

# *ECCE 2023 Workshop*

## *19 September 2023, Swansea, Wales*

### **Analysing the quality of collaboration: cognitive ergonomics meets data analytics**

#### **Important dates**

Position papers deadline: May 15, 2023, 18:00 (CET)

Notification: June 15, 2023

Workshop date: September 19, 2023

This full-day workshop welcomes submissions of position papers (2-4 pages maximum, one column, following the general ECCE ACM conference format). The workshop will be held as part of ECCE 23 conference (September 19-22 September, Swansea, Wales). It aims to capitalise on the links between research in cognitive ergonomics on the quality of collaboration and research in the domains of analytics and data science applied to collaborative situations. It will be organized as an interactive work group event, including short talks and group discussions.

#### **Goal and topics**

This workshop aims to study theories, models and analysis techniques that enable us to understand and assess the quality of collaborative activity in task-oriented interactions. The term ‘quality’ can be understood in descriptive terms (identifying and discriminating the intrinsic properties of collaboration) and/or in a normative sense (identifying what makes ‘good’ or less good collaboration, considered *sui generis*). These visions of quality can be complementary. Appraising the quality of collaboration requires deep models of the processes of collaboration, articulated with an assessment of the degree of achievement of collaboration goals in specific situations, and an understanding of productive and creative potentialities of dialogue. Collaborative activity is more and more often supported by digital artefacts, in all kinds of situations (remote or face to face, synchronous or not). It is therefore important to also take into account the role of the artefacts on the collaboration, how they may add constraints or ease a task, how their introduction transforms an activity, and how these technologies could be conceived to *support cooperative work arrangements* [1].

Research originating across a broad variety of disciplines in social, cognitive and computational sciences can contribute to these theoretical and methodological aims, within the perspective of making constructive interventions in concrete collaborative work situations. Application domains may range from various workplace and educational situations involving varied tasks (collaborative design, learning, decision-making, teaming, ...).

There are several reasons why the study of the quality of collaboration is important:

- Establishing links between the quality of collaboration and the quality of its outcomes (quality of solution, learning effects, quality of products, adequacy with respect to design constraints, creativity and innovation of products, ...);
- Establishing links between characteristics of artefacts that mediate collective action and the quality of collaboration e.g. [2, 3];

- Devising methods for training groups, in the workplace, in educational institutions, for more effective collaboration;
- Enabling participants in group work and learning to become reflexively aware of the nature and quality of their participation and collaboration.

One of the first conceptual and methodological frameworks for assessing the quality of collaboration (“QC”) was developed in Computer-Supported Collaborative Learning research [4], which involved coding collaborative problem-solving interactions along multiple dimensions. It was shown that teaching students these dimensions produced significantly higher learning effects. On the basis of theoretical arguments [4, 5] five aspects (communication, joint information processing, coordination, reciprocal interaction, individual task orientation) were considered as central for successful collaboration under the conditions of video-mediated communication and complementary expertise.

These initial models were adapted and extended in the domain of collaborative design [6, 7], for example, in order to address the question of intercultural differences [8], and to take into account the roles of values (such as equity and mutual respect) in codesign. This approach is based on strong theories and models of collaborative processes (e.g. [9]) allowing fine-grained qualitative analysis. However, such approaches are time consuming and lack effective procedures for dealing with large quantities of data, from the perspectives of multimodality – integrating the role of non verbal aspects in collaboration- and behavioural science. A useful and important research approach would therefore be to extend the QC approach with reference to multimodal data analytics, applied to collaborative situations.

With respect to data analytics research, there is a need to interpret behavioural regularities, with the aid of theories and models of collaboration [10, 11, 12]. Recent research on learning analytics does in fact make certain links between “e-data” (e.g., from group artefacts, and speech logs) and specific higher-order collaboration constructs such as symmetry of action and transactivity (e.g. [12]); but these constructs, as well as initial data analysis, would benefit from being better situated within and guided by more general theories of collaboration, dialogue and cognition. Theories and models of collaboration would also benefit from integrating data analytics, in order to account for the intertwined nature of multiple dimensions of collaboration (cognitive, behavioural, affective, regulative, etc.), which is difficult to model using traditional statistical approaches.

The principal aim of this workshop is therefore to deepen the intellectual encounter between cognitive ergonomics research and data analytics research, on the issue of conceptualising and analysing the quality of collaboration. Such a two-way interaction would be mutually beneficial, enabling theories to be further tested, possibly falsified and improved in a number of different ways.

Topics could include (non-exhaustive list) the following:

- Models and dimensions of collaboration and their relationship with the design of collaborative systems
- Collaboration analytics
- Quality of collaboration and performance
- Multimodal collaboration
- Dynamics and temporality of collaboration
- Empirical and automatised assessment of collaboration quality
- Specific empirical studies, across different domains (Collaborative design, collaborative learning, collaborative problem solving, human-agent collaboration, technology-mediated collaboration)
- Specific processes and dimensions of collaboration, e.g. emotion regulation, conflict resolution and argument, knowledge co-construction processes

## REFERENCES

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## Event format

The workshop will take place on September the 19<sup>th</sup>, at the beginning of ECCE 2023 (19-22 sept 2023) in Swansea, Wales, UK.

The number of participants will be limited so as to ensure that genuine discussion can take place.

The workshop will be organised around small group discussions and plenary reporting, on topics that have emerged from the set of accepted position papers.

In the morning, after the workshop organisers' introduction, there will be short presentations (maximum 10 mins) of each accepted position paper, organised in thematic groups, with brief clarification questions.

In the afternoon, three or four subgroups of discussion will be organised to debate on specific emerging themes. The organisers will ensure appropriate disciplinary balance within groups. Following the discussions, one participant of each group will present to the whole workshop the key issues discussed and the group's conclusions. The workshop will end with a plenary discussion.

## Submission requirements

The participants will be selected on the basis of **position papers** (2-4 pages, one column, following the general ECCE ACM conference format, <https://digitaleconomy.wales/ecce2023/submission-information/>). Position papers should address key issues and challenges related to the workshop themes.

Papers should be sent, in the first instance, to the following workshop organisers before the deadline of **May 15th, 2023**, 18:00 (CET): **Françoise Détienne** ([francoise.detienne@telecom-paris.fr](mailto:francoise.detienne@telecom-paris.fr)) AND **Jean-Marie Burkhardt** ([jean-marie.burkhardt@univ-eiffel.fr](mailto:jean-marie.burkhardt@univ-eiffel.fr))

Notification of acceptance will be sent to authors on **June 15th, 2023**.

The co-organisers intend to organize a joint publication on the basis of the Workshop contributions.

Position papers will be reviewed by the workshop co-organisers. Main criteria are relevance with respect to the theme of the workshop and scientific quality.

## Workshop organisers

The workshop **co-organisers** are from the two fields of Cognitive Ergonomics and Informatics.

In Psychology/ Cognitive Ergonomics, CSCL

- **Michael Baker**, Research professor, I3 UMR 9217 CNRS - Telecom Paris, Institut Polytechnique de Paris, France [[michael.baker@telecom-paris.fr](mailto:michael.baker@telecom-paris.fr)]
- **Jean-Marie Burkhardt**, Research Professor, University Gustave Eiffel & Université de Paris Cité, LaPEA - Laboratoire de Psychologie et d'Ergonomie Appliquée / Applied Psychology and Ergonomics lab. Versailles, France [[jean-marie.burkhardt@univ-eiffel.fr](mailto:jean-marie.burkhardt@univ-eiffel.fr)]
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In Computer Science, Learning Analytics, CSCW

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## Contact information

- For inquiries about the workshop, please contact **Françoise Détienne** [[francoise.detienne@telecom-paris.fr](mailto:francoise.detienne@telecom-paris.fr)] and **Stéphane Safin** [[stephane.safin@telecom-paris.fr](mailto:stephane.safin@telecom-paris.fr)]