History & Theories in Human-Computer Interaction

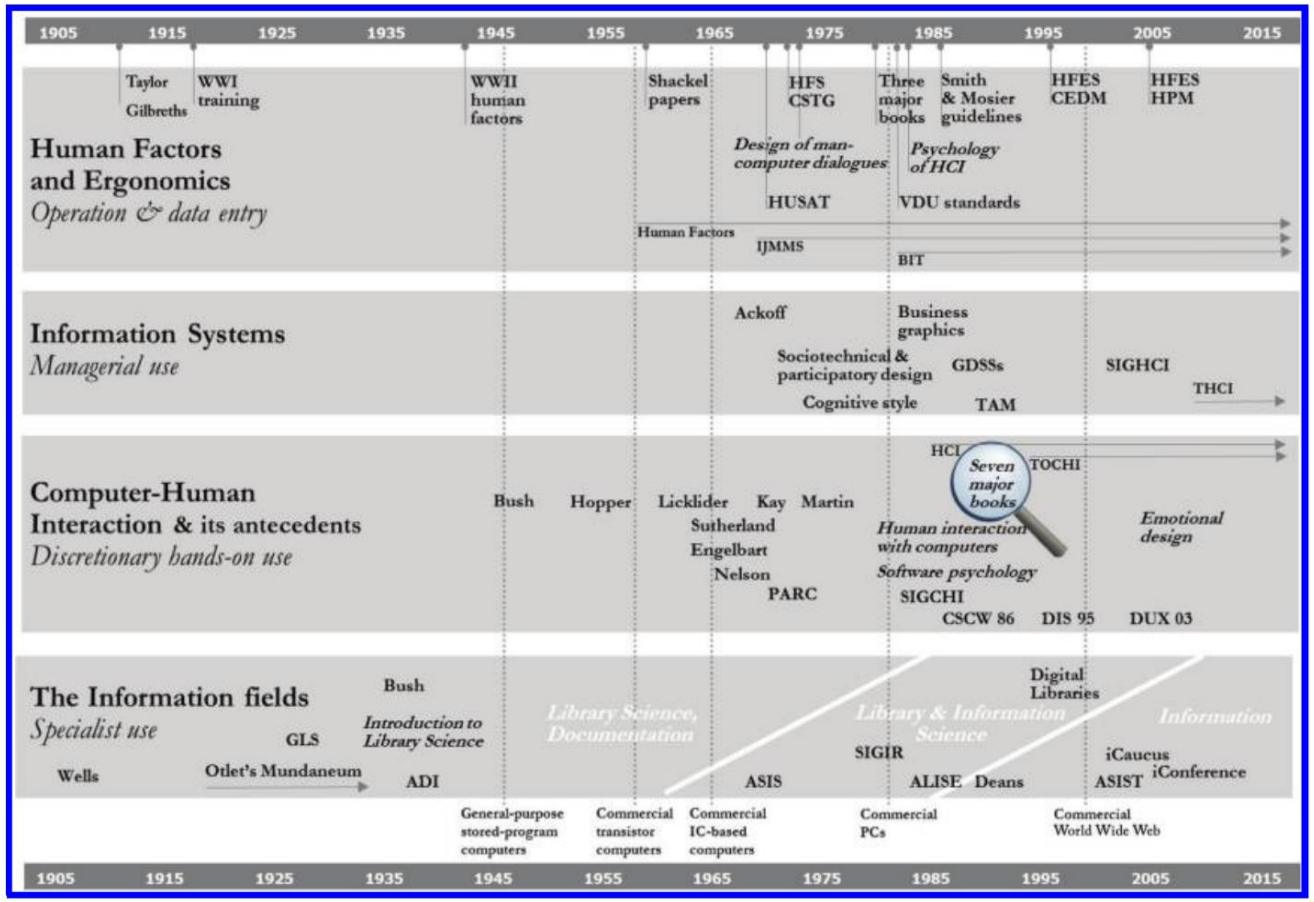
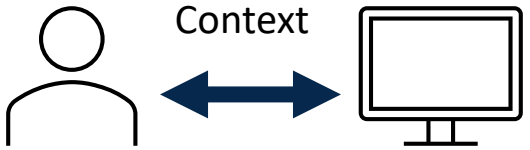


Figure 7.1: Fields with major HCI threads. Left edges of items align with the dates that articles or books were published, organizations or conference series initiated, and so on. Details are in the text.

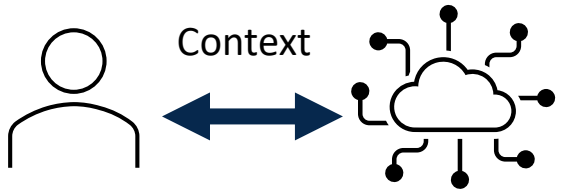
Grudin, J. (2022). *From tool to partner: The evolution of human-computer interaction*. Springer Nature.

Theories: Overview

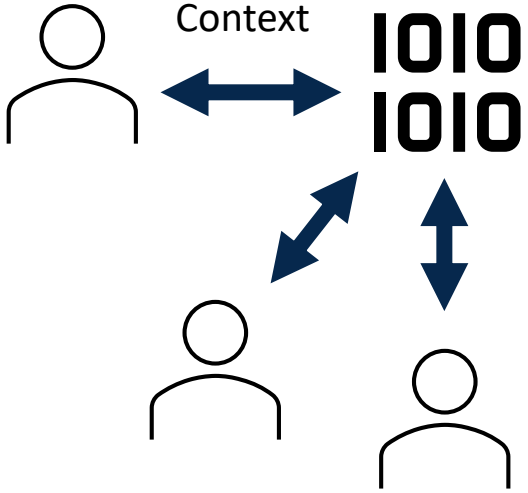
Task-based



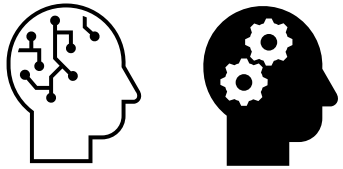
Ubiquitous Computing



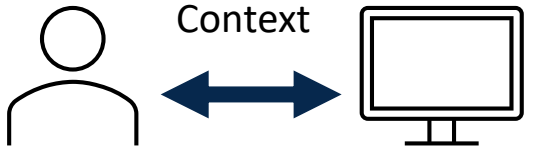
Awareness

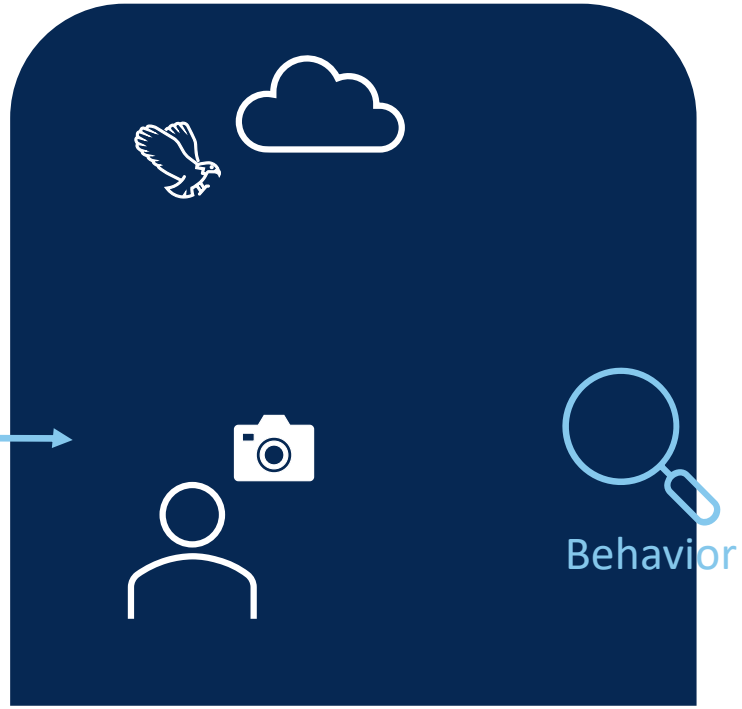


AI-specific



Theories: Task-based, Subjective factors





Situated Action Models

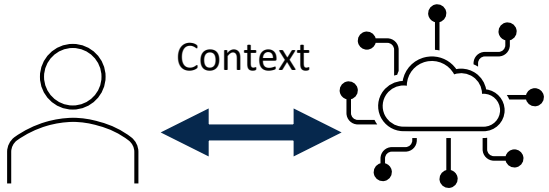
Activity Theory

Distributed Cognition

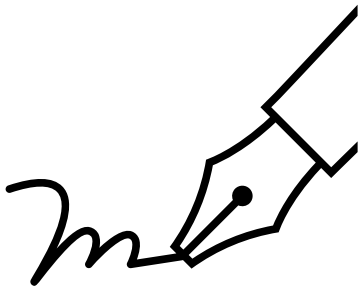
Evolving nature, e.g., shoemaker novice (Dourish, 2004)

- Nardi, B. A. (1996). Studying context: A comparison of activity theory, situated action models, and distributed cognition. Context and consciousness: Activity theory and human-computer interaction, 69102, 35-52.
- Dourish, P. (2004). What we talk about when we talk about context. Personal and Ubiquitous Computing, 8(1), 19-30. https://doi.org/10.1007/s00779-003-0253-8

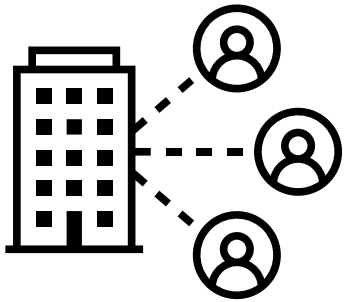
Theories: Ubiquitous Computing, Context



To develop novel uses, often focusing on implicit user input to minimize the intrusion of technology into everyday life. The objective of this application-centered research is to understand how everyday tasks can be better supported, and how they are altered by the introduction of ubiquitous technologies.

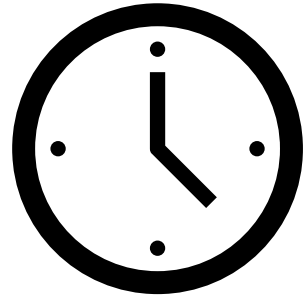


Natural interfaces



Context-aware applications

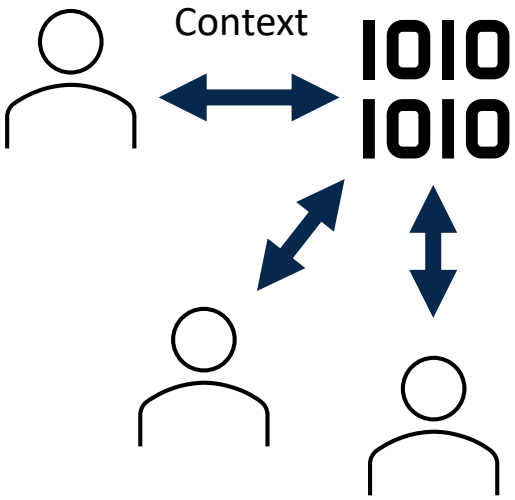
Automated capture and access



7*24 continuous interaction

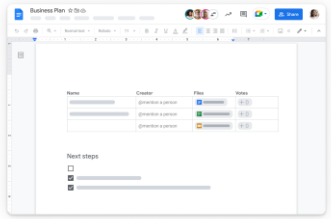
- Abowd, G. D., & Mynatt, E. D. (2000). Charting past, present, and future research in ubiquitous computing. ACM Transactions on Computer-Human Interaction (TOCHI), 7(1), 29-58.

Theories: Awareness, Groupware



Ethnographically-informed

- Coexistence awareness
  - Media spaces
  - Collaborative virtual environments
- Cooperation awareness
  - Shared workspaces
  - Group editors



Technology-oriented

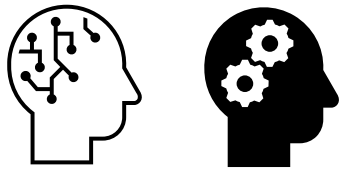
- Base technology
  - Awareness information environments
  - Sensing technology
  - Awareness information presentation
- Modeling awareness
  - Spatial model
    focus, nimbus, medium, aura
  - Future awareness model

A → B

Awareness: a **user**'s internal knowing and understanding of **a situation** including **other users** and the **environment** that is gained through subtle practices of **capturing and interpreting information**; and this awareness information partly exists in the **environment** and is partly provided by awareness **technology**.

- Gross, T. (2013). Supporting Effortless Coordination: 25 Years of Awareness Research. Computer Supported Cooperative Work (CSCW), 22(4-6), 425-474. https://doi.org/10.1007/s10606-013-9190-x

Theories: AI opportunities and challenges



Human-Centered AI **Opportunities**:

(i) automation and human agency,

(ii) system uncertainty and user confidence,

(iii) system's objective complexity and a user's perceived complexity

Challenges:

Unclear expectations of AI (existing and future),

Communication between user-centered and technology-driven approaches

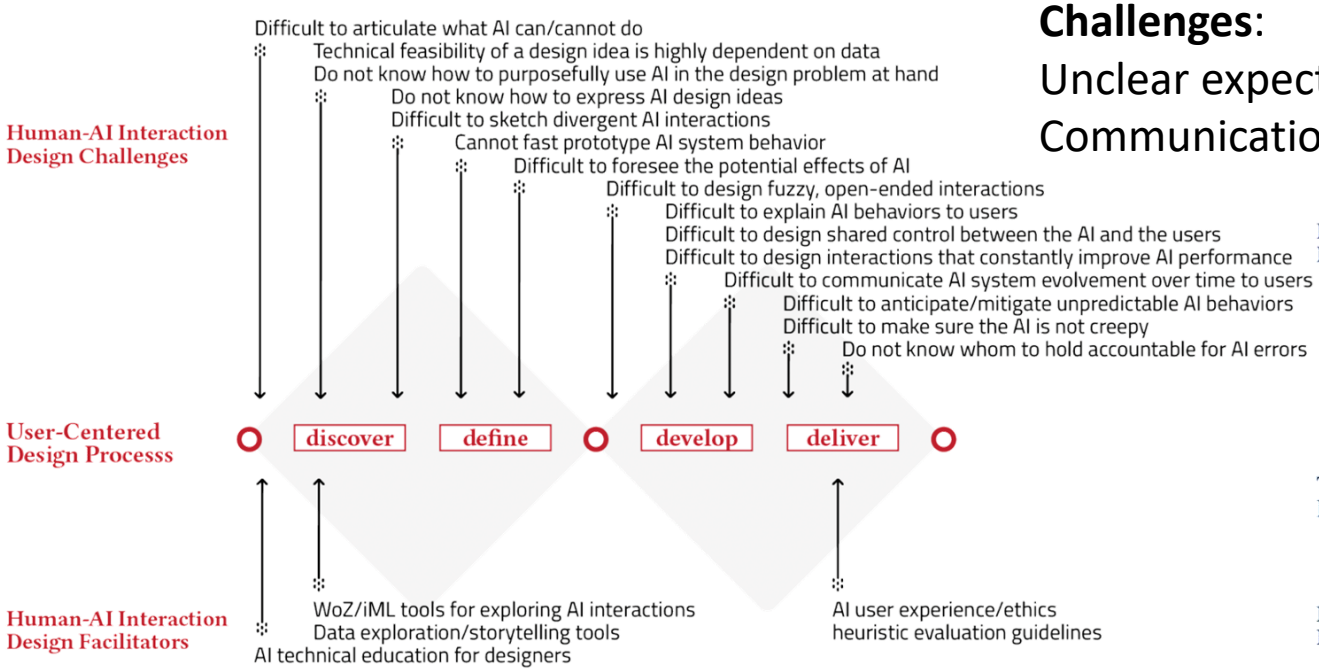


Figure 1: Mapping the human-AI interaction design challenges in the literature [58, 13, 26, 53] onto a user-centered design process (Double Diamond [10])

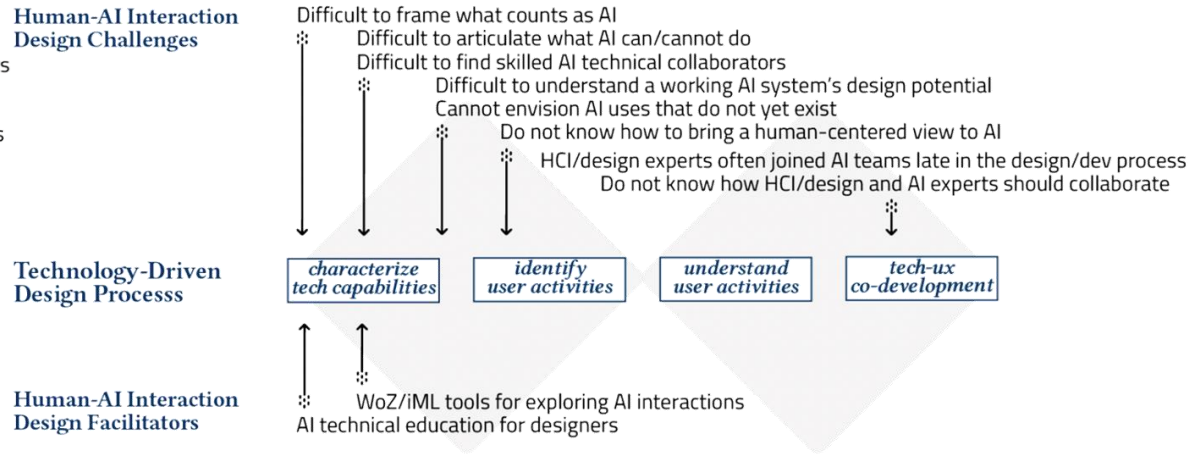


Figure 2: Mapping UX design challenges of AI in prior research on a technology-driven design innovation process [41, 5]

- Jiang, J., Karran, A. J., Coursaris, C. K., Léger, P. M., & Beringer, J. (2022). A situation awareness perspective on human-AI interaction: Tensions and opportunities. International Journal of Human–Computer Interaction, 1-18.
- Yang, Q., Steinfeld, A., Rosé, C., & Zimmerman, J. (2020, April). Re-examining whether, why, and how human-AI interaction is uniquely difficult to design. In Proceedings of the 2020 chi conference on human factors in computing systems(pp. 1-13).

Sep 9th, 2023