Chapter 8 - Data Gathering

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8.2 Six Key Issues for Data Gathering**

1. Setting Goals 🎯

- Define clear goals to guide the data gathering, analysis, and sessions. Goals can vary from measuring a user interface's effectiveness to understanding user reactions to new technology.
  Quotes & Attributions:
- **Robson and McCartan (2016)**: Emphasize that well-defined goals determine the techniques and analysis used.
- **Ron Kohavi et al. (2020)**: Stress the complexity of combining metrics in online experiments like A/B testing.

2. Identifying Participants 👥

- Choose participants based on study goals. Techniques include probability sampling (random selection) and nonprobability sampling (e.g., convenience sampling or volunteer panels). **Quotes & Attributions**:
- **Vera Toepoel (2016)**: Details various sampling methods for surveys, emphasizing their impact on generalizability.

3. Relationship with Participants 🤝

- Build a professional rapport and gain informed consent. The relationship affects data reliability. Consent can be oral, written, or recorded. Rapport is key for quality data collection, especially in remote settings. **Quotes & Attributions**:
- **Peter Kaulbach et al. (2021)**: Emphasize the importance of respecting sociocultural norms, like meeting community leaders before data collection.
- **Dray and Siegel (2004)**: Mention challenges in building rapport in remote data collection.

4. Ethical Considerations of Data Collection and Storage 🛡️

- Ensure participants' data is secure and anonymous. Regulations like GDPR require careful data handling and protection, with potential legal consequences for mishandling. **Quotes & Attributions**:

- **GDPR Guidelines**: Highlight the need for data encryption and secure storage to protect participants.

5. Triangulation 📐

- Use multiple perspectives to ensure data accuracy. This can include different data sources, researchers, theories, or methodologies. **Quotes & Attributions**:
- **Denzin (2006)** and **Jupp (2006)**: Define four types of triangulation, such as data triangulation and investigator triangulation, to improve data reliability.
- **Nan Gao et al. (2021)**: Found that physiological data and self-reported engagement may not always match, questioning the reliability of ground truth.

6. Pilot Studies 🧪

- Conduct a trial run of the study to identify and correct issues before the main data collection. It helps test procedures, equipment, and even research questions. **Quotes & Attributions**:
- **Omid Mohaddesi and Casper Harteveld (2020)**: Piloted their study to verify if their game-based environment was suitable for future research.

**8.3 Capturing Data **:

8.3.1 Notes Plus Photographs 📒📸**:**

- **Note-taking** (handwritten or typed) is a flexible, low-tech way to capture data, helping analysts focus and reflect 📝.
- **Handwritten Notes** are less intrusive than typing, and more adaptable for things like diagrams ✍️.
- **Benefits**: Writing by hand helps researchers concentrate on important points and begin analyzing early 🔍.
- **Challenges**: Difficult to capture everything accurately, tiring, prone to biases, and can be hard to read 🌀.
- **Photographs & Videos**: These visual aids help supplement notes with more context—like snapshots of artifacts, events, or environments 📷🎥.
- **Collaboration**: Working with a colleague helps capture more perspectives and reduces note-taking fatigue 🤝.

Quotes & Attributions:

- **Sharp et al. (2022)**: Describes the benefits and challenges of using handwritten notes for data gathering and the value of adding photographs and videos for richer context.

8.3.2 Audio Plus Photographs 🎤📸**:**

- **Audio Recording** is a helpful alternative to note-taking, less intrusive than video, and lets observers focus on the activity rather than jotting down everything 🗣️.
- **Interview Advantage**: Allows the interviewer to focus on the interviewee, improving the quality of the interaction 🤝.
- **Selective Transcription**: Usually, only important parts are transcribed based on study goals. Full transcription isn't always necessary ✍️.
- **Memory Aid**: Recordings evoke vivid memories of the session, providing richer context during analysis 🧠.
- **Quality Matters**: Good audio quality is crucial—positioning the recording device well and avoiding loud noises is key 🎙️.
- **Tools & Tech**: Platforms like Zoom and Teams allow direct recording, sometimes with automated

transcription, reducing the burden of manual transcription 💻📝.

- **Accuracy Issues**: Automated transcriptions are around 80-90% accurate, affected by noise and clarity of speech 🔊.
- **Visual Aid**: Audio recordings are often paired with photographs to provide more complete context 📷.

Quotes & Attributions:

- **Sharp et al. (2022)**: Highlighted the benefits of using audio recordings combined with photographs for enhancing the quality of data gathering and reducing the workload of note-taking.

8.3.3 Video 📽️:

- **Video Recording**: Smartphones can collect short video clips; ideal for capturing rich context quickly 📱.
- **Long-term Needs**: For long recordings (e.g., in labs or hospitals), dedicated cameras are often better for stability and coverage 🔄.
- **Camera Types**:
  - **Wearable Cameras**: Capture from a participant's point of view, great for immersive experiences 🚶👀.
  - **360-Degree Cameras**: Capture full context, providing a comprehensive overview of the activity 🌐.
- **Fixed vs. Flexible Settings**:
  - **Fixed Cameras**: Stay in one place, ideal for consistent angles 🗺️.
  - **Flexible Cameras**: Allow zooming and focusing; useful if researchers need control over the recording remotely or onsite 🔍.
- **Camera Placement**: Crucial for capturing relevant action. Plan in advance, and familiarize with the environment to find the best locations 🗺️📌.
- **Participant Involvement**: Involve participants in deciding what and where to record; especially important in private settings (e.g., home) 🏠🤝.
- **Impact on Participants**: Video might affect behavior; researchers should empirically assess whether recording influences actions (e.g., participants being camera-conscious) 📹👀.

Quotes & Attributions:

- **Nassauer and Legewie (2022); Heath et al. (2010)**: Discussed considerations for choosing cameras, placement, and settings, emphasizing the importance of understanding context and participant behavior during video recording.

8.4 Interviews 🎙️:

8.4.1 Unstructured Interviews 🎙️:

- **Exploratory Approach**: Unstructured interviews are like conversations, providing open-ended exploration rather than strict question-answer sequences 🌊.
- **Freedom in Answers**: Questions are open, allowing interviewees to answer in detail or briefly, based on their comfort and insight 💬.
- **Interviewer's Role**:
  - Uses **probes** to delve deeper (e.g., "Can you tell me more about...?") 🕵️.
  - Needs a **plan** to ensure all important topics are covered but remains flexible to explore unexpected areas 📝.
- **Rich & Complex Data**: Generates detailed and interconnected information, offering deep insights into the

topic 🧠✨.

- **Time-Consuming Analysis**: The open nature means interviews differ greatly between participants, leading to longer analysis times ⏳.
- **Unique Insights**: Often surfaces issues not initially considered by the interviewer, offering fresh perspectives 🌱.

Quotes & Attributions:

- **Grounded Theory & Other Analytic Approaches (Chapter 9)**: Techniques from grounded theory are used to identify themes across interviews and interpret the complex data produced in unstructured formats.

8.4.2 Structured Interviews 📝:

- **Predetermined Questions**: Interviewer asks **prewritten questions**, similar to a questionnaire format, to ensure consistency 📋.
- **Standardization**: The same questions are asked to every participant, making the study results **comparable and standardized** 📊.
- **Closed Questions**: Typically uses **closed questions**, with answers from a **set of alternatives** (e.g., multiple-choice or Yes/No) to gather focused data 🎯.
  - Examples: "Which app do you use most frequently: Prime Video, GoogleTV, or Netflix?" 📱.
- **Clear & Concise**: Questions are designed to be **short and clearly worded** for efficient communication 💬.
- **Specific Goals**: Best used when research goals are **well understood** and specific insights are targeted 🎯.
- **Consistent Wording & Order**: Questions are **asked in the same way and order** to all participants for consistency 🔁.

Quotes & Attributions:

- **Section 8.5**: For more information on designing questions for structured interviews, refer to the "Questionnaires" section to understand formatting techniques and consistency requirements.

8.4.3 Semi-Structured Interviews 🎤📝

- **Combination of Structured & Unstructured**: Uses a mix of **structured questions** (like in surveys) and **open-ended questions** to allow deeper exploration 🌐.
- **Basic Script for Guidance**: Interviewer follows a **basic script** to ensure all key topics are covered, while still leaving room for flexibility 🚦.
- **Preplanned Questions + Probing**: Starts with **prepared questions**, then **probes** for further details until no new information is provided 🔍.
  - Example: "Which music websites do you visit?" ➡️ Probing deeper into reasons and layout preferences 🎶.
- **Avoiding Bias**: Questions must be **neutral** and **non-leading** to avoid pre-empting answers, especially important with children 🤐😠.
- **Body Language Matters**: Interviewer's **body language** (e.g., smiling, scowling) can impact how the interviewee responds, hence should be neutral 🤷‍♀️.
- **Use of Probes**: Neutral probes like "**Do you want to tell me anything else?**" and **prompts** are used to gain more details without introducing bias 📌.

Quotes & Attributions:

- **Section 8.4.5**: For more techniques on avoiding biases in interviews, refer to the "Planning and Conducting

an Interview" section, which provides deeper insights into effective interview practices.

8.4.4 Focus Groups 💬👥

- **Group Interviews**: Unlike one-on-one interviews, focus groups involve **3-10 people**, led by a **trained facilitator** 👩‍🏫👨‍🏫.
- **Participant Selection**: Participants are chosen to represent a **diverse sample** of the target population. For example, administrators, faculty, and students could form different focus groups for a campus map evaluation 🎓📍.
- **Benefits**:
  - **Diverse Viewpoints**: Great for capturing multiple perspectives and shared issues, which might be missed in individual interviews 🌍🔍.
  - **Flexibility**: The facilitator can follow **unexpected topics** as they come up while keeping a **preset agenda** 📋.
- **Facilitator Role**: Facilitator manages the discussion, **encourages quieter participants**, and **controls dominating voices** to ensure everyone is heard 🤐📢.
- **Challenges**:
  - **Careful Facilitation Needed**: It can be easy to stray off-topic, requiring skillful moderation 🔴🗣️.
  - **Groupthink**: Risk of people agreeing with dominant voices instead of providing **individual insights** 🧠➡️🧠.
- **Examples**:
  - **Smart Home Study**: Abir Ghorayeb et al. (2021) held focus groups in a **smart home setting** to bring in real-world examples of technology use 🏠🤖.
  - **Kenyan "Talking Circle"**: Elizabeth Warrick et al. (2016) used a **traditional Kenyan talking circle** approach for focus groups to respect the cultural practices of elders speaking in turn 🔄🗣️.

Quotes & Attributions:

- **Nielsen (1997)**: Warned that focus groups should not be the sole source of information for understanding user behavior.
- **Unger and Chandler (2012)**: Highlighted that focus groups are effective for surfacing multiple user stories in collaborative processes.

8.4.5 Planning and Conducting an Interview 📝🎤

- **Interview Planning**:
  - Prepare **questions/topics** and collate **documentation** (e.g., consent forms) 🗂️.
  - Test **recording equipment** and schedule the interview time and place ⏱️🎥.
  - If in-person, bring **snacks and drinks** to create a relaxed atmosphere ☕🍪.
- **Guidelines for Developing Questions**:
  - **Short Questions**: Avoid long or compound questions; break them into simpler parts 🗣️➡️❓.
  - **Avoid Jargon**: Use **simple language** to ensure interviewees understand 🧠🔍.
  - **Keep Questions Neutral**: Don't assume a particular answer; ask open-ended, unbiased questions ⚖️❔.
- **Interview Structure**:

    - **Introduction**: Introduce yourself and explain the purpose of the interview 👋🎯.
    - **Warm-Up**: Start with simple questions (e.g., demographic info) to make the interviewee comfortable 🌞.
    - **Main Session**: Ask the main questions, with more complex ones towards the end 🏞️.
    - **Cooling-Off**: Wrap up with easy questions to wind down ❄️.
    - **Closing**: Thank the interviewee and end any recordings ✨🙏.

- **Examples and Activities**:

    - **Goal Definition**: Understand the **appeal of devices** to young people aged 14-16 📚👦👧.
    - **Suggested Questions**:
        - Why do you like using an ebook reader? 📖🤔
        - Have you used similar devices before? Yes/No ❓✅❌.
    - Use **audio recording** for less distraction, supplemented with photos for clarity 🎙️📸.

Quotes & Attributions:

- **Robson and McCartan (2016)**: Provided guidelines for planning interviews, emphasizing simplicity, neutrality, and good structure.

8.4.6 Doing Interviews Remotely 💻📞

- **Advantages of Remote Interviews**:

    - Participants are in **familiar environments** and feel more relaxed 🏠😌.
    - No need to **travel** or worry about health and safety 🚗🛡️.
    - Less concern about **appearance** since they're at home 👕🏞️.
    - **Sensitive topics** can be easier to discuss, especially with audio-only calls 🎙️🙈.
    - Participants have the freedom to **leave anytime** if they feel uncomfortable 🚪👋.

- **Disadvantages of Remote Interviews**:

    - Lack of visibility for **body language**, making it harder to gauge responses 🤷👀.
    - Participants may be more tempted to **multitask** instead of focusing 🖥️📱.

- **Tips for Conducting Remote Interviews**:

    - **Technology Check**: Ensure participants have the right equipment and knowledge for video/audio calls 💻🔧.
    - **Building Rapport**: Making a connection can be harder remotely, especially if participants don't know you beforehand 🤝💬.
    - **Environmental Challenges**: Beware of **distractions** or other people appearing in the background, which could breach data protection ⚠️🚪.

- **Remote Focus Group Challenges**:

    - Manage participation with several people effectively 👥🗣️.
    - Combine tools like **Zoom** or **Teams** with collaborative activities like **brainstorming** or **mindmapping** using tools like **Miro**, **Mural**, or **Jamboard** 🧠📊.

Quotes & Attributions:

- **UX Booth**: Discusses remote user interview techniques, emphasizing the importance of building rapport and managing technology challenges effectively.

8.4.7 Enriching the Interview Experience 🎨💬

- **Using Artifacts as Props**:
  - Using **personas**, **prototypes**, or **scenarios** helps make the discussion more tangible and relatable 🖼️👥.
  - Props provide a **contextual focus** for participants, grounding their responses in practical examples 🛠️.
- **Virtual Prototypes for Remote Interviews**:
  - **Almohannad Albastaki et al. (2020)** used a virtual prototype to explore robotic expressions in an urban setting 🌆🤖.
  - Participants were asked to navigate a **virtual alleyway at night** while using "think-aloud" methods 🌃🗣️.
  - Results showed that **virtual prototypes** can achieve **ecological validity**, meaning they provide realistic results comparable to physical settings 🧪✅.
  - Videoconferencing to record sessions helped minimize the **equipment needed** for capturing data, making the process more efficient 🎥💻.

Quotes & Attributions:

- **Almohannad Albastaki et al. (2020)**: Explored the effectiveness of virtual experience prototypes, concluding that they offer valid insights and reduced equipment requirements for remote evaluations.

8.5 Questionnaires 🎙️:

8.5.1 Questionnaire Structure 📝📊

- **Start with Demographic Info**:
  - Gather details like **gender, age, and experience** to give context to responses 🎯👥.
  - Relevant background can explain different perspectives (e.g., novice vs. experienced users) 🔄.
- **Organizing Questions**:
  - Begin with demographic questions, then move to questions about the study's goals 🗂️➡️.
  - Related topics should be grouped together for **logical flow** 🧩.
- **Questionnaire Design Tips**:
  - Order of questions matters—**previous questions can influence responses** to following ones 🔄.
  - Tailor versions for **different populations** if necessary 👥📝.
  - Provide **clear instructions** on how to answer and complete the questionnaire ✅✍️.
  - Avoid unnecessary questions to keep it **concise and focused** ✂️.
  - For long questionnaires, allow respondents to **opt out** in stages to reduce dropout 📉🚪.
  - Balance **layout and pacing** with effective use of space—compact but not overwhelming 📏.

Quotes & Attributions:

- **General Advice**: Clear instructions, logical flow, and effective pacing are key to successful questionnaires.

8.5.2 Question and Response Format 📝🔍

- **Closed-Ended Questions**:
  - Use predetermined answers (e.g., multiple choice, “none of these”) for easy analysis and response clarity 🗂️✔️.
  - Include "no opinion" or “other” options where applicable to keep responses unbiased 🚫🤔.
- **Ranges and Predefined Lists**:
  - Use ranges for predictable responses like age or nationality 🌍🔢.
  - Be careful of overlapping ranges—e.g., **15-19** and **20-24** to avoid confusion 🔄.
  - Ranges don't always need to be equal; tailor them to the study goals (e.g., younger adults or generational analysis) 🎯.
- **Rating Scales**:
  - **Likert Scale**: Used to measure opinions with statements like "Strongly Agree to Strongly Disagree" 👍👎.
  - **Semantic Differential Scale**: Measures bipolar attitudes using pairs like "Attractive vs. Ugly" 😍🤢.
  - The number of points on a scale can vary (e.g., 3, 5, 7, or more), depending on how fine the discrimination needs to be. Odd numbers allow a central "neutral" point, while even forces a decision 🖨️.
- **Tips on Designing Rating Scales**:
  - Choose the scale length based on how nuanced you need the responses to be (e.g., **3-point for simple**, **7-point for judgments**, **longer for subtle differences**) 📏.
  - **James Lewis and Oğuzhan Erdinç (2017)** found no major differences in reliability between 7-point, 11-point, or 101-point scales. Use the scale that fits your need best without overwhelming respondents 🚦.

Quotes & Attributions:

- **James Lewis & Oğuzhan Erdinç (2017)**: Found no difference in reliability, validity, and sensitivity between 7-point, 11-point, and 101-point scales.

Figure 8.5 (a) Radio buttons are used when only one option can be selected. (b) Check boxes are used when several options can be selected. (c) A drop-down menu for currency.

Source: Microsoft Corporation

Likert Scales

Likert scales are used for measuring opinions, attitudes, and beliefs, and consequently they are widely used for evaluating user satisfaction with products. For example, users' opinions about the use of color in an interface could be evaluated with a Likert scale using a range of numbers, as in question 1 here, or with words, as in question 2:

1. The use of color is excellent (where 5 represents strongly agree and 1 represents strongly disagree):

1	2	3	4	5
☐	☐	☐	☐	☐

2. The use of color is excellent:

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
☐	☐	☐	☐	☐

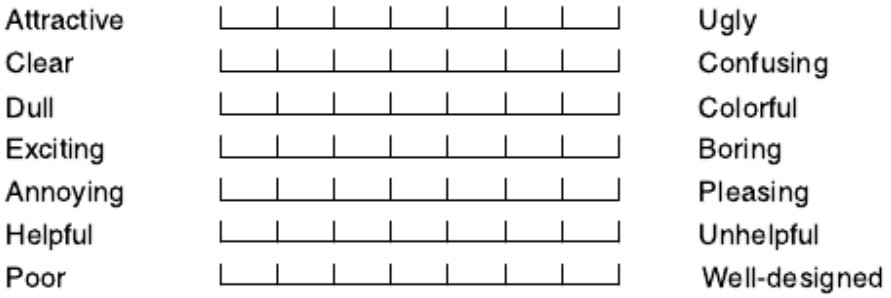

Figure 8.6 An example of a semantic differential scale

8.5.3 Administering Questionnaires 📋📊

- **Participant Sampling**:
  - Small samples (less than 20) often achieve full response rates 📈.
  - Larger surveys may require sampling techniques to reach a broader audience 🌐.
- **Questionnaire Formats**:
  - **Paper Questionnaires**: Still useful in specific contexts, e.g., public places 📝.
  - **Online Questionnaires**: Most popular; allow interactive features like checkboxes, drop-down menus, and automatic data validation 💻✔️.
- **Response Rates & Incentives**:
  - High return rates (~40%) are often seen as acceptable; incentives may be needed for larger samples to ensure engagement 🎁.
- **Designing & Deploying Online Questionnaires**:
  i. **Plan Timeline**: Work backward from the deadline to ensure all steps are completed on time ⏳📅.
  ii. **Offline Design**: Create in plain text for easy transfer to online tools ✍️➡️💻.
  iii. **Program the Survey**: Complexity affects the time needed (e.g., multiple paths or interactions) 🤖.
  iv. **Test the Survey**: Ensure proper behavior and get feedback from content experts and potential respondents 🧪👥.
  v. **Recruit Respondents**: Make invitations appealing, simple, and respectful to encourage participation 📢✨.
- **Segmentation**:
  - Allows respondents to skip irrelevant questions, reducing frustration and increasing data quality ✂️❓.

Quotes & Attributions:

- **Toepoel (2016)**: Emphasizes the value of properly planning, designing, and testing surveys to ensure quality responses.

8.6 Observation 👀📊

- **Purpose of Observation**:
  - Useful throughout product development: early on to understand user context and later to evaluate prototypes ⚙️📝.
- **Types of Observation**:
  - **Direct Observation**: Watching users perform activities in real-time 👥.
  - **Indirect Observation**: Reviewing records of activities afterward 📄.
- **Settings for Observation**:
  - **In the Wild**: Observing people in their natural environment to see genuine behaviors and context 🌍🏞️.
  - **Controlled Environment**: Conducting observations in a lab to control variables and capture detailed interactions 🧪📏.
- **Scenario Comparisons**:
  - **In the Wild**:
    - 👍 **Advantages**: Real-life context; provides insight into natural user behaviors and practical challenges.
    - 👎 **Disadvantages**: Subjectivity from observer involvement; qualitative data that's hard to replicate.
  - **Controlled Environment**:
    - 👍 **Advantages**: Replicable; can identify specific usability issues and compare multiple participants' performance.
    - 👎 **Disadvantages**: Artificial setting may not reflect real-world usage accurately 🌐⚠️.
- **Use Cases**:
  - **Lab Studies**: Ideal for detailed usability testing to find interface issues 🔍.
  - **In the Wild**: Best for understanding how a product fits into users' daily lives and impacts their behavior 🚶‍♂️📱.

Quotes & Attributions:

- **Kjeldskov and Skov (2014)**: Emphasized that deciding between wild or lab studies depends on the research goals, and both have merits. They suggest considering long-term in-the-wild studies for more comprehensive insights.

8.6.1 Direct Observation in the Wild 🕵️‍♂️🌍

- **Why Observation in the Wild?**:
  - Helps capture *real behaviors* and nuances not easily explained in interviews or questionnaires 🗣️📋.
  - Shows how people use technology in natural settings, providing richer context 🌄✨.
- **Challenges**:
  - Gathering lots of data that can be *tedious to analyze* and not always relevant 🌀📊.

    - Requires a clear goal but flexibility to adapt if unexpected situations arise 🎯🔄.

- **Simple Framework for Observation**:

    - **The Person**: Who is using the tech? 👤
    - **The Place**: Where are they using it? 🏠
    - **The Thing**: What are they doing with it? 📱

- **Detailed Framework for In-Depth Observation (Robson & McCarten, 2016)**:

    - **Space**: Physical environment and layout 📏
    - **Actors**: People involved and their details 👥
    - **Activities**: What they are doing and why 🎬
    - **Objects**: What physical objects are around? 🛋️
    - **Acts**: Specific actions taken 📌
    - **Events**: Is this part of a special event? 🎉
    - **Time**: Sequence of actions ⏳
    - **Goals**: What are they trying to achieve? 🏆
    - **Feelings**: Mood of individuals or group 😊😠

- **Degree of Participation**:

    - **Passive Observer**: Watches without intervening, suitable for lab studies 👨‍🔬.
    - **Participant Observer**: Becomes part of the group, balancing between participation and observation 🤝.

- **Benefits of Team Observation**:

    - **Coverage**: Each observer focuses on different aspects, covering more ground 🗺️.
    - **Reliability**: More observers mean more reliable data and diverse perspectives 🔍👥.
    - **Reflection**: Easier to interweave observation and reflection 🔄.

Quotes & Attributions:

- **Robson & McCarten (2016)**: Emphasized the importance of structured frameworks for observation to maintain focus, while also allowing the observer to adapt as new insights emerge.

Structuring Frameworks for Observation in the Wild

During an observation, events can be complex and rapidly changing. There is a lot for observers to think about, so many experts have a framework to structure and focus their observation. The framework can be quite simple. For example, this is a practitioner's framework for use in evaluation studies that focuses on just three easy-to-remember items:

The person: Who is using the technology at any particular time?
The place: Where are they using it?
The thing: What are they doing with it?

Even a simple framework such as this one can be surprisingly effective to help observers keep their goals in sight. Experienced observers may prefer a more detailed framework, such as the following (Robson and McCarten, 2016, p. 328), which encourages them to pay greater attention to the context of the activity:

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?

8.6.2 Direct Observation in Controlled Environments 🧪👀

- **Formal Settings**: Controlled observations often take place in usability labs with a prepared script to maintain consistency among participants. 📋
- **Data Collection Tools**: Techniques like taking notes, photos, audio, and video are used to capture participant behavior, with a focus on detailed individual actions rather than environmental context. 🎥✍️
- **Multi-Camera Setup**: Cameras may record different perspectives—face, body language, and interface activity—allowing for a comprehensive understanding of user interactions. 📸👤💻
- **Think-Aloud Technique**: Participants verbalize their thoughts during tasks to help observers understand their cognitive processes. This technique is crucial in identifying users' challenges but often leads to awkward pauses or silence. 🗣️🤔
- **Constructive Interaction**: To avoid awkward silences, having participants work together and talk to each other during the task can produce more natural and insightful data, especially for children. 👥🤝

Quotes & Attributions:

- **Anders Ericsson and Herbert Simon (1984)**: Developed the think-aloud technique for examining problem-solving strategies.
- **Miyake (1986)**: Introduced constructive interaction as a less intrusive alternative to think-aloud protocols.
- **Clemmensen et al. (2008)**: Highlighted cultural influences on verbalization during think-aloud sessions.

Here's a summarized version with emojis for the given section:

8.6.3 Indirect Observation: Tracking Users' Activities 📊👀

- **When Direct Observation Isn't Possible**: Use diaries and interaction logs to collect data when direct observation is not feasible or would be too intrusive. 🗂️💻
- **Diaries as Data Collection**:
  - **Participant Records**: Participants keep track of what they do, how they feel, and the challenges they face. 📖✍️

    - **Real Life Example**: Junchao Lin et al. (2020) conducted a 30-day diary study on couples sharing digital accounts, finding both the benefits of shared routines and the drawbacks of unintended information sharing. ❤️🔐
    - **Self-Care Study**: Caroline Claisse et al. (2022) used paper diaries to study self-care practices of adults living with HIV, highlighting how diary routines became part of care practices. 📝✨
    - **Challenges**: Diaries can be unreliable if participants forget or lose motivation; incentives and reminders may be needed. 🎁⏰
- **Experience Sampling Method (ESM)**:
    - **Prompting Participants**: Unlike traditional diaries, ESM prompts participants at random times for immediate feedback (e.g., Mintra Ruensuk et al. (2022) used ESM to understand Instagram users' emotions). 📲😊😟
- **Interaction Logs**:
    - **Activity Tracking**: Interaction logging software captures data like key presses, mouse movements, and session times—allowing deep quantitative analysis. 🖱️📈
- **Web Analytics & Data Scraping**:
    - **Online Behavior Insights**: Analyzing online trails, such as Twitter discussions, provides insights into public reactions, although ethical concerns about privacy can arise. 🌐🔍

Quotes & Attributions:

- **Junchao Lin et al. (2020)**: Conducted a diary study on couples sharing digital accounts, highlighting both the benefits and drawbacks of shared digital spaces.
- **Caroline Claisse et al. (2022)**: Explored self-care through diaries with adults living with HIV, emphasizing the role of mundane practices in empowering patient care.
- **Mintra Ruensuk et al. (2022)**: Used ESM to capture emotional states of Instagram users immediately after app use.

8.7 Putting the Techniques to Work

8.7.1 Choosing Techniques 🛠️🔍

- **Choosing Techniques Depends on Study Goals**:
    - Different techniques gather different types of data—quantitative, qualitative, or a mix. 📊📋
    - The chosen technique should fit the study goals, participants, available resources, and whether data collection will be remote or face-to-face. 🌐👥
- **Overview of Data Gathering Techniques**:
    - **Interviews**:
        - Best for exploring issues in depth.
        - Mostly qualitative, some quantitative.
        - Direct contact helps understand participants, but it can be intimidating in artificial settings. 👥💬
    - **Focus Groups**:
        - Useful for gathering multiple viewpoints.

        - Mainly qualitative data.
        - Encourages discussion but may suffer from “groupthink” or dominant voices. 🗣️🤝

    - **Questionnaires**:

        - Good for answering specific questions with fewer resources.
        - Collects both quantitative and qualitative data.
        - Can reach many people, but response rates might be low. 📄✒️

    - **Direct Observation in the Wild**:

        - Understands the natural context of activities.
        - Mostly qualitative.
        - Provides deep insights but requires time and results in large volumes of data. 🌿👀

    - **Direct Observation in Controlled Environments**:

        - Captures task details in a structured setting.
        - Both quantitative and qualitative data.
        - Results may be less applicable to real-world scenarios due to artificial conditions. 🧪🎥

    - **Indirect Observation**:

        - Involves logs or diaries.
        - Mix of qualitative (diary) and quantitative (logging) data.
        - Less intrusive, but logs require tool support, and diary entries can be biased. 📈📖

Quotes & Attributions:

- **Robert Yin (2018)**: Emphasized that case studies are best for answering "how" and "why" questions, integrating multiple perspectives, and analyzing events in context.
- **Jonathan Lazar et al. (2017)**: Identified four reasons for using case studies in HCI: exploration, explanation, description, and demonstration.

Technique	Good For	Kind of Data	Advantages	Disadvantages
Interviews	Exploring issues	Some quantitative but mostly qualitative	Interviewer can guide interviewee if necessary. Encourages contact between researchers and participants.	If interview takes place away from participants' own environment, it may seem artificial and they may be intimidated.

Technique	Good For	Kind of Data	Advantages	Disadvantages
Focus groups	Collecting multiple viewpoints	Some quantitative but mostly qualitative	Highlights areas of consensus and conflict. Encourages contact between researchers and participants.	Possibility of dominant characters and "groupthink."
Questionnaires	Answering specific questions	Quantitative and qualitative	Can reach a wide range of people with low resource requirements.	Response rates may be low. Unless carefully designed, the responses may not provide suitable data.
Direct observation in the wild	Understanding context of activity	Mostly qualitative	Observing gives insights that other techniques don't provide.	Very time-consuming. Huge amounts of data can be produced.
Direct observation in a controlled environment	Capturing the detail of what individuals do	Quantitative and qualitative	Can focus on the details of a task without interruption.	Results may have limited use in the natural setting because the conditions were artificial.
Indirect observation	Observing activity without researcher being present; data may be captured automatically or by participant.	Quantitative (logging) and qualitative (diary)	Participant isn't distracted by the data gatherer; automatic recording means that it can extend over long periods of time.	A large amount of quantitative data needs tool support to analyze (logging); participants' memories may exaggerate (diary).

8.7.2 Adapting Techniques for Different Participants 🛠️👥

- **Adapting Data Gathering Techniques**:
  - Techniques must be adjusted to suit the participants' needs and study context. 🧩👥
- **Child-Friendly Methods**:
  - Children react differently than adults; visual aids like visual Likert scales help make things easier. 📊🖍️
  - **Cynthia Putnam et al. (2020)** used visual Likert scales for 7-11-year-olds to make data gathering more accessible.
- **Involving Caregivers**:
  - For participants with intellectual disabilities, caregivers helped make abstract questions concrete and relatable. 🗣️❤️
  - **Laurianne Sitbon & Shanjana Farhin (2017)** adapted their questions by involving familiar examples and caregiver assistance.
- **Animal-Computer Interaction**:

    - Studying animal interaction with technology requires adapting human-centered methods to interpret animal behaviors. 🐶🔍
    - **Luisa Ruge & Clara Mancini (2019)** reinterpreted usability evaluation principles for mobility assistance dogs to understand animal interaction.

- **Wearable Devices for Animals**:

    - Wearable devices need careful design to avoid interfering with the natural behaviors of animals. 🐾📡
    - **Patrizia Paci et al. (2017)** studied the wearability of GPS trackers on cats to ensure they didn't cause harm or discomfort.

Quotes & Attributions:

- **Cynthia Putnam et al. (2020)**: Created a visual Likert scale for children aged 7-11 to ease data gathering.
- **Laurianne Sitbon & Shanjana Farhin (2017)**: Emphasized the role of caregivers in adapting questions for participants with intellectual disabilities.
- **Luisa Ruge & Clara Mancini (2019)**: Adapted usability evaluation methods for animals in the context of Animal-Computer Interaction.
- **Patrizia Paci et al. (2017)**: Developed methods to assess wearable GPS trackers on cats, ensuring no negative impact on their welfare.

8.7.3 Gathering Data Remotely 🌐📊

- **Access to Diverse Participants**:

    - Remote data gathering allows researchers to reach participants from different countries, age groups, or with different abilities. 🌍👥

- **Adaptations for Remote Studies**:

    - During COVID-19, many studies moved to remote data gathering, requiring adjustments like indirect observation through video recordings rather than direct real-time observation. 📹💡

- **Best Practices for Remote UCD Activities**:

    - **Angela Mastrianni et al. (2021)** shared their best practices for remote user-centered design in the emergency medical field, suggesting:
        a. **Remote Access**: Establish access to as many systems as possible and include this in protocols. 🔒💻
        b. **Pilot Tests**: Conduct pilot tests before real sessions to avoid issues. 🚧✅
        c. **Backup Plans**: Have backup plans for potential technological failures. 📟🔄
        d. **Participant Interaction**: Inform participants about technical requirements and use familiar technologies. 🗣️⚙️
        e. **Researcher Roles**: Define roles within the research team clearly and introduce each member during the session. 👩‍🏫👥

Quotes & Attributions:

- **Angela Mastrianni et al. (2021)**: Shared insights on transitioning to remote user-centered design activities, including best practices for interacting with participants and managing technical issues effectively.

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.

Table 8.2 Best Practices for Remote Data Gathering Activities

Source: Mastrianni, et al. (2021) Transitioning to Remote User-Centered Design Activities in the Emergency Medical Field During a Pandemic. In CHI Conference on Human Factors in Computing Systems Extended Abstracts (CHI '21 Extended Abstracts), ACM, New York, NY, USA, Article 41, pp. 1–8.

Summary of Chapter 8: Data Gathering 📊📝

- **Key Issues in Data Gathering**:
  - Goals, participant identification, relationship management, data storage, triangulation, and pilot studies. 🎯👥📦
- **Planning & Execution**:
  - Main techniques: **Interviews**, **Questionnaires**, **Observation**. Planning and capturing data was a critical part of the discussion. 📋🔍
- **Key Points**:
  - **Clear Goals**: All data gathering needs specific, well-defined goals. 🎯
  - **Permissions**: Informed consent and permissions may be required based on study context. 📝✔️
  - **Data Confidentiality**: Plan data storage carefully to protect participant confidentiality. 🔐
  - **Pilot Studies**: Use pilot studies to test the feasibility of the data gathering instruments and approach. 🚀📝
  - **Triangulation**: Investigate phenomena from different perspectives for more reliable results. 🔍🔄
  - **Data Recording Methods**: Handwritten notes, audio/video recordings, and photographs. ✏️🎥📷
  - **Types of Interviews**: Structured, semi-structured, unstructured. 🗣️
  - **Questionnaires**: Can be online, email, or paper-based, with open or closed-ended questions. 📧💻📝
  - **Observation Styles**: Direct vs. indirect observation; the observer can be a participant or passive. 👀👤
  - **Technique Selection**: Choose methods based on study goals, participant types, technique specifics, and resource availability. 🎯🔧💡

    - **Remote Data Gathering**: Useful for accessing diverse participants and can be adapted to different contexts. 🌐💻
    - **Combining Techniques**: Often, multiple data gathering techniques are used together for thorough results. 🔄🔗

Quotes & Attributions:

- **Chapter Summary**: Highlights key aspects of gathering data, including goals, methods, recording techniques, and managing participant relationships.

Glossary for Chapter 8: Data Gathering

1. Data Gathering 📊
The process of collecting information to achieve specific research goals. It includes methods like interviews, questionnaires, and observation.

2. Goal Setting 🎯
Defining clear objectives for data collection that guide what data is gathered and how it will be used.

3. Identifying Participants 👥
The process of selecting individuals who will provide data for the study, often chosen based on research goals and target demographics.

4. Relationship with Participants 🤝
Building a professional rapport and ensuring participants understand their role, rights, and how their data will be used during the study.

5. Informed Consent 📝
Permission obtained from participants after explaining the study's purpose, procedures, and their rights, ensuring ethical participation.

6. Triangulation 📐
Using multiple data sources, researchers, or methods to validate findings and increase reliability.

7. Pilot Studies 🧪
Trial runs of the study conducted to test and refine data collection methods, instruments, and overall feasibility.

8. Direct Observation 👀
Collecting data by watching participants in their natural setting or in a controlled environment to understand their behaviors.

9. Observation in the Wild 🌍
A type of direct observation conducted in a participant's natural environment to gather real-life context and behaviors.

10. Controlled Environment Observation 🧪
Observation performed in a structured, lab-like setting where variables can be controlled, allowing for focused insights on specific tasks.

11. Indirect Observation 🔍

Gathering data through methods like diaries or logs, where researchers are not directly observing participants in real-time.

12. Think-Aloud Technique 🗣️
A method used during observation where participants verbalize their thought process, allowing researchers to understand their reasoning and decision-making.

13. Constructive Interaction 👥💬
An observation technique where participants work together, discussing their actions, providing a more natural flow of interaction data.

14. Structured Interviews 📝
Interviews with predetermined questions that are consistently asked to every participant to gather comparable data.

15. Unstructured Interviews 🌊
Free-form interviews where questions are more open-ended, allowing participants to guide the conversation and provide deeper insights.

16. Semi-Structured Interviews 🪄📝
Interviews combining structured questions with open-ended prompts to explore topics more flexibly.

17. Focus Groups 💬👥
Group discussions led by a facilitator to gather multiple perspectives and explore consensus or conflict on specific topics.

18. Questionnaire 📋
A data gathering tool used to collect information from participants, typically consisting of structured questions that can be administered online, on paper, or via email.

19. Likert Scale 👍👎
A rating scale used to measure attitudes or opinions, often ranging from 'strongly agree' to 'strongly disagree.'

20. Semantic Differential Scale 😊🤢
A scale used to measure attitudes by asking participants to choose between two opposite adjectives (e.g., 'attractive' vs. 'ugly').

21. Experience Sampling Method (ESM) 📲
A technique where participants are prompted at random times to provide immediate data on their experiences or feelings.

22. Remote Data Gathering 🌐📊
Collecting data from participants who are not physically present, often using online tools or video conferencing, allowing for a broader participant base.

23. Wearable Technology in Studies 📡🐾
Using wearable devices, like GPS trackers, to collect data on user behavior, commonly applied in studies involving animals or human health monitoring.

24. Ethical Considerations 🛡️
Ensuring participants' privacy, confidentiality, and informed consent during the data collection process, following regulations like GDPR.

25. Data Storage 🔒

The methods used to securely store participants' information, maintaining confidentiality and complying with legal requirements.