Humans are social beings ...

Groups structure human activity

Professional life: teams, management chain,

Private life: family, friends, sport teams, choir, etc.

Groups are more than the sum of their parts
Division of labor
Take advantage of different expertise
Transfer of skills: learning

... but computers are (mostly) personal

Time-sharing systems create the illusion that each user has access to all the resources and do not support awareness of what other users are doing.

Example: file system

Don Norman

"Most work done on any complex entity is done by more than one person"

"Social impact of technology is hard to predict"
Augmenting the human intellect

1968: Engelbart and his colleagues NLS/Augment, a system that supported file sharing, personal annotations, electronic messaging, videoconferencing, screen sharing, telepointers, etc.

Emergence of a field

Software that supports group work
- Groupware (Johnson-Lenz, 1982)
- Computer Supported Cooperative Work (Greif & Cashman, 1984)

In French:
- Collecticiel
- Travail Coopératif Assisté par Ordinateur (TCAO)

Conferences: CSCW (ACM) and ECSCW since 1986
Journal of CSCW

Social definition

CSCW should be conceived as an endeavor to understand the nature and characteristics of cooperative work with the objective of designing adequate computer-based technologies. [...] The focus is to understand, so as to better support, cooperative work.

Bannon et Schmidt, 1989

Engineering definition

Computer-based systems that support groups of people engaged in a common task (or goal) and that provide an interface to a shared environment

Ellis, Gibbs & Rein, 1991
Software definition

Groupware is distinguished from normal software by the basic assumption it makes: groupware makes the user aware that he is part of a group, while most other software seeks to hide and protect users from each other.

*Lynch, Snyder & Vogel, 1990*

Challenges

What should groupware systems do?
How to design them?
How do they affect use?

A multidisciplinary endeavor: sociology, ethnography, anthropology, design, computer science, etc.

Problems are both technical and human
Solutions are both technical and human

Functional taxonomy

- **Communication**
  - exchanging information among participants

- **Sharing**
  - creating and computer artifacts and actions for editing them

- **Coordination**
  - organization of labor among participants

A sample of groupware systems
Some groupware systems

- e-mail, distribution lists
- discussion groups (EMISARI, 1976)
- chat, talk, IRC
- workflow systems
- group calendars
- shared editors
- audio-video communication systems
- argumentation tools
- roomware, collaborative buildings
- etc.

Information lens

Malone et al., 1987

To: Thomas Malone
From: Anyone
Cc: Anyone
Subject: LENS Meeting This Monday
Topic: Lens
Day: Monday
Meeting Date: Time: 3:00
Place: E53-301
Text:

Colab

Stefik et al., 1987

Meetings of small group in a specially-equipped room

“Shared external memory”
Boardnote: hand drawing
Cognote: outlining ideas
Argnote: argumentation spreadsheet

View, space and time congruence
What You See is What I See
What You See Is Almost What I See

WYSIWIS / WYSIAWIS

WYSIWIS
Strict view congruence

WYSIAWIS
Relaxed congruence
Shared editing

Text, asynchronous
- Quilt (Leland, Fish & Kraut, 1988)
- Prep (Neuwirth et al., 1989)

Text, synchronous
- Grove (Ellis, Gibbs & Rein, 1989)
- ShriEdit (McGuffin & Olson, 1992)
- SASSE (Baecker et al., 1993)

Graphics, synchronous
- GroupDesign (Karseity & Beaudouin-Lafon, 1992)

GROVE

Group Outline Viewing Editor
- concurrent editing at the character level
- private, shared and public views
- clouds to show activity to other users
- aging text: first blue, then progressively black

Workflow systems

Managing a document across an organization
Example: a document includes metadata describing its path through an organization
- must be written by Anne by April 15
- must be proofread by Bob by April 22
- must be approved by Charlie by April 29
- must be sent to Charlie by May 4

The document “knows its way” and can send reminders to the various people involved

The Coordinator

Based on the theory of speech acts
From communication to social networking

Unix talk

Chat rooms

Babble (Bradner et al., 1988)

Chat circles (Viégas et al., 1999)
http://web.media.mit.edu/~fviegas/circles/
http://web.media.mit.edu/~fviegas/CC2/

Notification Collage

Greenberg & Rounding, 2000

Social networks
Networked games

World of Warcraft

Video-mediated communication systems

ClearBoard (1991-94)
VideoDraw (1991)
TeamWorkStation (1990)
Mediaspaces (1983)
Hole-in-Space (1980)
Virtual window (1985)
Videoplace (1974-85)

Collaborative Virtual Environments

Represent participants by avatars in a virtual world

DIVE (1991)
Second Life (2005)

CSCW infrastructure

Cooperative buildings (Streitz et al., 1998)
Ubicomp (Weiser, 1991)
Crowdsourcing

Harness the power of the crowd
Combine human intelligence with machine computation

Taxonomies

Several ways to classify systems:
- Time, space and size of the group
- Sharing (e.g., editors) vs. exchanging (e.g., email)
- Structured (e.g., workflow systems), vs. open (e.g., whiteboards)
- Strong vs. weak computer support

Time-space matrix

<table>
<thead>
<tr>
<th></th>
<th>Same place</th>
<th>Different place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same time</td>
<td>face-to-face conversation</td>
<td>telephone call</td>
</tr>
<tr>
<td>Different time</td>
<td>Post-it note</td>
<td>letter</td>
</tr>
</tbody>
</table>

Challenges for groupware developers

- Who does the work vs. who gets the benefit
- Critical mass and Prisoner’s dilemma problems
- Disruption of social processes
- Exception handling
- Unobtrusive accessibility
- Difficulty of evaluation
- Failure of intuition
- Careful adoption process
Privacy, and other social behaviors

Plausible deniability

Some references


http://www.lri.fr/~mbl/Trends-CSCW/