Chapter XXIII
Modern Design Dimensions of Multiagent CSCW Systems

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ABSTRACT

This chapter introduces and investigates the applicability of the multiagent paradigm for engineering and developing CSCW systems with the aim of advocating modern design dimensions and software engineering implications. It argues that the use of multiagent systems can significantly improve and enhance the functionalities of computer supported work systems. To meet such an objective, the chapter raises the importance of "revisiting" the context and domain of CSCW in accordance with the growing organizational transformations, situational shifts, and technological developments. While such changes are motivating group collaboration, the information systems that support them must be powerful. The author believes that because of their specific limitations and the continuous changes in the collaboration environment, there is an urgent importance of using thorough system-oriented approaches to address the way they evolve. Furthermore, the chapter draws a framework for the use of the multiagent paradigm to understand and deploy CSCW systems by adopting an integrated context of analysis that improves our general understanding about their potentials.

INTRODUCTION

The proliferation and advancement of information technology is dictating new axioms for collaborative work especially in information intensive working environments. Within such environments information technology plays an increasingly significant role by extending the back office (core and support processes) to the front office and beyond the branch. The Internet and e-business, for example, have affected enterprise-wide information availability both in terms of type and quantity. Because the adoption of Internet-based business transaction models has outpaced the development of tools and technologies to deal with information explosion, many businesses are being motivated to share information and tasks through integrated computer supported collaborative work systems. Especially for global enterprises, the use of networks is enabling collaborative work through information sharing and task accomplishment. While such collaboration allows organizations to save resources, it also improves their learning

curves within a wider environment of a computer supported collaborative work.

Despite their growing deployment, little has been done to investigate the development aspects of CSCWs. Emphasis continued to be placed on understanding the role of computer systems in group work by using different theories without focusing on the way such systems are being developed. The migration of organizations towards decentralization, micro-management, delegation, networking and alliances, and customer satisfaction coupled with the growing functionality of hardware, software, and communication systems are increasing the demand for augmenting the benefits of such developments by refining the process of CSCW systems design.

The review and analysis of related work provided evidence that the use of agents' technology can improve the functionality of computer supported collaborative work systems. Their use can improve task collaboration and refinement, communication, and coordination by coupling both task identification and implementation characteristics (domain) with the capabilities of agents (agent qualities) in accordance with organizational principles (i.e., unity of command, hierarchy, structure, and decision-making styles) and technological build ups (multiagent technology). However, it is only through this approach that it becomes possible to understand the context of collaboration and the way to support it.

CSCW: BACKGROUND

The growing deployment of computer network technologies (including the Internet) has drastically changed not only the way network-based systems are designed and used but also affected the styles, methods, and environments in different application domains and dictated new axioms for interorganizational collaboration. Within such a technology-intensive environment, it is becoming increasingly possible for groups located in remote trajectories to engage in both synchronous (where all members of the entire work group are working on the task on-line) and asynchronous (when at least some of them are off-line and working separately on the task) collaborative work processes.

The migration towards CSCW originates from the emerging pressures to reduce resources (e.g., lead time, costs, and defects), to increase client satisfaction, to improve communication with others, and to establish consistency in tools and procedures (Steve & Phebe, 2003). They are used to provide and maintain shared information resources and workspaces (David, Jenkins, & Joseph, 2006; Siriwan & Peter, 2006;).

Computer supported collaboration environments are often promoted as an open, safe, and trustable "learning" domains that allow equal opportunities—for collaborating members—to participate without the limitation of knowledge levels associated with work and individual characteristic, collaboration processes, and satisfaction with collaborative work (Silvia, Saskia, Wim, & Nick, 2007; Yan & Jacob, 2006). They have been also viewed as means for maintaining transparency for decision-making quality and trust for openness of communication (Henk, Paul, & van Doremalen, 2004). During such collaborative work, many activities, guidelines, operating procedures, and functions can be initiated, negotiated, "mainstreamed," revised, and implemented by the "collaborating members" of the entire group.

CSCW aims at understanding how collaborative activities, their coordination, productivity, and effectiveness can be supported by means of computer systems (Carstensen & Schmidt, 2002; Kevin, 2003). It is regarded as a fundamentally design-oriented concept that has two main dimensions: (a) technology-centric placing (emphasizing on devising ways to design computer technology to better support people to work together) and (b) work-centric placing (emphasizing on understanding work processes with an aim to better design computer systems so as to support group work). Such orientations reflect the role of computer systems in supporting work groups

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