ACHI-CSCW: Exploring Computer-Human Interactions in New Contexts of Computer Supported Cooperative Work

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Diana Saplacan
Department of Informatics, Digitalization, Research Group of Design of Information Systems
University of Oslo
Oslo, Norway
e-mail: diana.saplacan@ifi.uio.no

Klaudia Carçani
Faculty of Computer Sciences
Østfold University College
Halden, Norway
e-mail: klaudia.carcani@hiof.no

***Abstract*—Computer Supported Cooperative Work (CSCW) is a field studying how cooperative work in a cooperative ensemble is supported by computers and technologies and how these contribute or hamper the cooperation between people. This editorial paper covers the ACHI-CSCW special track, giving an overview of the special track's accepted contributions. The paper presents the track, which was structured in three sessions, covering classic CSCW, CSCW in education, and challenging classic CSCW. In total, nine papers were accepted. Finally, a summary of each of the papers and final conclusionssome suggestions for future directions is presented in this editorial paper.**

Keywords-computer-human interactiont; computer-supported cooperative work (CSCW); classic CSCW; CSCW in education; challenging CSCW.

I. INTRODUCTION

This special track aimed to invite researchers to reflect on the new challenges in computer-human interactions in the context of computer-supported cooperative work.

The immersion of technology in the last decades in people's lives and workplaces has changed the dynamics of how we live, how we interact, how we work, and how we cooperate. New ways of interacting, cooperating, and working have emerged, such as customer services have changed radically lately, while adopting an extensive use of chatbots, or robots intended to do the work previously done by humans. However, the previous types of human work have not vanished but changed into facilitation, maintenance, or supportive work for the technology. Moreover, the changes in the society at large, the empowerment of marginalized groups has been calling for new ways of cooperation, expanding the cooperative space, and the development of new tools to support this cooperation in a way that enhances new relationships, responsibilities, tasks, and the division of labor between the actors.

We invited the contributors to use Computer Supported Cooperative Work topics and concepts with a human-computer interaction perspective.

II. SUBMISSIONS TO EXPLORING COMPUTER-HUMAN INTERACTIONS IN NEW CONTEXTS OF COMPUTER SUPPORTED COOPERATIVE WORK

In total, nine papers were accepted to ACHI-CSCW Track, which we then organized these in three sessions with a specific focus.

The first session covered CSCW Classic papers. Four papers were part of this session. They have contributed to new insights into existing concepts and practices in different CSCW settings.

- Paper 1: "*Closing the loopholes: categorizing clients to fit the bureaucratic welfare system.*"
- Paper 2: "*BEACON: A CSCW Tool for Enhancing Co-Located Meetings Through Temporal and Activity Awareness*"
- Paper 3: "*Designing Personal Health Records for Cognitive Rehabilitation*"
- Paper 4: "*Exploring engagement in distributed meeting during CV-19 lockdown.*"

The second session covered CSCW studies in the domain of education. Three papers were part of this session:

- Paper 5: "*A Digital TABLETOP Tool for Teacher-Student Supervision to Support Student Learning*"
- Paper 6: "*A simple system for complicated cases? Using service design methods to visualize case handling practice*"

- Paper 7: "*Cross-Use of Digital Learning Environments in Higher Education: A Conceptual Analysis Grounded in Common Information Spaces*"

Finally, the last session of this track covered papers challenging the classic CSCW research domain. Two contributions were submitted here. These are:

- Paper 8: "*Assembling Participation: Positioning CSCW Insights in Designing Maritime Technology*"
- Paper 9: "*Smart Home Techniques for Young People with Functional Disabilities*"

A summary of each of the sessions and their corresponding papers is given in the next section.

III. Summary of Contributions

A. Summary of CSCW classic session

The first paper (Paper 1) [1] is a study on the Norwegian Labour and Welfare Administration (NAV). The paper categorizes clients of NAV. It also analyzed the distribution of work between NAV supervisors, front-line workers, and central unit case-workers. Also, the paper points out that specific knowledge is needed to assess individual cases. However, with digitalization and automation of work, this kind of knowledge cannot always be captured by digitalized and automated systems. The paper concludes that digitalization, automation, and self-services of such systems may be difficult since the system may not capture specific knowledge about laws and rules associated with individual cases. Therefore, a digitalized and automated assessment of individual cases may suffer from discriminating decisions, i.e., the cases might not be assessed correctly, and therefore, the individual will not get the welfare benefits he is otherwise entitled to get.

The next paper (Paper 2) [2] considers one of the main concepts of cooperative work, awareness. They explore awareness in the context of "meetings" meant to support articulation work and division of labor between actors that are involved in cooperative work. Meetings due to the proximity of participants have not taken precedence in CSCW research. However, awareness in meetings can influence the meeting effectiveness and consequently influence further the discussion on the division of labor in cooperative work settings. Studying temporal and activity awareness in meetings, the authors have designed BEACON. BEACON is compounded by two parts: a) a tangible artifact that supports temporal awareness during the meeting b) a web-based application that supports activity awareness focused on the structure of the meeting and each element in the agenda.

The third paper (Paper 3) [3] discusses Personal Health Records (PHR), a concept widely used in healthcare and discussed in the CSCW journal as well as a special issue. The authors describe a set of implications for the design for PHRs in rehabilitation by analyzing a specific case of rehabilitation called cognitive rehabilitation. The authors also discuss the conceptualization of PHRs in CSCW as Common Information Spaces and Hybrid Information Spaces [4]. They conclude that in the case of cognitive rehabilitation, PHRs should also be conceptualized as Coordination Mechanisms [5], which will promote patients' involvement in their care.

The next study (Paper 4) [6] investigates the meeting as a space where Fahad and Carcani have also explored articulation work. They had studied the engagement of people in distributed cooperative meetings when physical meetings were not an option – the lockdown due to COVID 19. The authors have initially presented a theoretical model for studying engagement in meetings considering two dimensions: the participants' dimension and the technology dimension. The authors highlight a set of elements that influence engagement in distributed cooperative meetings and suggest some implications for design that can be taken into consideration by remote meeting platforms to enhance engagement of people in meetings in cooperative work settings.

B. Summary of CSCW and education session

The fifth paper (Paper 5) [7] is short. In this paper, the authors focus on a very specific part of education, the supervision sessions. Supervision sessions are meant to help the students to advance in their studies. The authors explore the idea of enhancing cooperation and cooperative work in supervision sessions to increase learning outcomes. They propose a tabletop design solution that can facilitate cooperation between students and teachers during supervision.

The next paper (Paper 6) [8] presents an ethnographic study from the Norwegian Agency for Quality Assurance in Education (NOKUT) in Norway. The agency works with recognizing foreign education. The study uses service design methods to explore, analyze, communicate, and visualize different touchpoints of a digital case handling practice. The paper shows a variation in how complex the cases are and the work they require to be handled. Finally, the paper discusses how different cases with different levels of complexity may benefit from digital system support and the case handling process.

The last paper from this session (Paper 7) [9] presents the cross-use of different Digital Learning Environments (DLE) in a Higher Education (HE) organizational entity. The paper suggests that DLEs are often analyzed from an educational perspective and less from a cooperative work perspective. Specifically, this paper aims to analyze DLEs and their use in a HE organizational entity through the lens of Common Information Spaces (CIS), a concept grounded in Computer Supported Cooperative Work (CSCW) literature. Moreover, the paper uses the seven CIS parameters from Bossen [9] to analyze DLEs as CIS. The author argues that a teaching/learning context "can be viewed as a co-dependent cooperative work arrangement, where the exchange of

information and knowledge is performed through- and with the help of DLEs" [9]. Moreover, the paper argues that DLEs are part of a complex cooperative ensemble and should be regarded as hybrid information spaces. The paper also points out that CSCW literature focuses on individual systems regarded as CIS, whereas this paper shows that DLEs are part of complex information spaces, where the CIS are formed through clusters of DLEs, rather than only individual CIS.

C. Summary of Challenging classic CSCW session

The last session contained two papers.

The first paper (Paper 8) [10] in this session addresses a long-term multiple-site ethnographic study where the author has study the design of remote control systems for maritime operation technologies. The paper is a reflective paper analyzing the relationships amongst different stakeholders and how their interests may be alike or different, compete, or balance. The author argues that CSCW researchers should practice reflexivity to reduce the gap between CSCW research practices and engineering practices. Finally, the author argues that in this way, the researcher and "the researched" will establish a better connection, and therefore it will contribute to better communication amongst different stakeholders, and thus, to better-designed systems.

The last paper (Paper 9) [11] presents ongoing experiments and techniques for Smart Homes, where the results are targeted towards young individuals with functional disabilities. Along with the United Nation's Agenda 2030, the paper argues that no one should be left behind, and therefore improving environments and services for vulnerable people should be seen as a clear prioritization. Specifically, the paper presents several techniques supporting vulnerable people, such as Smartphone apps, Kinect technologies, NeuroSky BrainWave, web-based interfaces, home devices, and simulated devices. Although the paper does not touch upon CSCW theories and concepts, it challenges the CSCW communities to think about how universal design, inclusive design, or design for vulnerable people can be discussed in CSCW.

IV. Conclusions

We can conclude that ACHI-CSCW special track has covered a range of topics: from classic CSCW to CSCW in education and challenging classic CSCW. Specifically, this special track has brought together CSCW researchers from different domains and focused on different theories and concepts central in CSCW such as CIS, awareness, coordination mechanisms and cooperative work practice, and the importance of reflexivity in CSCW.

The following research questions can guide suggestions for future work on ACHI-CSCW:

- How are classic or traditional concepts and theories used in CSCW challenged by the automation and digitalization of products and services used in the public or private sector?
- How can we re-purpose classic CSCW concepts and theories across disciplines?
- What other CSCW concepts and theories can be applied in education?
- What can the role of universal design be in CSCW, and how does it challenge classic CSCW?

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