

# Collaboration Technology in Teams, Organizations, and Communities

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**Abstract:** Technology to support groups is rapidly growing in use and in its impact on us, our organizations, and society. Some very important trends are only now being identified, as use of collaboration technology becomes routine in some places. Most applications now provide collaboration features; their designers and users benefit from exploring the wealth of past and current research and development. This full-day course covers experiences, current possibilities, and future trends in collaboration technologies. It is organized around the nature of the support: whether it is directed at workgroups, entire organizations, or broader assemblies of people interacting on the Internet. Lectures and video illustrations are accompanied by three exercises in which participants share their experiences. There are few cookbook principles in this rapidly developing area, but we cover lessons learned, current trends, and long-term challenges that should provide a solid foundation for reflection and guidance.

**Keywords:** computer-supported cooperative work, groupware, workflow, virtual teams, virtual communities

## 1 Collaboration Technologies

Fifteen years ago almost all experience with collaboration technology was confined to research laboratories and reported at conferences, notably the then-new Computer Supported Cooperative Work (CSCW) series. The situation has changed, especially in the past few years. This full-day tutorial provides a framework for attendees who have some experience as designers, developers, evaluators, marketers, buyers, and users of these technologies. It relies primarily on lectures and videos to survey the topic, and includes exercises to allow participants to share experiences. We identify key challenges and factors responsible for successes and failures. We survey the current state of research and application, and identify specific trends and general issues that are central to design and use.

## 2 An Overview of CSCW

Most INTERACT attendees are generally aware of CSCW research and collaboration technology, although the pace of change in the area has accelerated, making it difficult to keep up. Fundamental contributions come from many areas. We briefly identify the diverse backgrounds of

technologists, behavioral and social scientists, customers, and users from a wide range of organizational contexts. CSCW may be more usefully viewed as a *forum* for communication and exchange of ideas rather than as a technical field.

## 3 Design & Evaluation Challenges

Successfully overcoming technical hurdles has not guaranteed success. We briefly review behavioral, social, and organizational phenomena that undermine technically impressive applications. Some of these hinder the development of useful and usable software, some prevent the acquisition of the systems, and many obstruct successful use.

Methods to address the challenges have been refined as our understanding of these problems has matured. Again, diverse disciplines have contributed, from specialists in organizational behavior to computer scientists to anthropologists. We briefly review several promising approaches to improving the design and introduction of collaboration technologies, identifying strengths and weaknesses.

## 4 Research and Application

We present an overview of the state of the art in collaboration technology research and applications.

This survey is structured around collaboration activities, which in turn are structured by the human organizational entities such as teams, projects, companies, and communities. In this tutorial we focus on three key organizational structures: Teams or groups, organizations, and communities. Each of these has different collaboration requirements that are met by different kinds of technologies. Participants will consider the requirements of these structures in two of the group exercises.

#### **4.1 Supporting Groups**

Support for small groups and teams became a major focus of research and development when local area networks became widespread. Because most software applications now incorporate features that support communication, sharing, or coordination, “groupware” is not as useful a term, but the technical and social challenges remain.

Research into group behavior has identified a range of group modes, functions, and task types, each presenting opportunities and challenges for technology support (e.g., McGrath in Baecker, 1993). Small groups generally have high communication needs and rely more on mutual trust. Providing effective communication and establishing and maintaining trust in dispersed or virtual teams is an active area of research and product development. Case studies, including an extended look at application-sharing in an organization, illustrate the use of technologies to support teamwork and the user interface challenges these technologies pose.

#### **4.2 Supporting Organizations**

Across an organization, asynchronous sharing of work objects and coordination (workflow management) are key issues. For example, document management systems can aid organizational efficiency by providing access and version control, document search, and status tracking.

As applications are used throughout an organization, the fact that people in different roles have distinct needs can present obstacles to efficient system use, illustrated with several case studies.

#### **4.3 Support over the Internet & Web**

A rapidly developing area of research and development centers on technologies that span organizational boundaries, including the Internet, World Wide Web, and mobile or wireless devices that move between locations. This area is only beginning to see published research despite considerable efforts at product development. It is less clear what shape these technologies will ultimately take.

The tutorial does not cover support for on-line “communities” as extensively as groups and organizations.. We identify some of the principal themes — notification and awareness needs, privacy concerns, reputation servers, and so forth. Here and throughout the tutorial we note that these technologies bring with them serious considerations of social conventions and social values that interact with the expected efficiency benefits.

## **5 The Future of Digitally Mediated Interaction**

Although we cannot predict what technologies will succeed or how their use will evolve, we present several case studies of success and failure and point to trends that have emerged over the past decade. In addition, at a broader level, we can identify changes that are likely to raise fundamental questions for us as users as well as developers of these technologies. Members of society, informed or otherwise, will have to resolve how these technologies are used. Particularly interesting is the tension between liberating and constraining effects that often accompany new communication technologies. Another profound effect is our reactions to and uses of the increased visibility of activity that arises when it leaves digital traces. We believe these technologies will have profound influences, and conclude by conveying a flavor of what those might encompass.

## **6 Course Materials**

In addition to notes covering the lecture slides, attendees receive an extensive bibliography that includes the tables of contents of conference proceedings, journals, and edited books that focus on computer supported cooperative work and collaboration technology. Also included are pointers to relevant web sites and publicly available videos.

## **References and Further Reading**

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