indirect observation: tracking users' activities
  - Diaries
  - Interaction logging, web analytics and data scraping
  - Video and photographs collected remotely, e.g. by drones
  - Wearable sensors and social media

Structuring Frameworks to Guide Observation

- Three easy-to-remember parts:
  - The person: Who?
  - The place: Where?
  - The thing: What?
- A more detailed framework (Robson & McCarten, 2016):
  - Space: What is the physical space like and how is it laid out?
  - Actors: What are the names and relevant details of the people involved?
  - Activities: What are the actors doing and why?
  - Objects: What physical objects are present, such as furniture
  - Acts: What are specific individual actions?
  - Events: Is what you observe part of a special event?
  - Time: What is the sequence of events?
  - Goals: What are the actors trying to accomplish?
  - Feelings: What is the mood of the group and of individuals?

Planning and Conducting Observation in the Wild

- Decide on how involved you will be: from passive observer to active participant
- How to gain acceptance
- How to handle sensitive topics, for example, culture, private spaces, and so on
- How to collect the data:
  - What data to collect
  - What equipment to use
  - When to stop observing

Ethnography

- Ethnography is a philosophy with a set of techniques that include participant observation and interviews
- Debate about differences between participant observation and ethnography
- Ethnographers immerse themselves in the culture that they study
- A researcher’s degree of participation can vary
- Analysing video and data logs can be time-consuming
- Comments, incidents, and artifacts are collected

Ethnography (cont.)

- Co-operation of people being observed is required
- Data analysis is continuous
- Interpretivist technique
- Questions are refined as understanding grows
- Reports usually contain examples

Observations and Materials that might be Collected (Crabtree, 2003)

- Activity or job descriptions
- Rules and procedures that govern particular activities
- Descriptions of activities observed
- Recordings of the talk taking place between parties
- Informal interviews with participants explaining the detail of observed activities
- Diagrams of the physical layout
- Photographs, videos and descriptions of artifacts
- Workflow diagrams showing the sequential order of tasks
- Process maps showing connections between activities

Direct Observation in a Controlled Environment

- The Think-aloud Technique

*"I'm typing in **www.lycos.com**, as you told me." <types>*
*"Now I am typing **child's ebike** and then clicking the search button**.** <pause and silence>*
"It's taking a few seconds to respond."
"Oh! Now I have a choice of other websites to go to. Hmm, I wonder which one I should select. Well, I need some help in deciding, so perhaps I should start by looking at a review of ebikes for kids. This one has an up-to-date list of current ebikes. <He clicks on The 13 BEST Electric Bikes for Kids [2022]>
"Gosh, there's a lot of models to select from, and I need to know what size wheels would suit a 10-year-old. I guess that depends on how long their legs are! Hmm, maybe some of them recommend ages in their specifications."
<pauses and looks at the screen>
I guess I should scroll through them and identify those that might be appropriate."
<silence . . . >

Indirect Observation: Tracking User's Activities

- Diaries
- Interaction logs
- Web analytics
- Data scraping

- Video, audio, photos, and notes are used to capture data in both direct and indirect observation

PUTTING THE TECHNIQUES TO WORK ....

Choosing Techniques

- Focus of the study
- Participants involved
- Nature of the technique(s)
- Resources available

* Adapting techniques to suit different participants

Adapting the Techniques for Different Participants

Visual representation of a Likert scale for children (Putnam et al, 2020)

GPS tracker on a cat (Paci et al, 2020)

Gathering Data Remotely

Rapid Transitioning to Remote UCD Activities
1. Establish remote access for as many systems as possible.
2. Include remote access in IRB protocols.
3. Run pilot tests before conducting sessions with participants.
4. Have backup plan(s) in case of technological issues.
Interacting with Participants
5. Inform participants ahead of time about any technical requirements.
6. Use technologies that will be familiar and common to participants.
7. Use retrospective questioning if facing issues with the think-aloud method.
8. Gather information about the field site before running sessions.
Interacting with Other Researchers
9. Define the roles for each research member before the session.
10. Introduce the research team members and their various roles at the beginning of the session.

Best practices for remote data gathering activities (Mastrianni et al, 2021)

Key Points

- Data gathering sessions should have clear goals
- An informed consent and other permissions may be needed
- Six key issues of data gathering are: goals, identifying participants, participant relationship, ethics of collection and storage, triangulation and pilot studies
- Data may be captured as notes, audio and/or video recording, photographs, or any combination of these
- Interviews may be structured, semi-structured, or unstructured
- Questionnaires may be on online, sent by email or paper-based
- Observation may be direct or indirect; in the wild or in controlled settings
- Techniques are commonly combined for any one study
- Techniques may need to be adapted for participants and their context