

IN5500

# COMPUTER-SUPPORTED COOPERATIVE WORK: *REVIEW*



**Fabiano Pinatti**

Oslo, 23<sup>rd</sup> May 2024



# Course Objectives

- Overview of the field
- Conceptual understanding
- Research position development



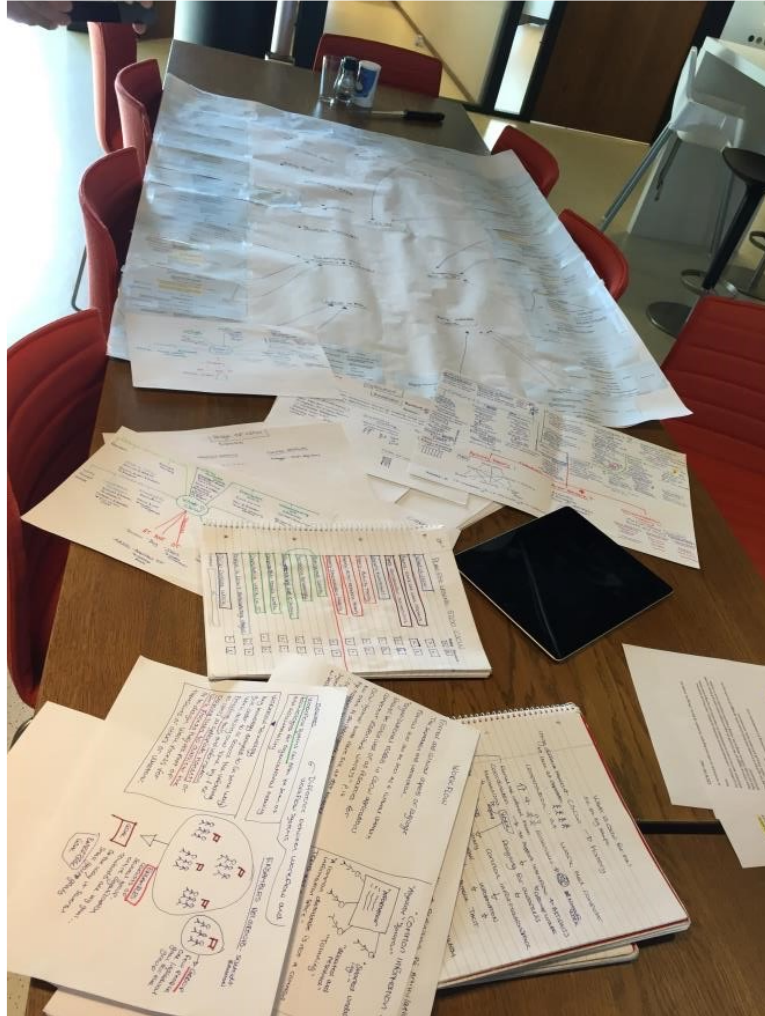
# Learning Outcomes



- Understanding of the field
- Critical thinking
- Reading and assessing research articles



# Oral Exam



# Qualification for the Exam

- Attendance (80% attendance  $\approx$  12 classes)
- Reading notes (80%  $\approx$  22 reading notes)
- 1 academic essay
- 1 report



# Exam Details

- **Date:** 30<sup>th</sup> of May 2024
- **Time:** 10:00 – 16:00
- **Location:** Prolog
- 25 min / student
- Timetable to be published by Monday, 27<sup>th</sup> of May, on the course page



# Grading



A	C	E
Read all mandatory articles and a few additional one	Read all mandatory articles	Read most of the mandatory papers
Understand the nuances of all articles read	Understand main points in the articles read	Basic understanding of some of the main points in the articles read
Provide own definition of CSCW, argue for it, and demonstrate application	Provide a known definition to CSCW, argue for it	Provide a known definition of CSCW
Give a coherent picture of the field	Reflect on the articles and make connections between some of them	No reflection on or connection between readings
Demonstrate elaborated understanding of concepts and theories of the field, being able to compare and contrast them	Basic understanding of concepts and theories, being able to compare them	Limited understanding of concepts and theories of the field
Connect the course with the Master Project and own practice		

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# Mandatory Readings

- Schmidt, K., & Bannon, L. J. (1992). Taking CSCW Seriously: Supporting Articulation Work. *Computer Supported Cooperative Work*, 1(1–2), 7–40.
- Bowers, J., Button, G., & Sharrock, W. (1995). Workflow from within and without: technology and cooperative work on the print industry shopfloor. In *ECSCW'95: Proceedings of the Fourth European Conference on Computer-Supported Cooperative Work* (pp. 51–66).
- Ciolfi, L., Lewkowicz, M., & Schmidt, K. (2023). Computer-supported cooperative work. In J. Vanderdonckt, P. Palanque, & M. Winckler (Eds.), *Handbook of Human-Computer Interaction* (pp. 1–20). Springer.
- Grudin, J. (1994). Computer-Supported Cooperative Work: History and Focus. *Computer*, (May), 19–26.

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# Highly Recommended Readings

- Bannon, L. J., & Schmidt, K. (1991). CSCW: Four Characters in Search of a Context. In J. Bowers & S. Benford (Eds.), *Studies in Computer Supported Cooperative Work: Theory, Practice and Design* (pp. 3–16). Amsterdam North-Holland.
- Fuks, H., Raposo, A., Gerosa, M. A., Pimental, M., & de Lucena, C. J. P. (2008). The 3C Collaboration Model. In N. Kock (Ed.), *Encyclopedia of E-Collaboration* (pp. 637–644). Hershey, PA; London: IGI Global.
- Ragsdale, W. A. (1981) *Cooperation to collaboration: A Survey of Selected Municipal Recreation and Community Education Joint Efforts Throughout the United States*, PhD Thesis, University of Oklahoma, USA.
- Richter, A., & Koch, M. (2018). Interviews with Volker Wulf and Myriam Lewkowicz on “The European Tradition of CSCW.” *Business and Information Systems Engineering*, 60(2), 175–179.
- Roschelle, J., & Teasley, S. D. (1995). The Construction of Shared Knowledge in Collaborative Problem Solving. *Computer Supported Collaborative Learning*, 69–97.



# Computer-Supported Cooperative Work?

- Practice
- Phenomenon
- Field of research



# Computer-Supported Cooperative Work?

*CSCW should be conceived of as an **endeavor** to **understand** the nature and **requirements** of **cooperative work** with the objective of **designing** computer based technologies for cooperative work arrangements*

(Schmidt & Bannon, 1992)



# Computer-Supported Cooperative Work?

*Computer Supported Cooperative Work (CSCW) is a generic term which combines the **understanding of the way people work in groups** with the **enabling technologies** of computer networking, and associated hardware, software, services and techniques.*

(Wilson, 1991)





T1: CSCW and Cooperative Work

# Cooperative Work?

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# Computer Supported?



# 3 Cs





# Cooperation

- Often used interchangeably with *coordination* and *collaboration* in the past
- Slight conceptual differences





# Cooperation vs. Collaboration

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*... cooperation, coordination, and collaboration are terms used many times interchangeably. Yet community educators [...] advocate a distinction between these terms using collaboration to imply more comprehensive long-term planning than either coordination or cooperation [...] Cooperation is considered the beginning point on the **continuum** followed by coordination and then collaboration as the final phase of the total process. (Ragsdale, 1981)*

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# Cooperation vs. Collaboration

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# Cooperation vs. Collaboration

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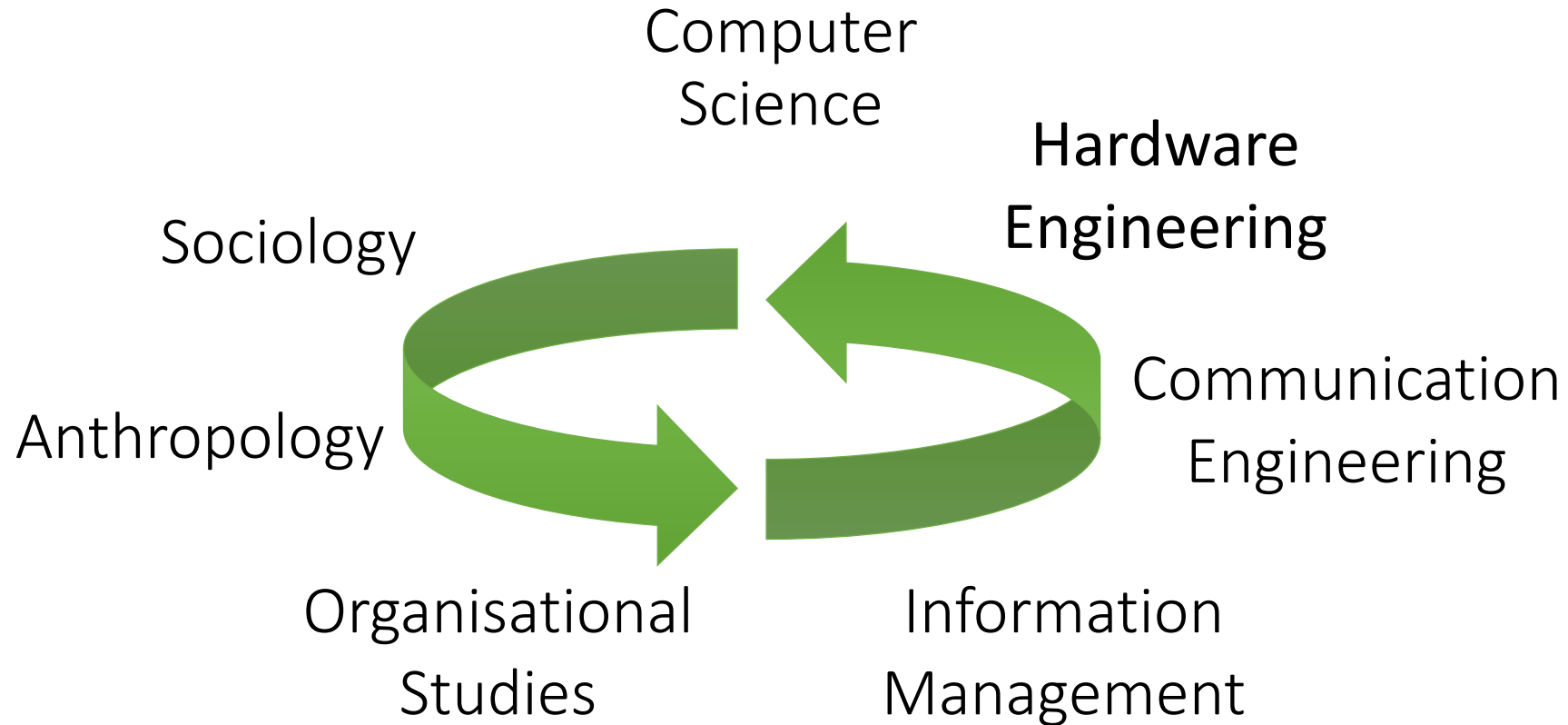


*Work having multifarious facets, it is no wonder that multiple, more or less synonymous terms abound: collective work, collaborative work, coordination, articulation work etc. We do not have to abstain from using any of these terms. They all have different connotations and designate different types or facets of cooperative work. The term 'collective work', for instance, designates cooperative work where the cooperating ensemble is sharing the responsibility for accomplishing the task. The emphasis of the concept is the fusion of the members of the ensemble into a whole, a 'collective'. That is, the term is conceptually close to 'group' and 'team' work. The term 'collaborative work', on the other hand, gives special stress to a particular 'collaborative' or complying spirit among the cooperators, as evident, for example, in the expression "collaborating" with an enemy. In sum, the term "cooperative work" is the general and neutral designation of multiple persons working together to produce a product or service. It does not imply specific forms of interaction or organization such as comradely feelings, equality of status, formation of a distinct group identity etc.*

*(Bannon & Schmidt, 1991)*



# Related Disciplines



# Mandatory Readings

- Schmidt, K. (2011). The Concept of “Work” in CSCW. *Computer Supported Cooperative Work*, 20(4–5), 341–401.
- Button, G., & Harper, R. (1995). The Relevance of “Work-practice” for Design. *Computer Supported Cooperative Work*, 4(4), 263–280.



# Highly Recommended Readings

- Schmidt, K. (2014). The concept of “practice”: What’s the point? In *COOP 2014: Proceedings of the 11th International Conference on the Design of Cooperative Systems* (pp. 427–444). Springer.
- Wulf, Volker, Rohde, Markus, Pipek, Volkmar and Stevens, Gunnar (2011) Engaging with practices. In *CSCW’11: Proceedings of the ACM 2011 Conference on Computer Supported Cooperative Work* (pp. 505-512). New York, New York, USA, ACM Press.



# The Concept of Work

- Work vs. leisure
- Primary vs. secondary cases of work
- Polymorphous concept



# The Concept of Practice

*Practices are understood as the smallest unit in the analysis of social phenomena. A practice is understood to be a mainly routinized pattern of human action which is not only encompassed by mental and physical forms of activity but that is also greatly imprinted by objects, especially by tools, media, and their usage. A practice is grounded in background knowledge that is both not entirely explicit and containing emotional as well as motivational elements. Practices, therefore, represent collective patterns of interaction that are reproduced in specific contexts. While the collective patterns of interaction are routinized, the concrete action is situated context-specifically and may deviate from them.*

*(Wulf et al. 2011)*





# The Concept of Practice

*In sum, when conceived of as a practice, work is not reduced to mere execution of some given task (i.e., what Aristotle and his modern followers might consider mindless), but is taken to also encompass not only handling variations and contingencies but also what is done to envision outcome; devise methods and plan for probable contingencies; identify tasks to be performed; prepare operations; allocate or assume responsibility, as well as activities of coordinating, aligning, evaluating, instructing, learning, etc. The term 'practice' is in other words used to frame contingent activities as committed to criteria for correct conduct in the form for norms, rules, procedures, plans, etc. The noun 'practice' thus means **normatively regulated contingent activity**.*

(Schmidt, 2014)



# The Relevance of Understanding Practices

- Design for appropriation
- Account of social-technical issues



# Mandatory Readings

- Malone, T. W., & Crowston, K. (1990). What is coordination theory and how can it help design cooperative work systems? In *CSCW'90: Proceedings of the 1990 ACM Conference on Computer-Supported Cooperative Work* (pp. 357–370).
- Schmidt, K., & Simone, C. (1996). Coordination mechanisms: Towards a conceptual foundation of CSCW systems design. *Computer Supported Cooperative Work (CSCW)*, 5(2–3), 155–200.



# Coordination

- Broader vs. narrower definitions
- 'Working together harmoniously' vs. 'managing interdependencies'
- Different types of dependencies
  - *Generic*: Pre-requisite, shared resources, simultaneity
  - *Domain specific*: Manufacturability, customer relationships
- Invisible until something goes bad



# Coordination Mechanisms

- Combination of information artefacts and coordinative protocols
- Focus on mitigating **articulation work**



# Articulation Work

- Work to get work done
- Refers to the engagement of semi-autonomous actors in continuous and situated renegotiation processes of different actions
- Emerges from the need to regulate the **distribution of tasks** (Boden et al. 2008)
  - who does what, when, where, how, with which quality, until when, etc.
- Formalization is a strategy to reduce the need for constant articulation work, but it can never be fully avoided



# Mandatory Readings

- Heath, C., & Luff, P. (1991). Collaborative Activity and Technological Design: Task Coordination in London Underground Control Rooms. In *ECSCW '91: Proceedings of the Second European Conference on Computer-Supported Cooperative Work* (pp. 65–80).
- Schmidt, K. (2002). The Problem with 'Awareness' Introductory. *Computer Supported Cooperative Work*, 11, 285–298.

# The Notion of Awareness

- Conceptual muddle?
- Multifaceted and nuanced
- ‘Taking the heed’ vs. ‘drawing attention to’
- Importance for articulation work



# Mandatory Readings

- Luff, P., & Heath, C. (1998). Mobility in Collaboration. In *CSCW'98: Proceedings of the 1998 ACM Conference on Computer Supported Cooperative Work* (pp. 305 – 314). ACM Press.
- de Carvalho, A. F. P. (2014). Collaborative Work and Its Relationship to Technologically-Mediated Nomadicity. In *COOP'14: Proceedings of the 11th International Conference on the Design of Cooperative Systems* (pp. 209–224). Springer International Publishing.



# Mobility vs Nomadicity

- Physical movement from A to B
- Micro vs. local/remote mobility
- Mobility of the workplace
- Ecology of practices

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# Mandatory Readings

- Grinter, R. E. (2003). Recomposition: Coordinating a web of software dependencies. *Computer Supported Cooperative Work (CSCW)*, 12(3), 297–327.
- Boden, A., Rosswog, F., Stevens, G., & Wulf, V. (2014). Articulation spaces: Bridging the gap between formal and informal coordination. In *CSCW'14: Proceedings of the 2014 ACM Conference on Computer Supported Cooperative Work* (pp. 1120–1130).

# Social Aspects of Cooperative IT Work



- Recomposition as coordination instrument
- Issues of communication

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# Mandatory Readings

- Ackerman, M. S., Dachtera, J., Pipek, V., & Wulf, V. (2013). Sharing knowledge and expertise: The CSCW view of knowledge management. *Computer Supported Cooperative Work (CSCW)*, 22(4–6), 531–573.
- de Carvalho, A. F. P., Hoffmann, S., Abele, D., Schweitzer, M., Tolmie, P., Randall, D., & Wulf, V. (2018). Of Embodied Action and Sensors: Knowledge and Expertise Sharing in Industrial Set-up. *Computer Supported Cooperative Work (CSCW)*, 27(3–6), 1–42.



# CSCW View of Knowledge Management

- 3 generations
  - Repository model
  - Expertise sharing
  - Cyber-physical systems
- Relevant CSCW constructs
  - Knowledge artefacts, boundary objects, common information spaces, assemblies, coordinative

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# Mandatory Readings

- Grinter, R. E., Edwards, W. K., Newman, M. W., & Ducheneaut, N. (2005). The Work to Make a Home Network Work. In *ECSCW 2005: Proceedings of the Ninth European Conference on Computer-Supported Cooperative Work* (pp. 469–488). Netherlands: Springer.
- Schorch, M., Wan, L., Randall, D. W., & Wulf, V. (2016). Designing for Those who are Overlooked - Insider Perspectives on Care Practices and Cooperative Work of Elderly Informal Caregivers. In *CSCW'16: Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing* (pp. 785–797). New York: ACM Press-



# Experience Home as Places

- Home as a (work)place
- Collaborative aspects of care work
- Impacts of technology on how home is experience
- Issues of articulation work and coordination





# Mandatory Readings

- Borchorst, N. G., McPhail, B., Smith, K. L., Ferenbok, J., & Clement, A. (2012). Bridging identity gaps - Supporting identity performance in citizen service encounters. *Computer Supported Cooperative Work*, 21(6), 555–590.
- Snellen, I., & Wyatt, S. (1992). Blurred partitions but thicker walls - Involving citizens in computer supported cooperative work for public administration. *Computer Supported Cooperative Work (CSCW)*, 1(4), 277–293.

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# Identity as a Collaborative Construct

- Cooperation with officers in public organisations
- Issues of bureaucratisation and impacts on articulation work and coordination
- Differences between public administration and other organisations
- Citizens as co-producers

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# Mandatory Readings

- Nardi, B., & Harris, J. (2006). Strangers and friends: Collaborative play in world of warcraft. In *CSCW'06: Proceedings of the ACM Conference on Computer Supported Cooperative Work* (pp. 149–158).
- Baumer, E. P. S., Sueyoshi, M., & Tomlinson, B. (2011). Bloggers and readers blogging together: Collaborative co-creation of political blogs. *Computer Supported Cooperative Work*, 20(1–2), 1–36.





# Particularities of Online Collaboration

- Collaboration in online games and social media → Work?
- Issues of identity
- Different affordances in online collaboration
- Notion of participation and co-creation

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# Mandatory Readings

- Wolf, C. T., & Blomberg, J. L. (2019). Evaluating the promise of human-algorithm collaborations in everyday work practices. *Proceedings of the ACM on Human-Computer Interaction*, 3(CSCW), 1–23.
- Mutlu, B., & Forlizzi, J. (2008). Robots in organizations: The role of workflow, social, and environmental factors in human-robot interaction. In *HRI 2008: Proceedings of the 3rd ACM/IEEE International Conference on Human-Robot Interaction: Living with Robots* (pp. 287–294).

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# Robots and Autonomous Systems

- Differentiation between robots and autonomous systems
- Collaboration as convivial experience
- Robot as colleague?

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# Mandatory Readings

- Bratteteig, T., & Wagner, I. (2016). Unpacking the Notion of Participation in Participatory Design. *Computer Supported Cooperative Work (CSCW)*, 25(6), 425–475.
- Dourish, P. (2006). Implications for design. In *CHI'06: Proceedings of the 2006 SIGCHI Conference on Human Factors in Computing Systems* (pp. 541–550).



# Methodological Implications for CSCW



- Participation in PD
  - Voice, decision making, participatory result
- Seeing-moving-seeing
- Use of ethnographic approaches
- Limiting character of implications for design

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# Mandatory Readings

- Lee, C. P., & Schmidt, K. (2018). A Bridge Too Far?: Critical Remarks on the Concept of “Infrastructure” in Computer-Supported Cooperative Work and Information Systems. In V. Wulf, V. Pipek, M. Rohde, G. Stevens, & D. Randall (Eds.), *Socio-Informatics: A Practice-based Perspective on the Design and Use of IT Artifacts* (pp. 177–218). Oxford, UK: Oxford University Press.
- Bødker, S., Korsgaard, H., & Saad-Sulonen, J. (2016). “A Farmer, a Place and at Least 20 Members”: The Development of Artifact Ecologies in Volunteer-Based Communities. In *CSCW '16: Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing* (pp. 1142–1156). New York, NY, USA: Association for Computing Machinery.



# CSCW Beyond Cooperative Work

- Infrastructure as relational and processual
- Critique to how CSCW was handling infrastructure
- Categorisation of CSCW in CSCW-in-use and spoused CSCW
- Ecologies as assemblages of elements that might be instantiated in infrastructure

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# QUESTIONS?

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