Group Awareness and Self-Presentation in the Information-Exchange Dilemma: An Interactional Approach

Joachim Kimmerle, Ulrike Cress, Knowledge Media Research Center, Konrad-Adenauer-Str. 40, 72072 Tuebingen
Email: j.kimmerle@iwm-kmrc.de, u.cress@iwm-kmrc.de

Abstract. A common challenge in many situations of computer-supported collaborative learning is increasing the willingness of those involved to share their knowledge with other group members. As a prototypical situation of computer-supported information exchange, a shared-database setting was chosen for the current study. This information-exchange situation represented a social dilemma: while the contribution of information to a shared database induced costs and provided no benefit for the individual, the entire group suffered when all members decided to withhold information. In order to alleviate the information-exchange dilemma, a group-awareness tool was employed. It was hypothesized that participants would use group awareness for self-presentational purposes. For the examination of this assumption, the personality variable 'protective self-presentation' (PSP) was measured. An interaction effect of group awareness and PSP was found: when an awareness tool provided information concerning the contribution behavior of each individual, this tool was used as a self-presentation opportunity. In order to understand this effect in more detail, single items of the PSP-scale were analyzed.

Introduction

A crucial prerequisite for nearly all settings of computer-supported collaborative learning (CSCL) is the willingness of the involved persons to share their knowledge and the information they possess. If those involved refuse to share their knowledge with the other members of a team of learners or collaborators, team work is much less efficient than it could be. Indeed benefiting from others' knowledge by reciprocally exchanging information is the very option open to team members which makes cooperative team work efficient (Hinds & Kiesler, 2002). From the perspective of CSCL it is of particular interest and relevance to analyze ways in which information exchange between team members interacting via computers can be supported (Olson & Olson, 2003).

The establishment of a shared database is one possibility when it comes to making individual team members' knowledge available to the whole group. Such a shared database enables each group member to enter information into and retrieve information from the database (Jian & Jeffres, 2006). Technically speaking, the implementation of a shared database is quite simple. Practically speaking, however, many problems tend to arise: many studies report low motivation of team members in entering information into the database and thus making it available for their group mates (Ardichvili, Page, & Wentling, 2003; Argote & Ingram, 2000; Huber, 2001; Orlikowski, 1993; Yuan, Fulk, Shumate, Monge, Bryant, & Matsaganis, 2005).

One important explanation for this poor willingness to share information with others will be presented in the following section on the so-called information-exchange dilemma. Subsequently, a concept will be discussed which may potentially be successful in influencing people's willingness to share information: the concept of group awareness. Following this, a further aspect supposed to affect people's information-sharing behavior will be presented: the need for self-presentation. This need is conceptualized as a personality variable.

An empirical section follows these theoretical considerations, beginning with a description of the methods employed in the current study. The results of the study are subsequently reported. In conclusion, the major findings are reviewed in the discussion section.

The Information-Exchange Dilemma

From a psychological point of view, a poor willingness to share knowledge with others is not a surprising observation: transmission of information is often regarded as a loss of power, and entering information into a database is additionally associated with extra time and effort. Therefore, the decision regarding whether to pass on

information or not, represents a social dilemma (Dawes, 1980; Kollock, 1998; Komorita & Parks, 1995; Olson, 1965; Weber, Kopelman, & Messick, 2004). An individual group member does not benefit from sharing his/her own knowledge with others (Cabrera & Cabrera, 2002; Kalman, Monge, Fulk & Heino, 2002). On the contrary, he/she saves time and remains in a leading or advantaged position by withholding information. On these grounds, withholding information is the most advantageous strategy. An individual is able to retrieve information from the database without contributing information in turn (Cress & Hesse, 2006). However, if all involved group members decide to behave according to this self-advantageous strategy, then nobody can use the shared database and each member has to compile the needed information for his/herself. As a consequence, the group as a whole suffers from individually efficient behavior (Cress & Kimmerle, in press; Cress, Kimmerle & Hesse, 2006).

However, recent research has shown that the individual's willingness to share knowledge in the face of the information-exchange dilemma can be influenced by the use of so-called group-awareness tools (Cress & Kimmerle, in press). The notion of group awareness and the application of corresponding tools will thus be presented in the following section.

The Concept of Group Awareness

Over the last few years, the concept of group awareness has found increasing interest in the relevant literature (e.g. Begole, Rosson & Shaffer, 1999; Briggs, 2006; Endsley, 1995; Gross, Stary & Totter, 2005; Soller, Martinez, Jermann & Mühlenbrock, 2005; Tam & Greenberg, 2006). Group-awareness refers to information received by members of a group about the other group members, about mutually employed objects, and about current group processes, in order to efficiently carry out certain tasks (Gross et al., 2005). Normally, in face-to-face situations, this kind of information is directly available. In situations of computer-mediated communication (CMC) and CSCL, however, group-awareness information is only available via technical support.

Carroll, Neale, Isenhour, Rosson and McCrickhard (2003) distinguish three kinds of awareness in CMC settings and point out that each variant can be supported by certain tools:

- With *social awareness*, Carroll et al., (2003) refer to the user's consciousness of the presence of others. A tool which makes the presence of others visible (e.g. by providing photographs of the team members) can foster social awareness.
- Tools which support *action awareness* provide information about what is going on, e.g. which actions the group is carrying out.
- *Activity awareness* relates the actions of group members to the task to be performed. Activity-awareness tools therefore provide information regarding completion of the group goal: activity-awareness increases knowledge on the group's task performance.

In the current study, a group-awareness tool was used to provide social-awareness information by presenting personal information as well as photographs of the involved team members. Additionally, the tool fostered activity awareness by presenting feedback on the contributions made to the database by group members. Awareness information was presented in three conditions differing according to their richness: In the control condition no activity awareness was induced. In the group-feedback condition, activity awareness in the sense of information about *cooperative* group members was provided. And in the individual-feedback condition, information was provided concerning cooperative group members *as well as* additionally allowing for self-presentation.

These three conditions were implemented on the basis of our belief that the individual's need for self-presentation could play an important role in their willingness to share their knowledge with others. In order to test whether this is the case, self-presentation as a personality variable is considered in the current study. In the following section, the self-presentation construct will be explored, before we turn to the study's hypotheses.

Self-Presentation

Self-presentation is an important motivation of behavior in both offline (Taylor & Altman, 1987) and online situations (Joinson, 2001; Joinson & Dietz-Uhler, 2002; Wallace, 1999; Walther, 1996). Self-presentation and impression management have recently been examined in online-dating settings (Ellison, Heino, & Gibbs, 2006; Gibbs, Ellison, & Heino, 2006) and diaries in web communities (Moinian, 2006), as well as with respect to personal web sites (Marcus, Machilek, & Schütz, 2006; Schau & Gilly, 2003). Self-presentation refers to strategic activities designed to give certain impressions to other persons (Goffman, 1959). In computer-supported environments,

individuals have greater control over their self-presentational behavior than in offline settings. Online interactions can thus be managed more strategically. For this reason, self-presentation is also thought to play an important role in information-exchange situations. It is assumed that virtually all people have a need for and the ability to present themselves in a certain way.

It is, however, also conjectured that people differ in terms of the intensity of this need. In line with this consideration, Snyder (1974, 1987) developed a personality construct termed *self-monitoring*. The self-monitoring (SM) of expressive behavior comprises self-observation and self-control and is guided by situational cues to social adequacy (Gangestad & Snyder, 2000). In an alternative conception of the SM construct proposed by Wolfe, Lennox, and Cutler (1986), a distinction is made between acquisitive and protective self-presentation. *Acquisitive self-presentation* pertains to the tendency to actively realize social profits, i.e. an acquisitive self-presenter presumes social reward given that she/he manages to behave appropriately. *Protective self-presentation* (PSP) refers to the avoidance of social rejection, i.e. a protective self-presenter fears social disapproval if he/she does not manage to behave appropriately in a social situation.

We believe that people are interested in self-presentation in general. We thus suppose that individuals present themselves in a more positive light when their behavior is identifiable by others. Consequently, we expect the highest contribution rate to occur in the individual-feedback condition:

A main effect for activity awareness with respect to participants'
cooperation rate is hypothesized (H1).

In addition, it is supposed that high protective self-presenters are more cooperative than low protective self-presenters, when activity awareness allows for the identification of individual behavior and consequently for self-presentation. Where such activity awareness is lacking, high and low protective self-presenters are assumed to be equally cooperative:

An interaction effect of PSP and activity awareness with respect to
cooperation rate is hypothesized (H2).

Method
Participants
119 university students participated in the study (70 women and 49 men, mean age = 24.3 years). They were informed that they would be participating in a group study using computers. Participants were randomly assigned to one of the three conditions with 43 participants in the control condition, 37 in the group-feedback condition, and 39 in the individual-feedback condition.

Procedure
Participants were led to believe that they would be one of six persons working in a group that is distributed across six locations and that is connected via a database. In fact, participants worked independently of the others: the behavior of the other participants was simulated using software. The participants' task entailed the calculation of fictitious salespersons' salaries (cf. Cress, 2005). In a first phase, participants were required to calculate the *base salaries* of as many salespersons as possible. In a second phase, the *total salaries* were to be calculated. Participants received money according to the number of base and total salaries calculated. Following the calculation of a base salary, participants had to decide whether to share their result with the other group members by contributing it to the shared database. When contributing a base salary, the respective participant had to wait for the somewhat lengthy transfer of the result to the database. During this waiting time, he/she was not able to continue with further calculations. Hence, each participant could calculate and consequently earn more, the less base salaries she/he contributed to the database. In the second phase, participants received money for each total salary calculated. In calculating a total salary participants required the appropriate base salary. If this base salary was not available (i.e. it was neither in the database nor had it been calculated by the participant in the first phase), the participant had to catch up on this calculation in the second phase. This resulted in a loss of time in which the participant was not able to earn money. Each person therefore earned less, the less pieces of information in the database. Hence, participants found themselves in a characteristic information-exchange dilemma: an individual earned less, the more information he/she shared with others, and at the same time, everybody earned more, the more pieces of information were available in the database. The succession of phase 1 and 2 was repeated three times. Except for the control condition,

awareness information was presented by an awareness tool after each of the three trials. The different experimental conditions are presented in the following.
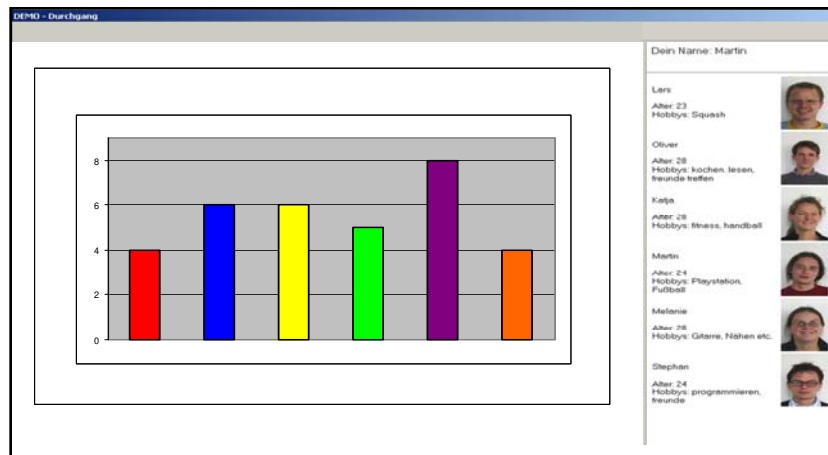
Conditions

Three experimental conditions were realized in this study:

- a *control* condition without feedback.
- a *group-feedback* condition in which an awareness tool presented the average contribution behavior of the other five group members and the participant's own contribution behavior in the first phase of the preceding trial (cf. Figure 1).
- an *individual-feedback* condition in which an awareness tool separately provided the contribution behavior of each group member in the first phase of the preceding trial (cf. Figure 2).
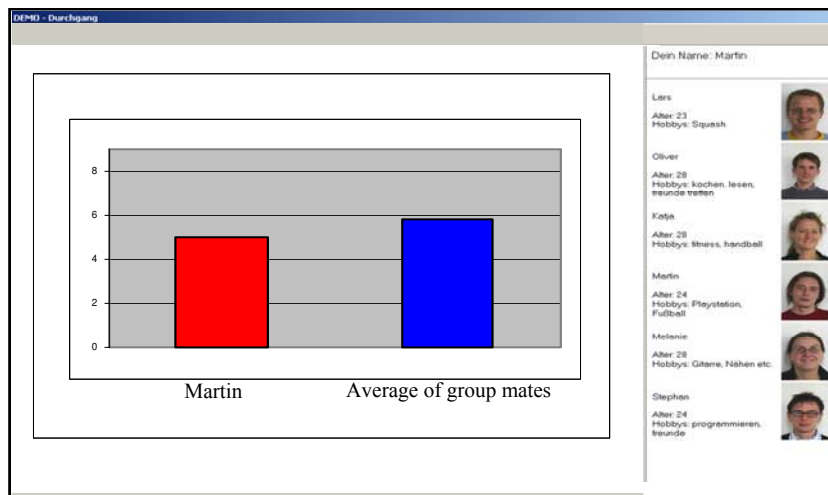
Figure 1. The group-feedback condition with "Martin" as relevant participant.

Figure 2. The individual-feedback condition enabling identification of each participant's behavior.

In both feedback conditions, the contribution behavior of cooperative group members was presented on the basis of the same pool of data. Photographs of the team members were provided in all conditions in order to foster social awareness.

Measures

A German version of the self-presentation scale according to Wolfe et al. (1986) was employed. This scale consists of two subscales (Laux & Renner, 2002): "acquisitive self-presentation" and "protective self-presentation". The subscale "acquisitive self-presentation" was excluded based on considerations that the individual-feedback condition – as operationalized here – is socially too reduced to allow for social profits such as making new friends. The subscale "protective self-presentation" on the other hand, was considered relevant for the present research question, given the adequate situational authenticity, whereby individuals sensitive to such processes could indeed experience social disapproval. The PSP-subscale consisted of twelve items. All items were rated on a 4-point scale with endpoints labeled 1 (*not at all*) and 4 (*very*).

Results

The employed scale showed satisfactory internal consistency. Cronbach's alpha for PSP was α=.83. With respect to PSP, participants were separated into two groups via a median split (cf. MacCallum, Zhang, Preacher, & Rucker, 2002). Cooperation rate was defined as the quotient of contributed and totally calculated base salaries. This quotient in the second and third trial served as the main dependent variable (the first trial was excluded because feedback was provided for the first time *after* the first trial).

Test of Hypotheses

In order to test both hypotheses, an ANOVA with PSP and group awareness as independent variables was calculated. A marginally significant main effect of group awareness with respect to cooperation rate (H1), $F_{(2, 113)}$=2.63, p=.076 was yielded. Post-hoc tests (Scheffé) showed that only the control condition and the individual-feedback condition differed significantly from each other: M_{cc}=.54 (SD=.35) vs. M_{ifc}=.69 (SD=.28). The group-feedback condition lay between the two: M_{gfc}=.56 (SD=.32).

The ANOVA also showed a significant interaction effect for PSP and group awareness (H2), $F_{(2, 113)}$=4.28, p=.016. Figure 3 illustrates this effect.
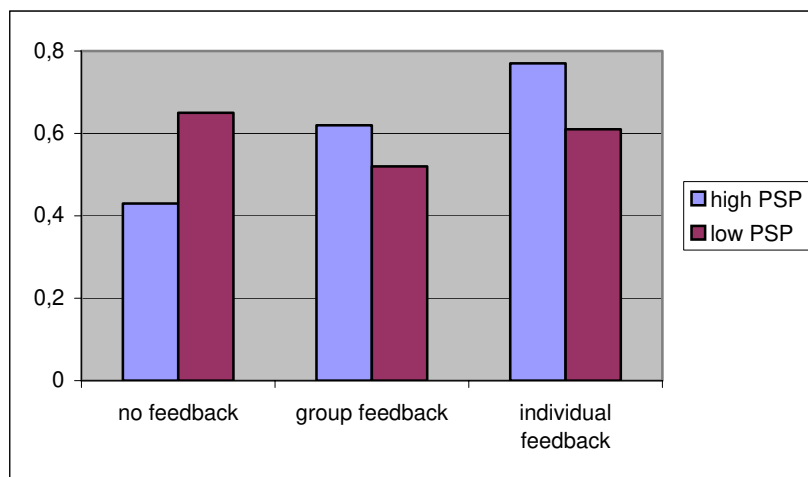
Figure 3. Cooperation rates for the three conditions according to PSP (low vs. high protective self-presenters).

As expected, there was no difference between high and low protective self-presenters in the group-feedback condition: M_{low}=.52 (SD=.33) vs. M_{high}=.62 (SD=.32), p>.05, but a significant difference in the individual-feedback condition: M_{low}=.61 (SD=.30) vs. M_{high}=.77 (SD=.24), p<.05. However, an unexpected difference was also found in the control condition: M_{low}=.65 (SD=.33) vs. M_{high}=.43 (SD=.34), p<.05.

Single Items Analyses

In order to better understand the way in which the need for PSP influences people's willingness to share their knowledge, it is worthwhile taking a closer look at those items which were more exactly able to predict the protective self-presenters' selective contribution behavior. We found three items showing the same interaction effect with group awareness as the total twelve-item scale. In the following list, these items are presented with their exact wordings (own translations from German) and corresponding statistics resulting from ANOVAs with the PSP-items and group awareness as dependent variables:

1. "If all persons of a group act in a certain manner, then I feel that this must be the appropriate way to behave." The ANOVA yielded an interaction effect with respect to cooperation rate, $F(2, 113)=6.03$, $p=.003$.
2. "The slightest hint of disapproval in the eyes of another person is sufficient to make me change my behavior." The ANOVA yielded an interaction effect with respect to cooperation rate, $F(2, 113)=4.73$, $p=.011$.
3. "It is important for me to fit into the group to which I belong." The ANOVA yielded an interaction effect with respect to cooperation rate, $F(2, 113)=3.54$, $p=.032$.

That which these three items have in common is that they all loaded onto the same factor resulting from a main component analysis of the twelve PSP-items with quartimax rotation. This procedure revealed three factors.

- The first factor had an eigenvalue of 4.30 and accounted for 35.8% of the explained variance. With regard to content and in accordance with Laux and Renner (2002), we labeled this factor "protective variability".
- The second factor had an eigenvalue of 1.93 and accounted for 16.1% of the explained variance. With regard to content, we labeled this factor "fear of social disapproval".
- The third factor had an eigenvalue of 1.06 and accounted for 8.9% of the explained variance. With regard to content and in accordance with Laux and Renner (2002), we labeled this factor "protective social comparison".

The three items showing an interaction effect with group awareness all loaded onto the factor "fear of social disapproval".

Discussion

The individual's motivation to share her/his knowledge with other persons is an essential precondition for successful CSCL (Stahl, Koschmann, & Suthers, 2006). A central reason for people's poor willingness to share their knowledge can be found in the viewpoint that computer-supported knowledge exchange represents a social dilemma. The present article studied the role of group awareness and self-presentation within this information-exchange dilemma. On the one hand, the study entailed the examination of three different group-awareness conditions in a dilemma situation. On the other hand, the personality variable of protective self-presentation was investigated. The study thus takes an explicitly interactional perspective, i.e. it examines situational and personal determinants of behavior as well as their interactions within an information-exchange dilemma. The construct of PSP as a personality variable is employed as an auxiliary means, insofar as knowledge concerning individuals' characteristics can help provide information about the situation in which these people exhibit a certain behavior. In doing so one can learn more about the effectiveness of group awareness. To this end, we observed the way in which persons with high and low scores in PSP reacted to the group-awareness information provided. Based on observations of ensuing behavioral reactions, conclusions can be drawn regarding the effect of group awareness which is generated by a respective tool.

Persons receiving individual feedback on cooperative group mates clearly increase their cooperation rate in comparison to those receiving no feedback. The result showing that group feedback failed to increase cooperation rates suggests that – at least in the study reported here – mere feedback on cooperative group mates in itself does not necessarily enhance the willingness to share one's knowledge. Rather, in addition to this perception of cooperativeness and the resulting trust in others in the information-exchange dilemma (Kimmerle, Cress, & Hesse, 2006), self-presentation opportunities should be made available.

The interaction effect found for feedback and PSP shows that persons with a high need for PSP are particularly cooperative in the individual-feedback condition. However, without feedback allowing for identifiability, it is this very subgroup, that proves particularly selfish in demonstrating a low willingness to share knowledge. Two insights can be gained from this finding. Firstly, we learned how group awareness can be affected by individual feedback: a situation in which the behavior of every single person concerned can be exactly identified is used by the participants in the information-exchange dilemma for purposes of self-presentation. Secondly,

important insights can be gained concerning the psychology of individuals with a high need for PSP: even though this result cannot be generalized beyond the current CMC setting, it can be concluded that high protective self-presenters do not simply try to present themselves in a positive manner when their activities are recognizable to others, but that they are also especially uncooperative when this is not the case.

Taking a closer look at those individual items showing the same interaction effects with the group-awareness condition as the total PSP-scale, can facilitate a more detailed understanding of high protective self-presenters' contribution behavior. In its entirety, the PSP construct is composed of three facets: "protective variability", "fear of social disapproval", and "protective social comparison". The fact that the individual items concerned all load onto the factor "fear of social disapproval" suggests that contribution behavior is caused merely by people's dread of being negatively evaluated by their peers. However, this can in our opinion only explain why high protective self-presenters enhance their cooperation rate when their behavior is identifiable. It cannot, however, explain why these very individuals decrease their cooperation rate in an anonymous situation. Further research is required to examine this issue in greater detail.

While underlying processes of information exchange were not uncovered in their entirety, it can be concluded that the approach adopted in the present article – gaining new insights by capturing interactions of personal and situational aspects – proved fruitful. This approach could help researchers gain new insights concerning the effects of group awareness and the influence of PSP as a personality variable. It is therefore our view that such an interactional perspective can also be recommended for research in other issues of CMC and CSCL.

References

Ardichvili, A., Page, V., & Wentling, T. (2003). Motivation and barriers to participation in virtual knowledge-sharing communities of practice. *Journal of Knowledge Management, 7*, 64-77.

Argote, L. & Ingram, P. (2000). Knowledge transfer: A basis for competitive advantages in firms. *Organizational Behavior and Human Decision Processes, 82*, 150-169.

Begole, J., Rosson, M. B., & Shaffer, C. A., (1999). Flexible collaboration transparency: Supporting worker independence in replicated application-sharing systems. *ACM Transactions on Computer-Human Interaction, 6*, 95-132.

Briggs, R. O. (2006). On theory-driven design and deployment of collaboration systems. *International Journal of Human-Computer Studies, 64*, 573-582.

Cabrera, A. & Cabrera, E. F. (2002). Knowledge-sharing dilemmas. *Organization Studies, 23*, 687-710.

Carroll, J. M., Neale, D. C., Isenhour, P. L., Rossen, M. B., & McCrickard, D.S. (2003). Notification and awareness: Synchronizing task-oriented collaborative activity. *International Journal of Human-Computer Studies*, *58*, 605-632.

Cress, U. (2005). Ambivalent effect of member portraits in virtual groups. *Journal of Computer Assisted Learning, 21*, 281-291.

Cress, U. & Hesse, F. W. (2006). The social complexity in establishing and sharing information resources. In J. Elen & R. E. Clark (Eds.), *Handling complexity in learning environments: Research and theory* (pp. 67-87). Amsterdam: Pergamon.

Cress, U. & Kimmerle, J. (in press). Guidelines and feedback in information exchange: Behavioral anchors and descriptive norms in a social dilemma. *Group Dynamics: Theory, Research, and Practice.*

Cress, U., Kimmerle, J., & Hesse, F. W. (2006). Information exchange with shared databases as a social dilemma: The effect of metaknowledge, bonus systems, and costs. *Communication Research, 33,* 370-390.

Dawes, R. M. (1980). Social dilemmas. *Annual Review of Psychology, 31*, 169-193.

Ellison, N., Heino, R., & Gibbs, J. (2006). Managing impression online: Self-presentation processes in the online dating environment. *Journal of Computer-Mediated Communication, 11*, 415-441.

Endsley, M. R. (1995). Toward a theory of situation awareness in dynamic systems. *Human Factors, 37*, 32-64.

Gangestad, S. W. & Synder, M. (2000). Self-monitoring: Appraisal and reappraisal. *Psychological Bulletin*, *126*, 530-555.

Gibbs, J. L., Ellison, N. B., & Heino, R. D. (2006). Self-presentation in online personals: The role of anticipated future interaction, self-disclosure, and perceived success in Internet dating. *Communication Research, 33*, 152-177.

Goffman, E. (1959). *The presentation of self in everyday life*. New York: Anchor.

Gross, T., Stary, C., & Totter, A. (2005). A user-centered awareness in computer-supported cooperative work-systems: structured embedding of findings from social sciences. *International Journal of Human-Computer Interaction,* **18**, 323-350.

Hinds, P. & Kiesler, S. (2002). *Distributed work.* Cambridge: MIT Press.

Huber, G. P. (2001). Transfer of knowledge in knowledge management systems: Unexplored issues and suggested studies. *European Journal of Information Systems*, *10*, 72-79.

Jian, G. & Jeffres, L. W. (2006). Understanding employees' willingness to contribute to shared electronic databases: A three-dimensional framework. *Communication Research*, *33*, 242-261.

Joinson, A. N. (2001). Self-disclosure in computer-mediated communication: The role of self-awareness and visual anonymity. *European Journal of Social Psychology, 31*, 177-192.

Joinson, A. N. & Dietz-Uhler, B. (2002). Explanations for the perpetration of and reactions to deception in a virtual community. *Social Science Computer Review, 20*, 275-289.

Kalman, M., Monge, P., Fulk, J., & Heino, R. (2002). Motivations to resolve communication dilemmas in database-mediated collaboration. *Communication Research*, *29* 125-154.

Kimmerle, J., Cress, U., & Hesse, F. W. (2006). A challenge for knowledge management: Situational and personal factors of influence in web-based information-exchange. In M. Boumedine, & C. Touzet (Eds.), *Proceedings of the Forth IASTED International Conference on Knowledge Sharing and Collaborative Engineering* (pp. 57-62). Anaheim, Calgary, Zürich: ACTA Press.

Kollock, P. (1998). Social Dilemmas: The anatomy of cooperation. *Annual Review of Sociology*, *24*, 183-214.

Komorita, S. S. & Parks, C. D. (1995). Interpersonal relations: mixed-motive interaction. *Annual Review of Psychology, 46*, 183-207.

Laux, L. & Renner, K.-H. (2002). Self-Monitoring und Authentizität: Die verkannten Selbstdarsteller. (Self-monitoring and authenticity: The misjudged self-presenters). *Zeitschrift für Differentielle und Diagnostische Psychologie, 23,* 129-148.

MacCallum, R. C., Zhang, S., Preacher, K. J., & Rucker, D. D. (2002). On the practice of dichotomization of quantitative variables. *Psychological Methods*, *7*, 19-40.

Marcus, B., Machilek, F., & Schütz, A. (2006). Personality in cyberspace: Personal web sites as media for personality expressions and impressions. *Journal of Personality and Social Psychology, 90*, 1014-1031.

Moinian, F. (2006). The construction of identity on the internet: Oops! I've left my diary open to the whole world! *Childhood: A Global Journal of Child Research, 13*, 49-68.

Olson, M. (1965). *The logic of collective action.* Cambridge: Harvard University Press.

Olson, G. M. & Olson, J. S. (2003). Human-computer-interaction: Psychological aspects of the human use of computing. *Annual Review of Psychology, 54*, 491-516.

Orlikowski, W. (1993). Learning from notes: Organizational issues in groupware implementation. *Decision Support Systems, 15,* 267-284.

Schau, H. J. & Gilly, M. C. (2003). We are what we post? Self-presentation in personal web space. *Journal of Consumer Research, 30*, 385-404.

Snyder, M. (1974). Self-monitoring of expressive behavior. *Journal of Personality and Social Psychology*, *30*, 526-537.

Snyder, M. (1987). *Public appearances and private realities: the psychology of self-monitoring.* New York: Freeman.

Soller, A., Martinez, A., Jermann, P., & Mühlenbrock, M. (2005). From mirroring to guiding: A review of the state of art technology for supporting collaborative learning. *International Journal of Artificial Intelligence in Education, 15*, 261-290.

Stahl, G., Koschmann, T., & Suthers, D. D. (2006). Computer-supported collaborative learning. In R. K. Sawyer (Ed.), *Cambridge handbook of: The learning sciences* (pp. 409-425). New York: Cambridge University Press.

Tam, J. & Greenberg, S. (2006). A framework for asynchronous change awareness in collaborative documents and workspaces. *International Journal of Human-Computer Studies*, *64*, 583-598.

Taylor, D. & Altman, I. (1987). Communication in interpersonal relationships: Social penetration processes. In M. E. Roloff and G. R. Miller (Eds.), *Interpersonal processes: New directions in communication research* (pp. 257-277). Thousand Oaks: Sage.

Wallace, P. (1999). *The psychology of the internet.* Cambridge: Cambridge University Press.

Walther, J. B. (1996). Computer-mediated communication: Impersonal, interpersonal, and hyperpersonal interaction. *Communication Research, 23*, 3-44.

Weber, J. M., Kopelman, S., & Messick, D. M. (2004). A conceptual review of decision making in social dilemmas: Applying a logic of appropriateness. *Personality and Social Psychology Review, 8*, 281-307.

Wolfe, R. N., Lennox, R. D., & Cutler, B. L. (1986). Getting along and getting ahead: Empirical support for a theory of protective and acquisitive self-presentation. *Journal of Personality and Social Psychology*, *50*, 356-361.

Yuan, Y., Fulk, J., Shumate, M., Monge, P. R., Bryant, J. A., & Matsaganis, M. (2005). Individual participation in organizational information commons: The impact of team level social influence and technology-specific competence. *Human Communication Research*, *31*, 212-240.