Chapter 11
Supporting Collaboration and Communication in Videoconferences

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ABSTRACT
Working together in a group may lead to advantages such as a higher task performance, gains in individual knowledge or social skills, or a higher motivation. In many situations of our daily life, the members of a group cannot meet face-to-face to work together but have to rely on communication media. This paper focuses on collaboration with the support of specific communication media, namely videoconferences. Two empirical studies will be described. The first study shows that groups which communicate via videoconferences for solving a task can achieve the same results as face-to-face groups. In order to achieve results equivalent to face-to-face groups, videoconference groups have to adapt their communication behavior to the specific characteristics of videoconferences. In the second study presented in this chapter, different trainings for collaboration in videoconferences will be investigated. One of the trainings in which students learned rules for collaborative problem-solving proved to be successful: Students who had obtained such a training achieved better problem solutions than students without a training.

INTRODUCTION
Computer networks bring people together who otherwise would not be able to communicate and collaborate with each other. Over the last years, computer-mediated communication tools have also become more and more powerful. Technologies such as videoconferences provide a communication setting that closely resembles face-to-face communication allowing team members to see each other, to listen and to talk to each other. Yet, little is known about how people organize their communication and collaboration in such a communication setting.

At the beginning of this chapter, a framework of communication media will be described. Then, the advantages and a model of collaboration in communities of practice or communities of learners will be discussed. In the following parts of the chapter, two studies on communication and collaboration in videoconferences are introduced. The first study focuses on group performance and communication in videoconferences compared to face-to-face settings. It investigates whether and how group members adapt their communication behavior to different communication settings. The second study investigates how communication and collaboration in videoconferences can be supported by a training of group members. Different trainings and their effects on group performance in videoconferences will be described.

COMMUNICATION WITH MEDIA

Communication can be understood as an ongoing process of coordination and interaction which may serve many purposes: Developing an impression of each other, exchanging information, working together, giving mutual support, etc. It can be regarded as a collective activity in which the participants have to coordinate on content as well as on process. The communication partners continually ensure that they are attending to, hearing, and trying to understand what a communication partner is saying. Therefore, they use means such as positive or negative evidences, visual and verbal back-channeling cues, or references to former contributions. In this way they ensure a common ground of mutual understanding (Clark & Brennan, 1996).

Communication partners try to minimize their collaborative effort to ensure understanding. They behave economically and try to invest only as much effort as necessary while being as clear and informative as possible. Clark and Brennan (1996, p. 135) describe this behavior as the principle of the “least collaborative effort”. The effort that is needed to ensure mutual understanding may change with the communication medium. Communication behavior that can be applied efficiently in one medium may not be applicable in another one or may cost more effort. Media vary on different dimensions that influence communication behavior.

Various theories of communication with media agree on several media characteristics that may influence the communication between two people or a group of people (Clark & Brennan, 1996; Dennis & Valacich, 1999):

- **Copresence** describes whether the communication partners share the same physical environment (as in a face-to-face communication). In a shared environment, the communication partners can carry out actions together, e.g., pointing to or manipulating an object.
- **Visibility** describes whether the communication partners can see each other (as in a face-to-face communication or in videoconferences).
- **Audibility** describes whether the communication partners can hear each other and take note of paraverbal cues such as intonation. In communication settings in which the communication partners cannot talk to each other they have to rely on written communication.
- **Synchronicity** (also cotemporality) describes whether there is a delay between the production of a message and its arrival at the recipient. E.g., in a face-to-face communication, a contribution is produced just about when it is received and understood, without delay. In e-mail conversation, messages may arrive only some time after their production.
- **Simultaneity** describes whether messages can be sent and received by different communication partners at once. E.g., in a chat, a communication partner may compose a
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