CGT 562 - Cognitive Offloading

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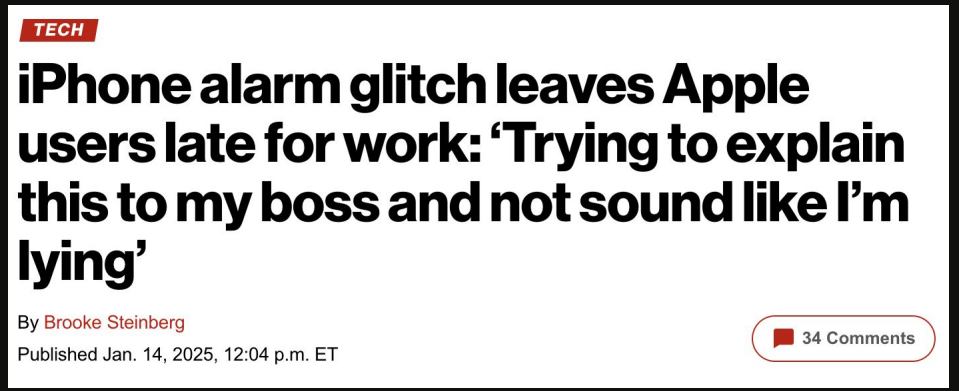
Project Overview - The problem

- Smartphones have become essential tools for managing daily cognitive tasks
  - Remembering appointments
  - Navigation
  - Task Management

Phones function as external memory systems but create potential risks when offloading strategies fail



TECH

iPhone alarm glitch leaves Apple users late for work: 'Trying to explain this to my boss and not sound like I'm lying'

By Brooke Steinberg

Published Jan. 14, 2025, 12:04 p.m. ET

34 Comments

Project Overview – Why it matters

Offloading Methods

Smartphones serve as external memory aids, reducing cognitive load by managing tasks and memory externally

Cue Dependence

Offloading reduces memory demands but **increases dependence** on cues that can fail

HCI

Understanding how instances of failure occur and how users adapt can help designers create better systems

Research Focus/Goals

Research Questions

1. How do people use smartphones to externalize memory and intention?
2. Under what conditions do smartphone offloading strategies break down?
3. What strategies or design features support resilient offloading in everyday life?

Goals

- Identify patterns of offloading and their successes/failures
- Provide design insights on how to create smartphone systems that are more resilient and adaptable to breakdowns

Course Concepts

- Distributed Cognition
- Ironies of Automation
- Prospective Memory
- Naturalistic Decision Making

Approach/Method

- Data Collection
  - Collected 9 critical incidents
  - Each participant took part in a semi-structured interview for 15–20 minutes
  - Participants were asked to recall incidents where offloading their succeeded or failed
- Analysis - Step 1: Descriptive Coding
  - Code incidents based on
    - Representation Type: reminder, list, visual cue
    - Cue Characteristics: timing, redundancy, automation
    - Cognitive Function: memory substitution, coordination, reconstruction

Approach/Method

- Analysis - Step 2: Theming
  - Identify Key Themes
    - Brittle Offloading: Over reliance on single cues or automated triggers leads to failure when contexts change
    - Resilient Offloading: Users combine multiple cues and recover from breakdowns through improvisation
- Challenges
  - Ensuring variability in incidents collected (work, academics, personal)
  - Recruiting a sample of participants who represent different types of smartphone usage

Current Findings

Externalization shifts cognitive effort

Offloading reduces the cognitive load but users must actively manage external systems

Brittle Systems

Single-trigger cues often fail when context changes

Resilience through redundancy

Layered cues and cross-channel cues support recovery and reduce dependency on a single system

Next Steps

- Increase the sample size
  - Aim for 12–15 total collected incidents
- Develop visual taxonomy
  - I will create a simple chart to show the different types of offloading and what makes them more or less reliable
- Connect findings to theory
  - Explain how the findings relate to cognitive theories/course concepts
- Refine design suggestions
  - Develop ideas for designs that could help make offloading more reliable

Feedback

- Are the themes of the data analysis clear, or is there something that I am missing?

- Do creating design suggestions seem like a practical thing that will align with my project goals?

Thank you!