

Groupware and Team Aware

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INTRODUCTION

A well-known drawback of groupware systems is that they focus on technical aspects and neglect social aspects of technology use. Designers simply implement the functionality they deem useful for cooperation without integrating the seemingly minor and irrelevant aspects of everyday work (Sohlenkamp, 1998). Collective awareness is one of these neglected aspects.

Historically, collective awareness is a concept associated with Emile Durkheim (1858–1917), referring to the common norms, values, and beliefs shared by members of a community. It consists of beliefs and ideas that shape the structure and direction of community life, rather than just the personal interactions of individuals. In the last decade, awareness support in multiuser applications becomes an increasingly important and accepted topic both in human-computer interaction and computer-supported cooperative work research (Dourish & Bellotti, 1992; Gutwin & Greenberg, 1996; Sohlenkamp, 1998; Carroll, Neale, Isenhour, Rosson, & McCrickard, 2003). Recently, management information systems researchers focused on human and organizational aspects of collective awareness rather than to the technical aspects. While computer science studies tried to solve technical problems related to providing awareness through the man-machine interfaces, management information systems studies tried to identify the factors affecting the maintenance and the evo-

lution of collective awareness from an organizational viewpoint (Barker, 1991; Daassi & Favier, 2004; Weisband, 2002).

COLLECTIVE AWARENESS: DEFINITION AND FORMS

Currently there is no consensus about the definition of collective awareness. The best-known and often-quoted definition in the literature is probably that of Dourish and Bellotti (1992). They define collective awareness as being “an understanding of the activities of others which provides a context for your own activity.” (p. 107). Several research studies have completed this definition. Beaudouin-Lafon and Karsenty (1992) underlined the importance of the coordination aspects of cooperative work. They define awareness as “being aware of what others are doing to facilitate coordination” (p. 171). From the viewpoint of Tollmar and Sundblad (1995), awareness refers to social presence and workspace sharing: “to be aware of the presence of other users and their access to the shared objects” (p. 181). Smith’s (1996) definition points out only the aspect of communication, that is via groupware support. He defines awareness as “informal communication which allows people to stay aware of the activities of their colleagues and co-workers and provides the context for work-related activities” (p. 59).

Table 1. Elements of collective awareness (Gutwin & Greenberg, 1996)

Element	Relevant Questions
Identity	Who is participating in the activity?
Location	Where are they?
Activity Level	Are they active in the workspace? How fast are they working?
Actions	What are they doing? What are their current activities and tasks?
Intentions	What are they going to do? Where are they going to be?
Changes	What changes are they making? Where are changes being made?
Objects	What objects are they using?
Extents	What can they see?
Abilities	What can they do?
Sphere of Influence	Where can they have effects?
Expectations	What do they need me to do next?

Table 1 presents a basic vocabulary to think about collective awareness requirements when using groupware systems (Gutwin & Greenberg, 1996).

To determine how to support awareness within a virtual team, it is helpful to distinguish between different subtypes of awareness (Greenberg & Gutwin, 1996; Schlichter, Koch, & Bürger, 1997; Sohlenkamp, 1998; Weisband, 2002). According to Weisband (2002), there are four forms of awareness needed to collaborate effectively:

- **Activity awareness** is knowledge about the project-related activities of other group members. For example, knowing what actions others are doing at any given moment.
- **Availability awareness** involves knowledge about whether others are available to meet or participate in an activity.
- **Process awareness** is a sense of where members' tasks fit into the stages of the project, what the next step is, and what needs to be done to move the process along.
- **Social awareness** is knowledge about the members, and especially about their social situation: what they are doing outside their context of work.

Based on the afore-mentioned definitions and awareness elements, we propose a working definition: *Collective awareness refers to a common and shared vision of the whole team's context which allows members to coordinate implicitly their activities and behaviors through communication.*

COLLECTIVE AWARENESS AND GROUPWARE

Collective awareness has been advocated as crucial in supporting cooperation and therefore for the successful introduction and use of groupware systems (Carroll et al., 2003; Dourish & Bellotti, 1992; Gutwin & Greenberg, 1996). Awareness of coworkers' activities is central to guarantee the success of cooperation and consequently leads to a better appropriation and use of groupware systems. As argued by Liechti (2000), collective awareness tools facilitate the coordination among people, and provide cues helpful to initiate communication and cooperation.

Adequate human behavior requires awareness of the overall situation of the involved persons and work objects (Sohlenkamp, 1998). Thus, building and maintaining collective awareness of one another's intentions, actions, and results seems to be critical in facilitating coordination. As Schlichter et al. (1997) suggest, awareness is important to keep group members up-to-date with impor-

tant events and therefore contributes to their ability to make conscious decisions. Furthermore, collective awareness reduces the effort needed to coordinate tasks and resources by providing a context in which to interpret utterances and to anticipate other's actions (Gutwin et al., 1996).

COLLECTIVE AWARENESS IN VIRTUAL TEAMS

One major challenge for virtual teams is building a shared understanding in a short period of time while using computer-based communication technologies to coordinate their work. In such a context, users need to reduce their uncertainty about each other by exchanging information to be aware of others, their tasks, and the team's progress. According to Gambetta (1988), members of distributed teams may need to actively monitor others' activities to keep informed about the work of the team and what other members of the team are doing.

Establishing a climate of collective awareness in a virtual environment needs time. With time, participants interact and accumulate knowledge about their team's behaviors, work styles, schedules, and habits, in short, "awareness information." Where the dynamic view of collective awareness converges is that collective awareness evolves over time as members accumulate awareness information through interaction and experiences of working together (Daassi & Favier, 2004).

Daassi and Favier (2004) tried to identify the antecedents of collective awareness within a virtual team. There were two factors that helped the development of collective awareness in virtual environment. The first was the openness and trust that was developed through sharing impressions and perceptions of each other. The existence of trust enables people to learn and assess each other through communication (Jarvenpaa & Leidner, 1998), a way to maintain a shared understanding among team's members (Sohlenkamp, 1998). The second was the cohesion which helps the teams to act and think as a single entity. Cohesion enables members to hold common perceptions about team activities. Since cohesion reflects the attraction to the team and how team members are linked to each others (Carless & De Paola, 2000), it is proved that cohesion must precedes team awareness.

CONCLUSION

In this article, we discussed the practical implications of collective awareness on the activities of a virtual team. Collective awareness is important for all forms of e-work as to coordinate cooperative work, to allow informal

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