Introduction to Collaborative Interaction Mediated by Technology Design

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Introduction to Collaborative Interaction Mediated by Technology Design

SUMMARY

In response to the global challenges (e.g., pandemy, climate change etc.) where remote collaboration has become radically more important, the need for designing and developing technologies that efficiently support collaborative interaction has become an even higher priority. This lecture aims to introduce the terms collaboration and collaborative interaction, instances of mediating technologies in space and time dimensions in which a collaborative interaction takes place along with the opportunities and challenges offered in these types of interactions.

OVERARCHING LEARNING GOALS:

Students will be able to;

• identify different domains of human collaborative interaction.
• describe design principles of how human collaborative interaction is mediated by technology design.
• discuss opportunities and challenges of different types of mediating technologies for collaborative interaction.

UNIVERSITY OF GOTHENBURG

AARHUS UNIVERSITY

TU/e Technische Universiteit Eindhoven University of Technology

ÖZYEĞIN UNIVERSITY

Recommended readings

- Schmidt, K., & Bannon, L. (2013). Constructing CSCW: The first quarter century. Computer supported cooperative work (CSCW), 22, 345-372. https://doi.org/10.1007/s10606-013-9193-7

- Briggs, R. O. (2006). On theory-driven design and deployment of collaboration systems. International Journal of Human-Computer Studies, 64(7), 573-582. https://doi.org/10.1016/j.ijhcs.2006.02.003

Content / Outline

- Introduction to collaborative interaction

- A brief history of computer-supported cooperative work research field

- Domains of collaborative interaction in groupware

- Opportunities and challenges in technology mediated collaborative interaction

- Summary

COLLABORATIVE INTERACTION

➢ What is collaboration according to you?

➢ How is collaborative interaction different than collaboration?

➢ Why do you think collaborative interaction is (un)important?

COLLABORATIVE INTERACTION: A BRIEF HISTORY

WHAT IS COLLABORATION?

"The drive to collaborate significantly sets us apart from chimpanzees, our closest cousins in terms of DNA similarly, and this difference is already visible in young children." (Rekers, Haun, and Tomasello, 2011)

"Collaboration is one of the most important 21st century skills." (OECD, 2018)

Rekers, Y., Haun, D. B., & Tomasello, M. (2011). Children, but not chimpanzees, prefer to collaborate. *Current Biology*, *21*(20), 1756-1758. https://doi.org/10.1016/j.cub.2011.08.066

OECD. (2018). *Education 2030: The future of education and skills*.

COLLABORATIVE INTERACTION: A BRIEF HISTORY

WHY IS COLLABORATIVE INTERACTION IMPORTANT?

In a time of pandemic, climate crisis, remote collaboration, home schooling, home office, etc.

➔ Need for technologies that support collaborative interaction

➔ Need for technologies that train collaboration skills

COLLABORATIVE INTERACTION: A BRIEF HISTORY

A BRIEF HISTORY OF COMPUTER SUPPORTED COOPERATIVE WORK (CSCW)

- CSCW is an established research field since the first conference series in 1984 (Austin, Texas) and its European track ECSCW first in 1989 (London, UK).

- CSCW research is highly heterogeneous and does not address a specific family of technologies, whether existing or in the making; thus, whatever unity it has is not derived from specific technologies.

Schmidt, K., & Bannon, L. (2013). Constructing CSCW: The first quarter century. Computer supported cooperative work (CSCW), 22, 345-372. https://doi.org/10.1007/s10606-013-9193-7

COLLABORATIVE INTERACTION: DEFINITION

ELEMENTS OF COLLABORATIVE INTERACTION

Collaborative interaction is a **technologically mediated social interaction** between **multiple people** who **share a common goal**

→ **Social** (synchronous or asynchronous)

→ **Multiple people** (human)

→ Those people have a **shared goal**

→ **Technology plays mediating role** between multiple people

→ Intention of designers and/vs. users' appropriation

COLLABORATIVE INTERACTION: CURRENT INSTANCES

WHAT TYPE OF TECHNOLOGIES DO YOU USE FOR COLLABORATIVE INTERACTION?

COLLABORATIVE INTERACTION: CURRENT INSTANCES

WHAT TYPE OF TECHNOLOGIES DO YOU USE FOR COLLABORATIVE INTERACTION?

- Games
- Collaborative writing tools
- Project management tools
- Learning management tools
- Online whiteboard applications
- Hybrid meeting technologies
- Social media
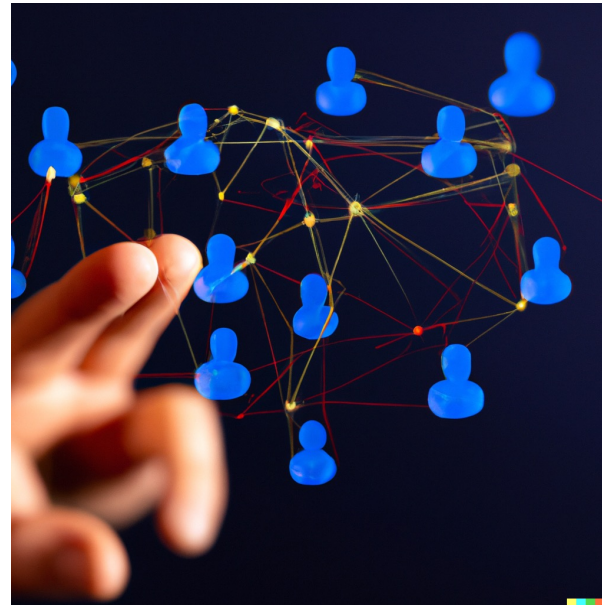- Drones
- Virtual environments
- etc., etc.

Image created by Dall-E in February 2023

COLLABORATIVE INTERACTION: CURRENT INSTANCES

MAINSTREAM APPLICATIONS / PRODUCTS

- Google Drive
- TikTok – new feature putting videos together
- Facebook – special interest groups
- Twitter – meet and work together, hashtags
- Reddit (community activities)
- Discord
- Spotify (build a playlist together)
- Snapchat
- PokemonGo (co-located or online)
- Notion
- Digital (smart, virtual, voice) assistants
- GPS – geocahching (playful way of sharing - https://www.geocaching.com/play)
- What else?

COLLABORATIVE INTERACTION: DIMENSIONS

DIMENSIONS OF COLLABORATIVE INTERACTION

- ➔ Temporality:
    - ➔ Synchronous Collaboration
    - ➔ Asynchronous Collaboration
- ➔ Spatiality:
    - ➔ Face to face Collaboration
    - ➔ Remote and Distributed Collaboration

COLLABORATIVE INTERACTION: DIMENSIONS
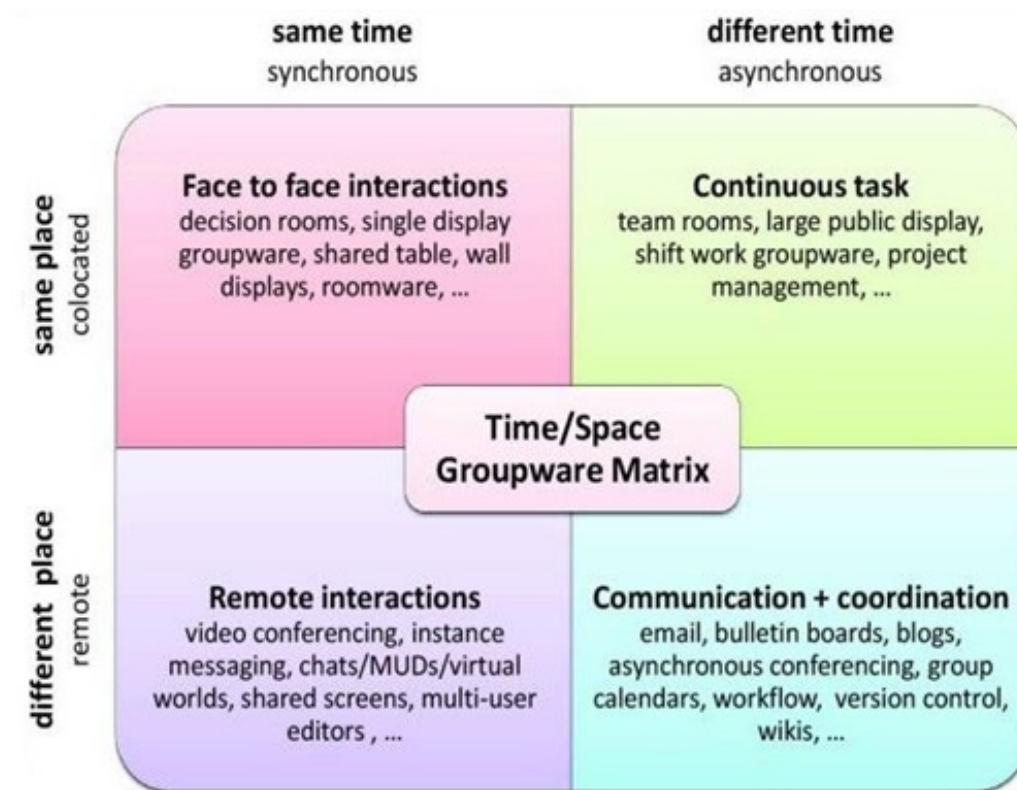
Johansen, R. 1991. Groupware: Future Directions and Wild Cards. In Journal of Organizational Computing, 1, 2, 219-227. DOI= http://dx.doi.org/10.1080/10919399109540160.

COLLABORATIVE INTERACTION: OPPORTUNITIES & CHALLENGES

OPPORTUNITIES OF TECHNOLOGY MEDIATED COLLABORATIVE INTERACTION

➔ Accessibility, convenience and efficiency; allows team members to collaborate from anywhere at any time and increased access to information and resources

➔ Rich media; allows team members share information in various formats e.g. images, videos, audio

➔ Scalability; allows team members to participate in large group sizes and diverse groups

➔ Documentation; allows team members to keep permanent or temporary records to document and track the progress of their collaboration process and output

COLLABORATIVE INTERACTION: OPPORTUNITIES & CHALLENGES

CHALLENGES OF TECHNOLOGY MEDIATED COLLABORATIVE INTERACTION

→ Personal interaction; limitations of remote collaboration in building connections

→ Communication breakdowns; flaws in reflecting ideas or opinions in asynchronous interaction

→ Challenges in representation and expression; pitfalls in new forms of identities and participation in group work (e.g. avatars, emotional expressions etc.)

→ Technical difficulties

COLLABORATIVE INTERACTION: DESIGN PRINCIPLES

DESIGN PRINCIPLES OF COLLABORATIVE INTERACTION

Technology design that mediate collaborative interaction seeks to support;

➔ Joint activity

➔ Awareness

➔ Interpersonal interaction

COLLABORATIVE INTERACTION: DESIGN PRINCIPLES: DESIGN PRINCIPLES

JOINT ACTIVITY

In a joint activity collaborators requires to;

➔ Enter into agreement that the participants intend to work together

➔ Be mutually predictable in their action

➔ Be mutually directable

➔ Maintain common ground

G. Klien, D. D. Woods, J. M. Bradshaw, R. R. Hoffman and P. J. Feltovich, "Ten challenges for making automation a "team player" in joint human-agent activity," in IEEE Intelligent Systems, vol. 19, no. 6, pp. 91-95, Nov.-Dec. 2004, doi: 10.1109/MIS.2004.74.

COLLABORATIVE INTERACTION: DESIGN PRINCIPLES

AWARENESS

Awareness in collaborative interaction entails;

➔ Group awareness

➔ Workspace awareness

➔ Contextual awareness

➔ Peripheral awareness

Liechti, O., & Sumi, Y. (2002). Editorial: Awareness and the WWW. International Journal of Human Computer Studies, 56(1), 1–5. doi:10.1006/ijhc.2001.0512

COLLABORATIVE INTERACTION: DESIGN PRINCIPLES

INTERPERSONAL INTERACTION

Verbal and nonverbal communication properties between collaborators

➔ Contingency

➔ Participation

➔ Synchronicity

➔ Proximity

➔ Interaction ease and coordination

➔ Mutuality

Burgoon, J. K., Bonito, J. A., Ramirez, A., Jr., Dunbar, N. E., Kam, K., & Fischer, J. (2002). Testing the interactivity principle: Effects of mediation, propinquity, and verbal and nonverbal modalities in interpersonal interaction. *Journal of Communication, 52*(3), 657–677. https://doi.org/10.1111/j.1460-2466.2002.tb02567.x

COLLABORATIVE INTERACTION: INSTANCES

INTERACTION TECHNIQUE AND APPLICATIONS - EXAMPLES

➔ The vast majority of games played all over the world are collective in nature, but despite this, most video games have traditionally been individual.

➔ Historically, this was due to e.g., high costs of technology, the isolated location of computers in homes, and the single-user nature of the personal computer.

➔ Later, we have witnessed a rapid change due to faster internet connections, cheaper technology and multiple platforms, and by now multiplayer has become an important part of computer games. (Zagal,2000)

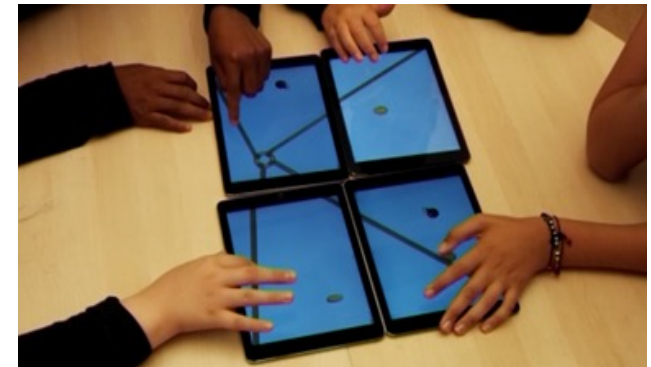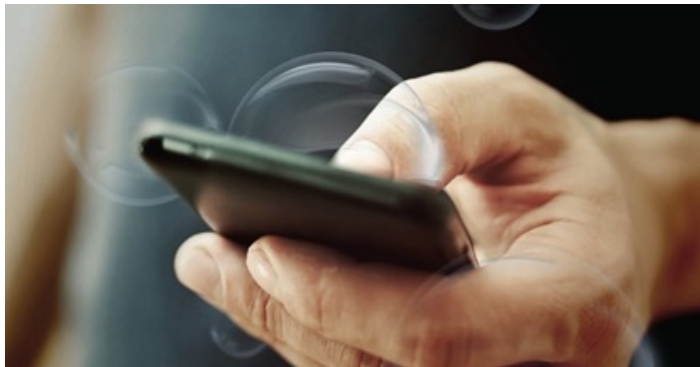# COLLABORATIVE INTERACTION: INSTANCES

FROM ALONE TOGETHER...

COLLABORATIVE INTERACTION: INSTANCES
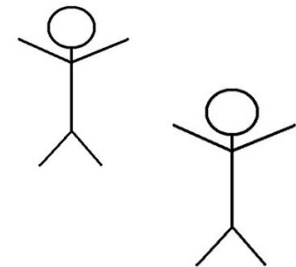
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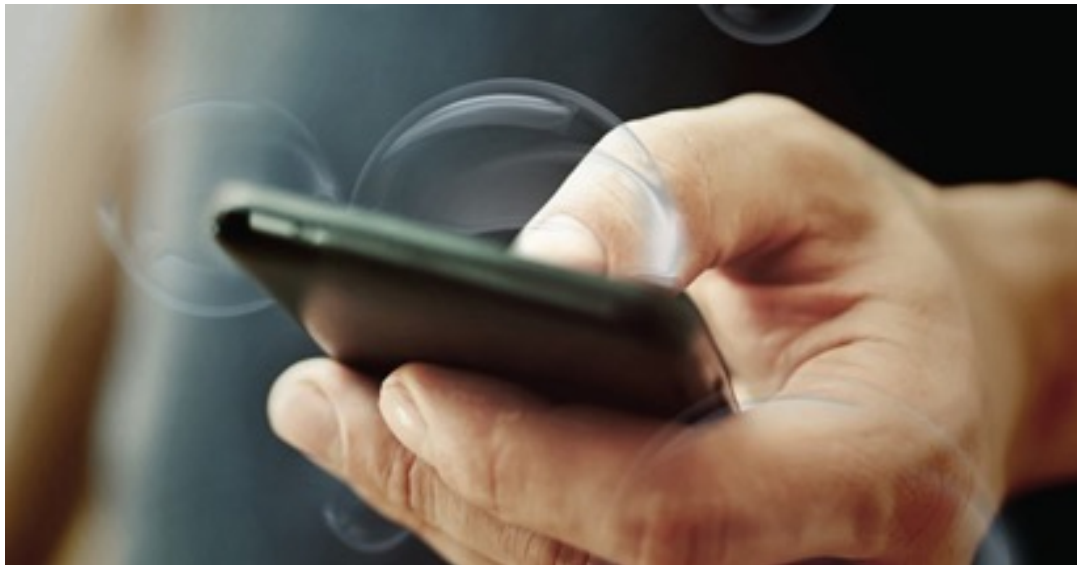
COLLABORATIVE INTERACTION: INSTANCES

FROM ALONE TOGETHER...

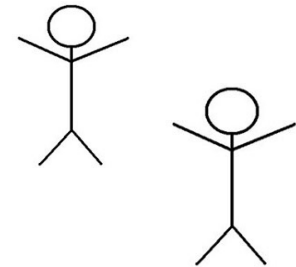# COLLABORATIVE INTERACTION: DIMENSIONS

WHO IS THE USER OF COLLABORATIVE TECHNOLOGY?

COLLABORATIVE INTERACTION: DIMENSIONS

WHO IS THE USER OF COLLABORATIVE TECHNOLOGY?

➔ Can involve a few individuals or a team, it can be within or between organizations, or it can involve an online community that spans the globe.

➔ What are the distinctions from dyads to globe-spanning communities?

COLLABORATIVE INTERACTION: FUTURE DIRECTIONS

FUTURE DIRECTIONS: OPPORTUNITIES AND CHALLENGES

→ Vulnerable populations (e.g. children, people with special needs, elderly)
Designing and evaluating technology with positive impact on vulnerable populations' collaborative interactions

→ Mediating higher level of collaboration
Design of mediating technology that allows reflective practices and communication while supporting collaboration.

→ Privacy by design
Balancing advantages of technologies that collect/store data while preserving control over the data of the collaborating actors (e.g., NFT).

→ Reality bites (e.g. VR)
Enabling communicative tools (e.g. emotions, gestures, facial expressions), maintaining togetherness and awareness in asynchronous, virtual environments.

Summary/take home

- Collaboration is one of the most important human skills and technology mediation for human collaboration is gaining importance.
- Collaborative interaction is a technologically mediated social interaction between multiple people who share a common goal.
- There are various dimensions (e.g. time, space, group size, etc.) to consider in design while finding ways to support collaborating people's joint activity, awareness towards self and each other and various communicative aspects of interpersonal interaction during collaborative activity.
- Future research consider broader spectrum of people's collaboration needs, increasing complexity of human interaction and reflective practices within collaboration, emerging ethical issues in new forms of interaction, and exchange of information in new forms of realities.

References

- Burgoon, J. K., Bonito, J. A., Ramirez, A., Jr., Dunbar, N. E., Kam, K., & Fischer, J. (2002). Testing the interactivity principle: Effects of mediation, propinquity, and verbal and nonverbal modalities in interpersonal interaction. *Journal of Communication, 52*(3), 657–677. https://doi.org/10.1111/j.1460-2466.2002.tb02567.x
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- G. Klien, D. D. Woods, J. M. Bradshaw, R. R. Hoffman and P. J. Feltovich, "Ten challenges for making automation a "team player" in joint human-agent activity," in IEEE Intelligent Systems, vol. 19, no. 6, pp. 91-95, Nov.-Dec. 2004, doi: 10.1109/MIS.2004.74.
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