Computer-Supported Community Work:
Old Wine in New Bottles?

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Introduction

The last decades have witnessed the invention of various networks like the ARPANET, FidoNet, Usenet, Internet and the widespread use particularly of the Internet for both global information systems (e.g., World-Wide Web) and for communication systems (e.g., email, Internet-relay chats, bulletin board systems). Such profound technological changes very often stimulate changes in society. One of the changes stimulated by these inventions are community networks. They emerged in the 1970s and are meanwhile a essential part of the information society and have become of interest to several research areas.

In this paper I would like to provide a few thoughts about the relationship between computer-supported cooperative work and community networks. I will start with a revision of CSCW—some basic assumptions and some requirements for the computer support of cooperative work; I will then have a look at community networks; and I will touch on the relationship between computer support for cooperative work and community networks.

Computer-Supported Cooperative Work

Computer-Supported Cooperative Work (CSCW) is a discipline concerned with the study of human behaviour—mainly in groups—and their technical support. More fundamentally, CSCW can be seen as a conceptual shift in our understanding of computing—whereas the classical view of computing was manipulation of data by isolated individuals, the CSCW view of computing is manipulation and exchange of data and information as well as cooperation by individuals aware of their environment as well as other users.

Bannon and Schmidt [1989] identified what they called ‘core issues for CSCW’ such as the articulation of cooperative work, the sharing of an information space, and the adaptation of the technology to the organisation and vice versa. Robinson [1991a] enumerates several ‘CSCW specific concepts’ such as articulation work, situated action, double level language, mutual influence, information sharing, and equality. In the following I will enumerate some of these basic aspects, which constitute on the one hand basic assumptions and on the other hand requirements for CSCW. They should help characterising CSCW.

Articulation work. Cooperation includes two levels of activities: the cooperative work itself, and the organisation of the cooperative work process. This organisation includes task allocation to the different actors, distributing accountabilities for the execution of the tasks, and so forth. In order to organise all sub-tasks of a cooperative undertaking and to position them into a network of interrelationships, articulation work is necessary. Articulation work has to allow to talk about the sub-task done on a meta level. According to Gerson and Star [1986] articulation work consists of all sub-tasks that are necessary to coordinate the execution of a task, to control the necessary sub-tasks, to resolve fault developments of tasks, and to divide resources. In the articulation process questions like who, what, where, when, how, and so forth have to be addressed [Strauss 1985].

Situated action. Suchman [1987] argues that there is no a priori and algorithmic connection between a specific act of the real work and an act of the plan. Furthermore, a certain goal can be achieved in various manners and the manners are contingent on the respective situation rather than on definitional properties of the action. Coherence between intentions, actions, and effects can only be analysed after actions have been completed; the course of the action can neither be induced from the intention of the actor nor from the analyse of the outcome. These assumptions of Suchman have interesting consequences. It can be argued that actions that result from particular plans cannot exactly be predicted. Robinson [1991a] calls this phenomenon the failure of planning. Therefore, Suchman claims that CSCW applications should be open and should not anticipate the work arrangement too much and lead it into certain tracks.

Double-level language. Computer support should help in separating and interacting between cultural and formal forms of communication. The cultural part of language are the soft facts, which are subject to perspectives, mood, intention, and interpretation. The formal part of language reflects a shared reference point for group members, a construct that is predictable and with a rule-based behaviour. In his paper on double-level language, Robinson [1991b] writes that ‘in general, it can be said that any non-trivial collective activity requires effective communication that allows both ambiguity and clarity. These ideas of ambiguity and clarity can be developed as the cultural and formal aspects of language…’.

Mutual influencing. In most group interactions two types of mutual influencing can be identified. Firstly, the thoughts, intentions, and emotions of the participants of the group interaction highly influence the working process. In face-to-face conversations, discussions and during formal meetings or informal chats, this information is propagated automatically. CSCW systems that hide these kinds of information can hinder work processes [Robinson 1991a]. Secondly, consecutive conversations often build on what has been said. Current discussions have to be seen and interpreted in the context of past discussions. Nevertheless, participants’ preferences, choices, and viewpoints can change

over time. Systems have to reflect these changes in the course of conversations rather than isolate conversations and fix the positions of participants. According to Robinson 'participants shouldbe able to retract, restate, change, or take a totally different position in the light of views and feelings expressed by others' [Robinson 1991b].

Information sharing. Information sharing has to support the retrieval of information and documents, which others have stored. It goes far beyond concurrency, access control, or transaction scheduling. During cooperative activities actors have to take many decisions based on information that was produced by others. Therefore, they often have to proof the validity of the information. This requires transparent information sharing, which show the creators of the information and the motivation that led to the information. In general, information is generated upon a specific question and within a conceptual frame. Therefore, knowledge of the perspective that led to the solution and that caused the information and decision, and that served as basis for further information production and decision making is essential. Information sharing has to present the relationship between the conceptual frame, the knowledge, and the information produced or the decision taken [Robinson 1991a].

Socio-technical dimension of design. There is a strong interdependence between technologies and society. Technological innovations are created by society and society is influenced by technological innovations. The same interdependence holds for organisational settings. Often studies of social structures of work processes precede the design of new technologies; the introduction of these new technologies then changes the social structures of work processes [Bannon & Schmidt 1989]. Winograd [1986] writes: 'Every time a computer-based system is built and introduced into a work setting, the work is redesigned—either consciously or unconsciously.' This means that any new system influences the environment into which it is embedded. The impact of traditional single-user or office automation systems is difficult to predict. Concerning cooperative work settings, predictions of the effects are even more difficult and the possibilities to deliberately control the effects are rather small [Boedker *et al*. 1988].

Community Networks

The community network initiative at the University of Michigan defines a community network as 'a locally-based, locally-driven communication and information system designed to enhance community and enrich lives' [Miller 1999]. The Association for Community Networking offers a much more detailed definition [Gonzalez 1999]:

> Community Networking (CN) projects bring local people together to discuss their community's issues and opportunities, learn about Internet technology, and decide upon and create services to address these community needs and opportunities. CN is comprised of a wide variety of groups that make up a community (e.g., libraries, universities, K-12 schools, local government, businesses, media, individuals), with special focus on including those who are traditionally left out of community decision making in general, and technology decision making in particular (e.g., low-income, minorities, senior citizens). CN projects value collaboration and participation, and are usually non commercial.

Kubicek and Wagner [1998] identify four generations of community networks. Community memories in the 1970s were a public forum, where everybody could freely publish their opinion electronically. The free-nets in the 1980s were the first publicly accessible information and communication systems that provided free email and Internet

access for its users. In the 1990s community networks like the Boulder Community Network took a different perspective: it is assumed that most people have a private email account and access to the Internet anyway. Therefore, they mainly focus on providing some public access terminal for less privileged people and on providing all kinds of local information about the community for people within and without the community. Nowadays, a fourth generation of professionalised community networks can be identified, where the basic assumption is that more and more users of community networks take the perspective of customers and consequently expect professional services (e.g., professional contents) and do not necessarily want to contribute themselves. The Digital Cities project of AOL, the Sidewalk project of Microsoft Network, and the New York Today project of the New York Times are mentioned as examples.

This transition can be seen as a new form of concentration of information and power. Whereas the aim of the first two generations was clearly a dissemination of information and power, the fourth generation can be seen as a movement back to a concentration, where the decisions of what kind of information, in which format, and so forth are taken by professional providers. The third generation—that is, the current community networks—can be seen as intermediate forms. This scenario contrasts several assumptions underlying new communities, which are described as 'fundamentally devoted to problem-solving' with 'principles based on equity', and so forth [Schuler 1996].

De Cindio and others [1997] take a slightly different perspective. They also mention early attempts of community networks and argue that these 'civic networks' provided members of the local community with 'access to a vast amount of resources' and 'bi-directional communication'. However, they argue that this movement split into 'community networks', which they also call 'citizen networks' and which were often based on bulletin board systems (BBS); 'civic nets' which were often promoted by local administrations and offered residents the possibility to inform themselves and to approach city officials; and 'city nets' which served as 'window-shows' for the public administration with hardly any interaction with the users.

The important point is that De Cindio and others [1997] emphasise the importance of the integration of the different movements into civic networks: 'it must however be noted that the above mentioned scenarios, instead of being alternative to each other, can also be seen as complementary. They can be designed as different dimensions of a single Network routed in a town…'. And, furthermore, the authors seem to be more optimistic concerning the democratising power of community networks than Kubicek and Wagner and claim that 'instead of reducing interactive communication to a new broadcasting medium, we need to transform it in the tool of choice able to sustain the local community—intended not as a mere recipient of electronic services offered by public and private organisations, but seen as a great resource for social development … or the transformation of the acronym CSCW, first related to the technologies of Computer Supported Cooperative Work and now used for Community Supported Cooperative Work…'.

CSC*ooperative*W and CSC*ommunity*W

The transitions described above cause changes to many basic assumptions underlying community networks. Consequently, many basic assumptions for the design of community networks have to be adapted. For instance, several of the above mentioned requirements for computer support of cooperative work are based on the assumption that groups of people interact with each other and work on a shared task or artefact. In the scenario of increasingly professionalised community networks, however, it is very likely that users of community networks mainly use the community network as an information repository rather than a forum for communication, information exchange, and the creation of common information bases.

These transitions are also interesting from a CSCW perspective, because in CSCW the evolution of computing systems went hand in hand with the evolution of organisational work styles. Computing systems evolved from mainframe systems, which offered only rudimentary collaborative applications like shared calendaring systems, to networked personal computers (PC), which brought a dissemination of computing power. Organisational work styles changed from a hierarchical, monolithic, and rigid form of cooperation to flatter organisations and lean management with increased division of labour within and between companies. And, furthermore, the focus of research has been highly influenced by the prevailing socio-technical and socio-political contingencies. Whereas in the mainframe era research in this context was concerned with whole organisations and included information systems, data processing and management information systems, in the PC era research in this context focused on single-users and on human factors or human-computer interaction. Some years later CSCW emerged as a research area on its own [Grudin 1994].

Conclusions

The question now is how CSCW and community networks will influence each other. In particular, questions like whether community networks will influence the research within and without CSCW in its focus, scope, and so forth and also whether parts of the body of knowledge of CSCW can be used for the design and use of community networks will have to be raised and answered. In my opinion a change or an extension of the scope, focus, and so forth of CSCW towards community networks—but also to other areas like computer-supported cooperative learning—can be very stimulating. However, it is dangerous to simply take the knowledge and results of CSCW research and apply it to other areas. It is essential to critically reflect the assumptions, under which the research in the area of CSCW has been carried out and to match them with those underlying community networks. In this workshop I would particularly like to discuss the relationship of CSCW and community networks in the light of the above mentioned transitions of community networks and also concerning potential cross-fertilisation between CSCW and community networks.

Biographical Information

Tom Gross recently joined GMD, where he is currently working in a project on an awareNESS envIronmEnt called NESSIE. The project NESSIE is part of the research framework the Social Web; its goal is the enhancement of social and task-oriented awareness between people who cooperate or inhabit the same context. In the years 1993-9 he was working at the Institute of Applied Computer Science at the Johannes Kepler University of Linz, Austria, where he received his Ph.D. in 1997. His research interests include CSCW, HCI and global Internet-based information systems.

References

Bannon, L.J. and Schmidt, K. CSCW: Four Characters in Search of a Context. In *Proceedings of the First European Conference on Computer-Supported Cooperative Work - ECSCW'89* (Sept. 13-15, Gatwick, UK). Elsevier, Dortrecht, NL, 1989. pp. 358-372.

Boedker, S., Ehn, P., Knudsen, J., Kyng, M. and Madsen, K. Computer Support for Cooperative Design. In *Proceedings of the Conference on Computer-Supported Cooperative Work - CSCW'88* (Sept. 26-28, Portland, OR). ACM, N.Y., 1988. pp. 377-394.

De Cindio, F., Sonnate, L. and Cannada Bartoli, V. From the Milano Community Network to the Association of Civic Networking in Lombardia. In *First European Community Networks Conference - ECN'97* (July, 3-5, Milan, Italy). 1997.

Gerson, E.M. and Star, S.L. Analysing Due Process in the Workplace. *ACM Transactions on Office Information Systems 4*, 3 (July 1986). pp. 257-270.

Gonzalez, M. *Assiciation for Community Networking (AFCN): What is Comunity Networking?* Boulder Community Network, http://bcn.boulder.co.us/afcn/cn/definition.html, 1999. (Accessed 1/7/1999).

Grudin, J. Computer-Supported Cooperative Work: History and Focus. *IEEE Computer 27*, 5 (May 1994). pp. 19-26.

Kubicek, H. and Wagner, R.M.M. *Community Networks in a Generational Perspective.* Presented at Designing Across Borders: The Community Design of Community Networks at the Participatory Design Conference - PDC'98 (Nov. 14, Seattle, WA). 1998.

Miller, M. *Community Network Initiative--What is a Community Network?* University of Michigan, School of Information, Community Networking Initiative, http://www.si.umich.edu/Community/what.html, 1999. (Accessed 1/7/1999).

Robinson, M. Computer-Supported Cooperative Work: Cases and Concepts. In *Proceedings of the Conference on Groupware - Groupware'91* (Utrecht, NL). Software Engineering Research Centre (SERC), Utrecht, NL, 1991a. pp. 59-75.

Robinson, M. Double Level Language and Co-operative Working. *AI & Society 5* (1991b). pp. 34-60.

Schuler, D. *New Community Networks: Wired For Change.* Addison-Wesley, N.Y., 1996.

Strauss, A. Work and the Division of Labour. *The Sociological Quarterly 26*, 1 (Feb. 1985). pp. 1-19.

Suchman, L. *Plans and Situated Actions. The Problem of Human-Machine Communication.* Cambridge University Press, Cambridge, MA, 1987.

Winograd, T. A Language/Action Perspective on the Design of Cooperative Work. In *Proceedings of the Conference on Computer-Supported Cooperative Work - CSCW'86* (Dec. 3-5, Austin, TX). ACM, N.Y., 1986. pp. 203-220.