Human–Computer Interaction

Diaries & Probes

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Agenda

»   Lecture — Cultural Probes, Technology Probes, and Diaries/Experience Sampling

   »   Definitions, differentiations, examples, and how-tos.

»   Assignment

Why these methods?[1]

»   **Challenge:** We want to study technology use in **naturalistic, everyday contexts** where labs/experiments fall short.

»   **Goal:** Capture rich, contextualized, temporal, and personal insights.

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[1] Image source

Cultural Probes

Definition & Origins

» Gaver, Dunne, Pacenti (1999):[2] kits of evocative materials (maps, postcards, cameras, diaries) left with participants to inspire responses.

» **Aim:** Inspiration, not information → provoke design ideas, not measure variables.

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[2] Gaver, B., Dunne, T., & Pacenti, E. (1999). Design: cultural probes. *interactions*, 6(1), 21–29.

Key Characteristics

» Open-ended, playful, aesthetic.

» Emphasize **participants' voices and cultural context**.

» Avoids framing around predefined needs.

Example Study

» *Presence Project* with elderly groups across Europe.[2]

    » Returned maps, photos, diaries revealed new roles (elders as local information resources, community builders).

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[2] Gaver, B., Dunne, T., & Pacenti, E. (1999). Design: cultural probes. *interactions*, 6(1), 21-29.

How-to: Designing Cultural Probes[3]

» Include evocative artifacts (maps, postcards, disposable cameras).

» Questions should be poetic, ambiguous, inspiring.

» Deploy personally, build rapport, encourage open interpretation.
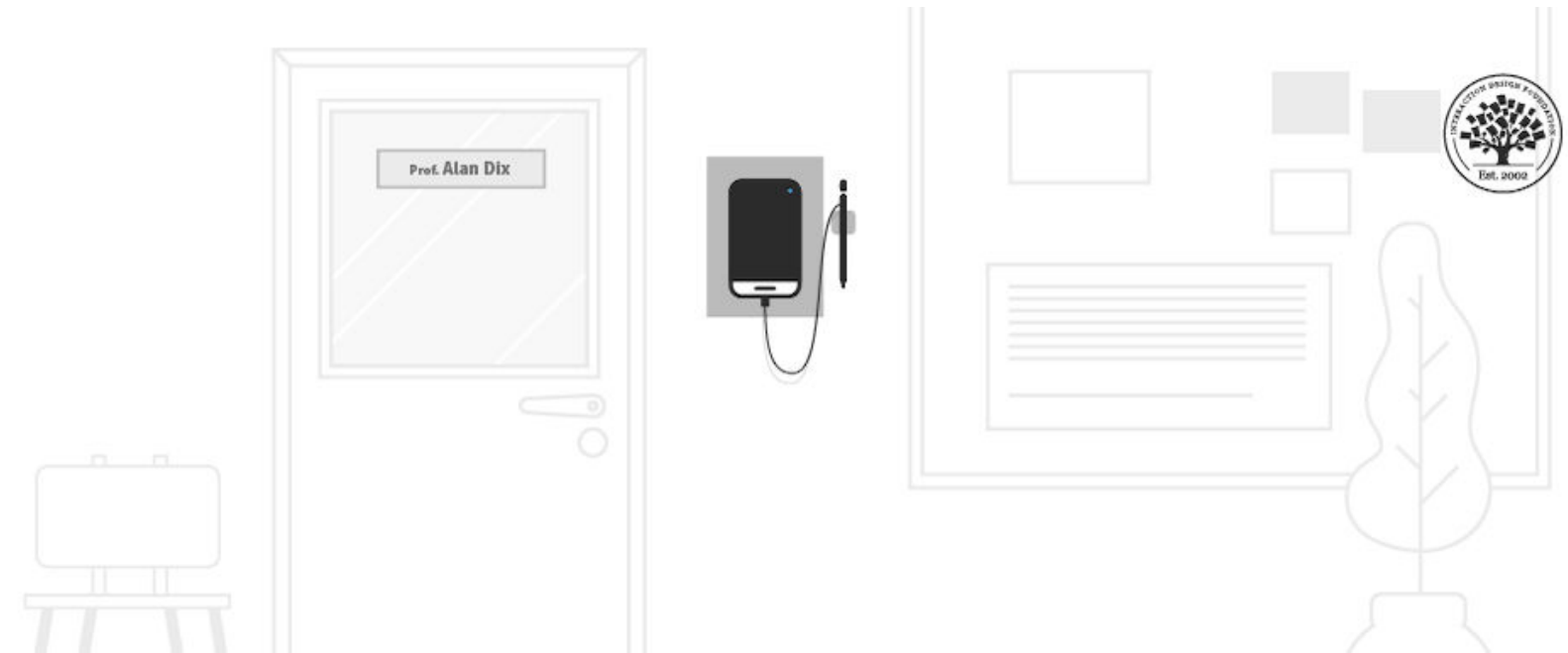
Technology Probes

Definition & Goals

» Hutchinson et al. (2003): [4] simple technologies deployed in homes, serving three goals:

  » *Social science:* understand needs/desires in real contexts.

  » *Engineering:* field-test technology.

  » *Design:* inspire new ideas.

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[4] Hutchinson, H., Mackay, W., Westerlund, B., Bederson, B. B., Druin, A., Plaisant, C., ... & Eiderbäck, B. (2003). Technology probes: inspiring design for and with families. CHI 2003.

Distinguishing Features[5]

» Not (hi-fi) prototypes: simple, flexible, deliberately limited.

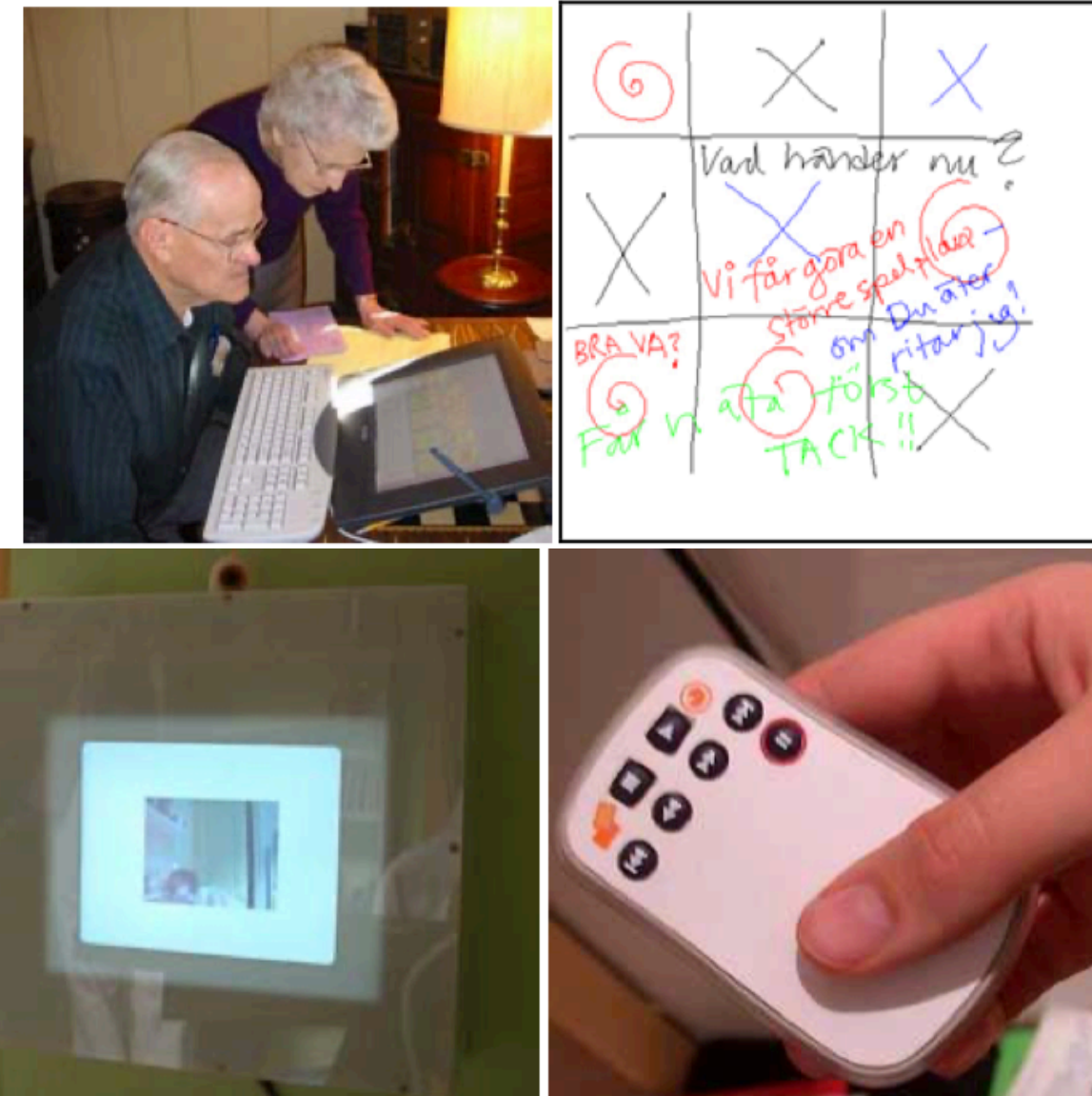» Co-adaptive: users shape the use.

» Collect logs of actual use.

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[5] Interaction-design.org: What are technology probes?

Example Studies

» **MessageProbe**:[4] shared digital Post–its for families.

» **VideoProbe**:[4] snapshots for asynchronous family communication .

» **Findings:** revealed patterns of coordination, playful uses.

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[4] Hutchinson, H., Mackay, W., Westerlund, B., Bederson, B. B., Druin, A., Plaisant, C., ... & Eiderbäck, B. (2003). Technology probes: inspiring design for and with families. CHI 2003.
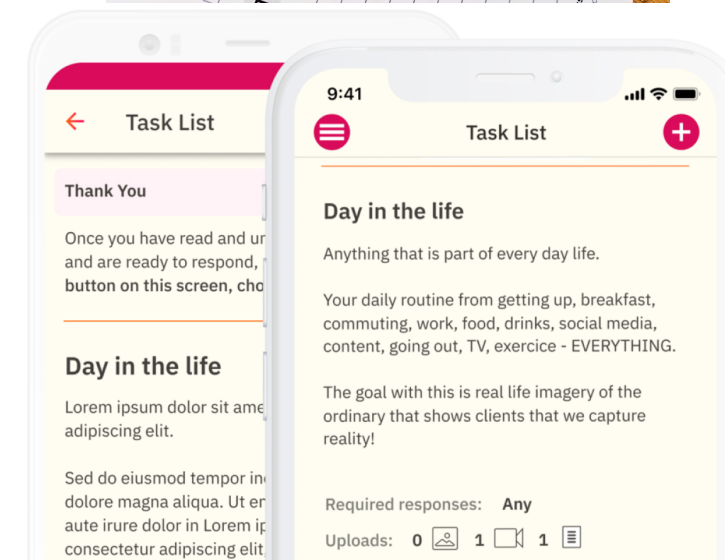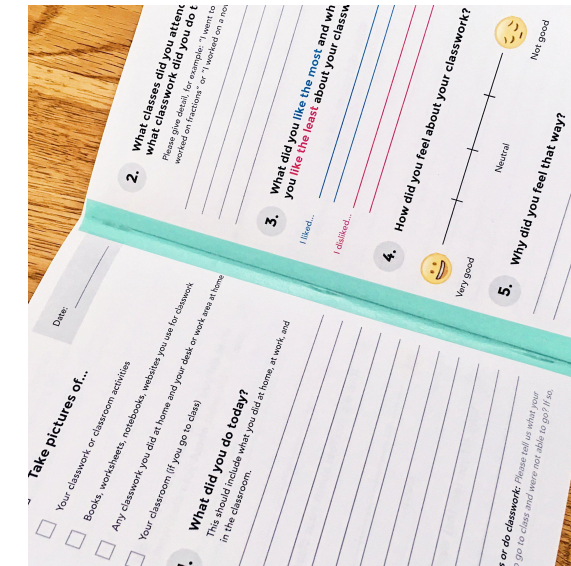
How-to: Implementing Technology Probes

» Keep function simple & open-ended.

» Place in natural settings (homes, workplaces).

» Collect both **usage logs** + **participant reflections**.

Diaries & Experience Sampling

Definition

» *Diary:* self–report log of events, feelings, experiences over time .[11]

» Time diaries focus on when events occur.
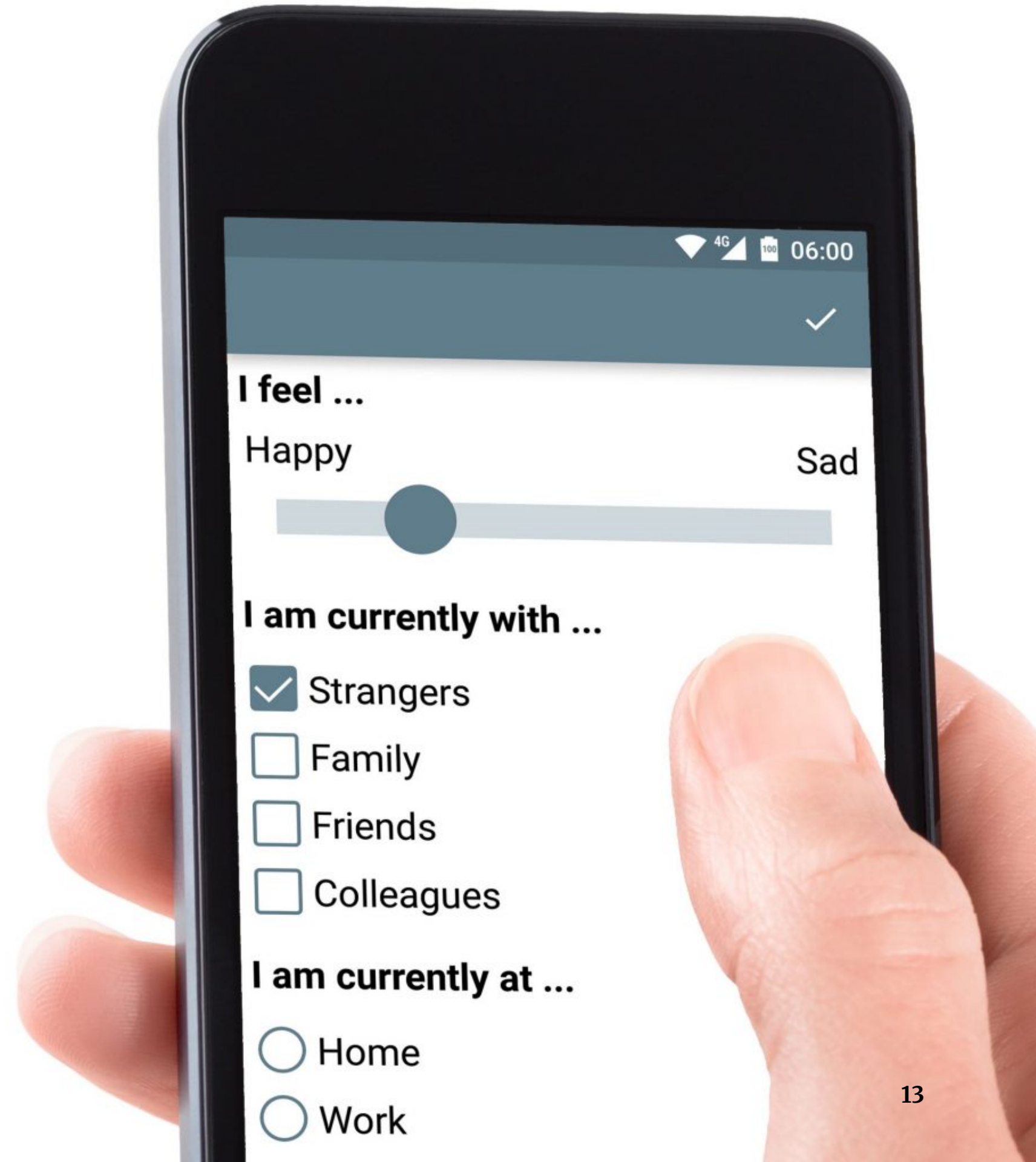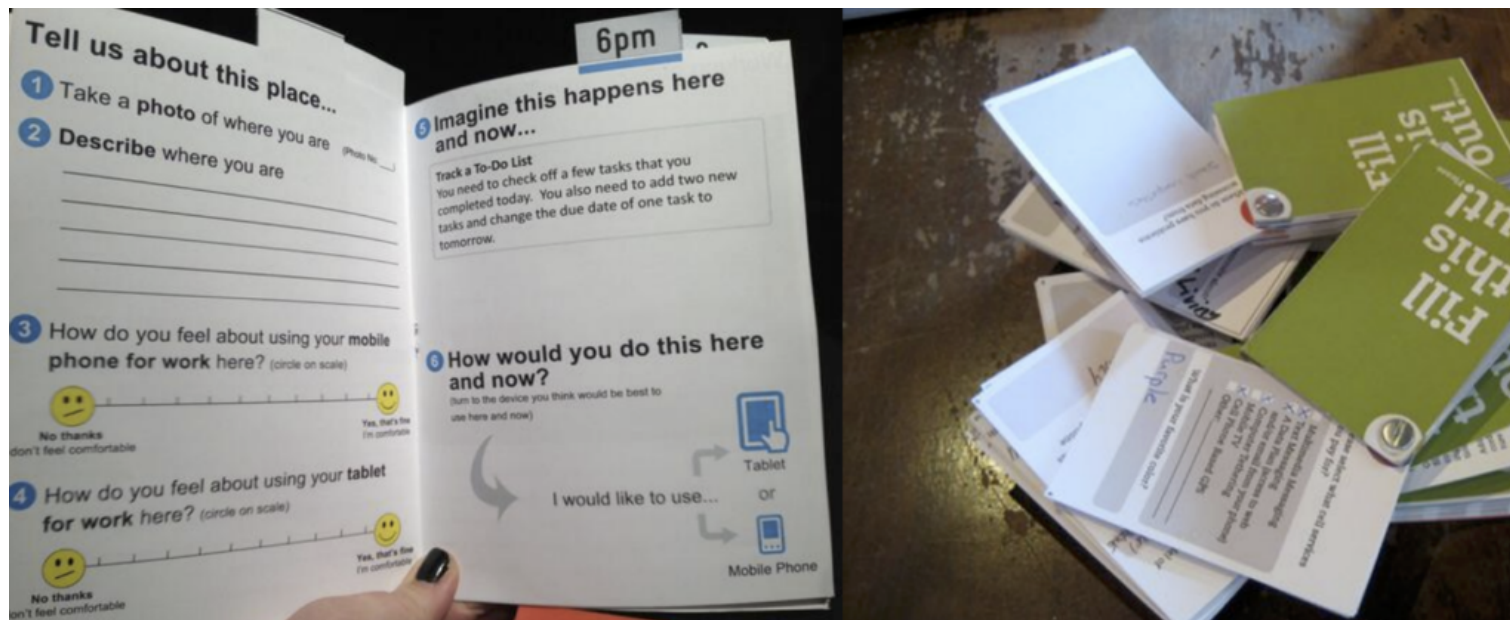

Definition

» *Experience Sampling (ESM):* participants record data **at random or prompted times** (traditionally via beepers, now smartphones).[12]

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[12] Image source

Why use diaries?[10]

» Capture experiences **as they happen**, reducing recall bias.

» Cover multiple contexts (home, work, mobile).

» Provide both qualitative richness and quantitative event counts.

Examples

» Frustration diary studies (Ceaparu et al. 2004)[6] — ~40% of computer time lost to frustration

» Mobile info needs (Sohn et al. 2008)[7] — text message + daily recall.

» Task switching diaries (Czerwinski et al. 2004).[8]

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[6] Ceaparu, I., Lazar, J., Bessiere, K., Robinson, J., & Shneiderman, B. (2004). Determining causes and severity of end-user frustration. *International journal of human-computer interaction*, *17*(3), 333–356.

[7] Sohn, T., Li, K. A., Griswold, W. G., & Hollan, J. D. (2008, April). A diary study of mobile information needs. In Proceedings of the sigchi conference on human factors in computing systems (pp. 433–442).

[8] Czerwinski, M., Horvitz, E., & Wilhite, S. (2004, April). A diary study of task switching and interruptions. In Proceedings of the SIGCHI conference on Human factors in computing systems (pp. 175-182).

Recap: Using Robots for Diary Studies[9]

» How to collect longitudinal, in-the-wild HRI data; limits of traditional diary methods.

» Diary Robot system (Misty II) as an interactive, conversational diary.

» In-home deployment with families; compared robot, text, and audio diaries.

» Robots can elicit richer, more natural self-disclosures; design implications for robot-mediated data collection.
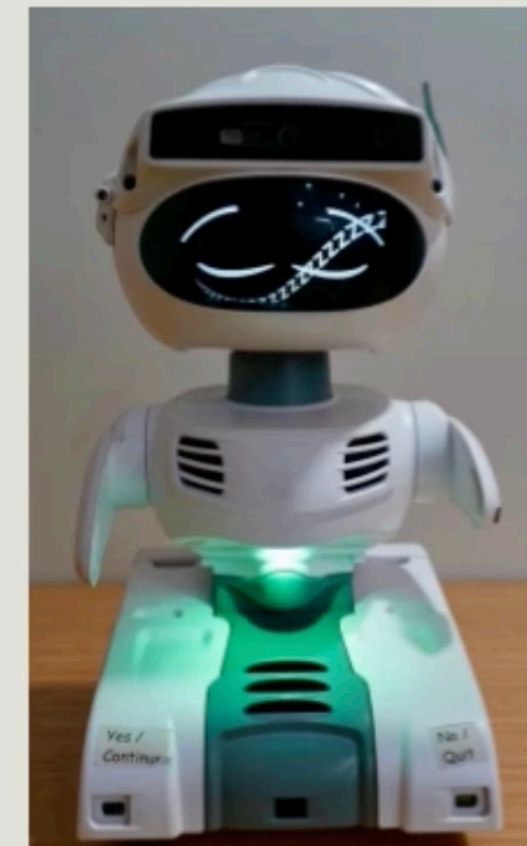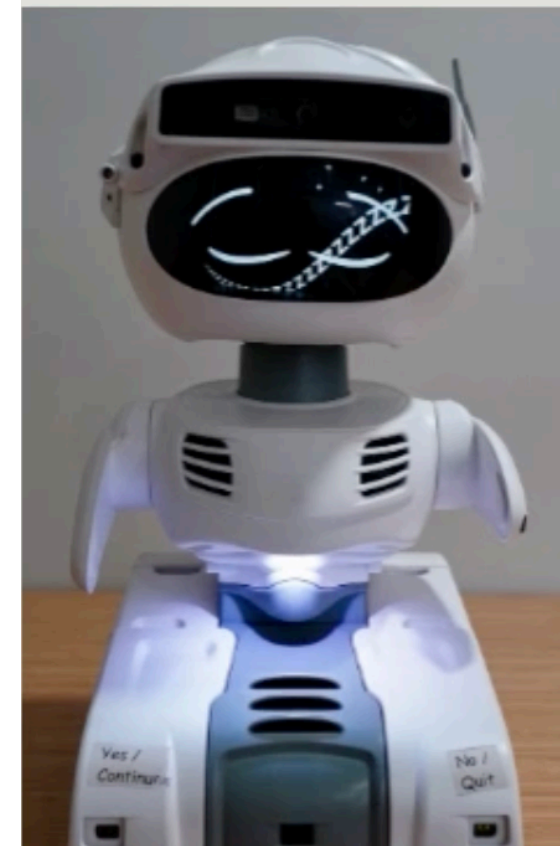
[9] Xu, H., & Mutlu, B. (2025). Exploring the use of robots for diary studies. HRI 2025.

How-to: Diary Studies

» *Decide type:* feedback vs. elicitation vs. hybrid.

» *Choose medium:* paper, electronic, voice, photos, text.

» *Clarify triggers:* event-based, time-based, random (ESM).

» *Balance structure:* Likert scales vs. open reflection.

» Analyze via coding + stats.

Differentiation & Choosing the Method

Comparing Methods

Method	Purpose	Strengths	Weaknesses	When to Use
Cultural Probes	Inspire design ideas	Playful, evocative, open-ended; reveal cultural context	Hard to analyze; not systematic	Early design exploration, inspiration
Technology Probes	Explore + co-design	Combines social science, engineering, design goals; logs real use	Technical challenges; scope limited	Early/mid design, field testing + ideation
Diaries / ESM	Document experiences	Ecological validity; temporal accuracy; rich data	Participant burden; compliance issues	Understanding practices, behaviors over time

Decision Guide

» Want **design inspiration** → Cultural probe.

» Want **field test + ideas** → Technology probe.

» Want **temporal data** → Diaries / ESM.

Summary Slide

» All three methods = ways to study life "in the wild."

» Differ in purpose: **inspiration**, **field exploration**, **temporal self–report**.

Assignment: Probes & Diary Research

» **Goal:** Practice *in-the-wild* methods for capturing everyday experiences.

» **Choose one method:**

   » **Diary Study** → participant logs events/ feelings over 3 days

   » **Experience Sampling** → send timed/ random prompts to capture in-the-moment data

Steps:

1. Pose a research question

2. Design study prompts (diary or ESM)

3. Run 3-day study with a peer

4. Analyze responses + reflect on method