

CS 160: Lecture 19

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Fall 2004

CSCW: Computer-Supported Cooperative Work

 Its about tools that allow people to work together.

 Most of the tools support remote work
* video, email, IM, Workflow

 Some tools, e.g. Livenotes, augment local communication.

Asynchronous Groupware

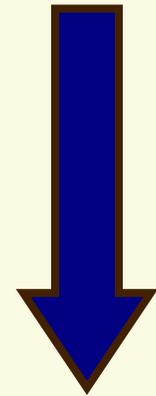
 Email: still a killer app



 Newsgroups: topical messaging

 Cooperative hypertext/hypermedia authoring: e.g. Wikis, Blogs

 Structured messaging: e.g. Workflow - messages route automatically.



Automation

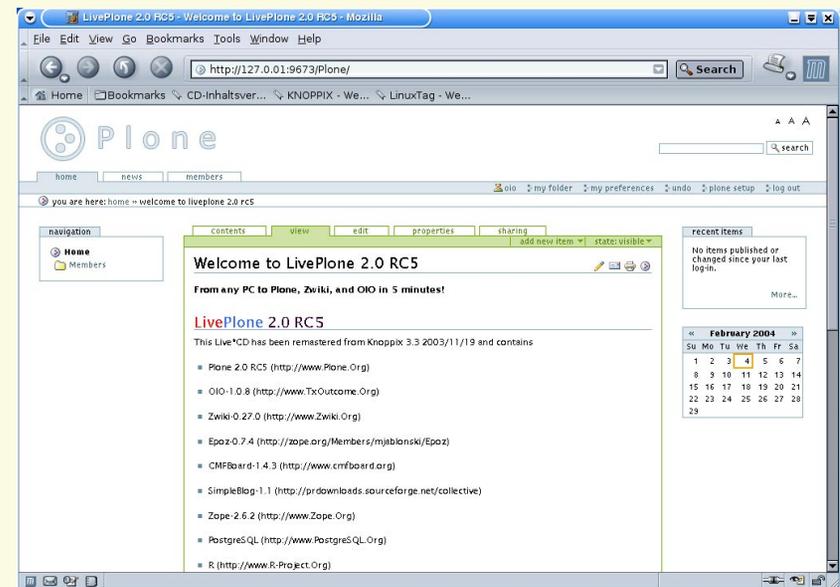
 Knowledge repositories:
Answergarden, MadSciNet, Wiki-pedia

Blogs and Wikis

-  Hybrids between mail/news and web sites.
-  Posting capabilities make the site dynamic.
-  Web presence makes it accessible+searchable
-  Usually create a hierarchy among the user group (posting, commenting, reading).

Content-Management Systems

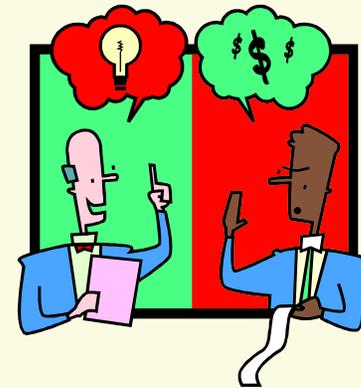
- ❏ CMSES (like Plone) go a step further.
- ❏ They include fancier publishing options (templates) and site navigation widgets.
- ❏ They also include more groupware features, scheduling, news, comments, etc.



11/8/2004

Language/Action Analysis

- ❏ Early studies of CSCW noticed that human dialogue at work was "transactional":
- ❏ It comprised a few categories of "speech acts", like ask, propose, accept, acknowledge..
- ❏ i.e. user action and form of dialogue were closely coupled.



Language/Action Analysis

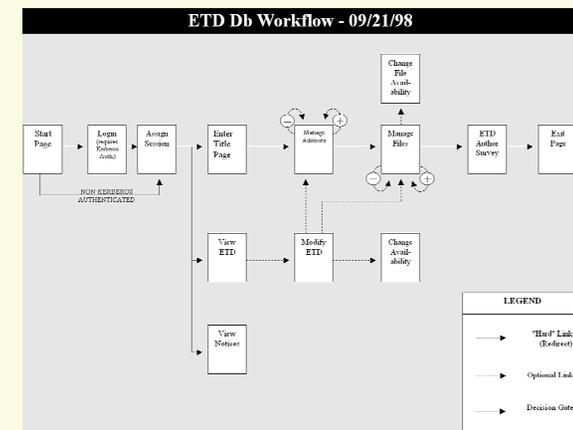
- ☞ Systems were built to support specific acts and to follow and help the work.
- ☞ BUT: they were *too* restrictive.
- ☞ E.g. the *Coordinator* forced users to identify the speech act they were using to the system.
- ☞ Finally a compromise was found: Workflow.

Workflow

Documents carry meta-data that describes their flow through the organization:

- * Document X should be completed by Jill by 4/15
- * Doc X should then be reviewed by Amit by 4/22
- * Doc X should then be approved by Ziwei by 4/29
- * Doc X should finally be received by Don by 5/4

The document "knows" its route. With the aid of the system, it will send reminders to its users, and then forward automatically at the time limit.



Workflow

- ☞ There are many Workflow systems available. Lotus notes was one of the earliest.
- ☞ Workflow support now exists in most enterprise software systems, like Peoplesoft, Oracle, SAP etc.

Knowledge repositories

 AnswerGarden (Ackerman): database of commonly-asked questions that grows automatically.

 User poses question as a text query:

- * System responds with matches from the database.
- * If user isn't satisfied, system attempts to route query to an expert on the topic.
- * Expert receives query, answers it, adds answer to the database.

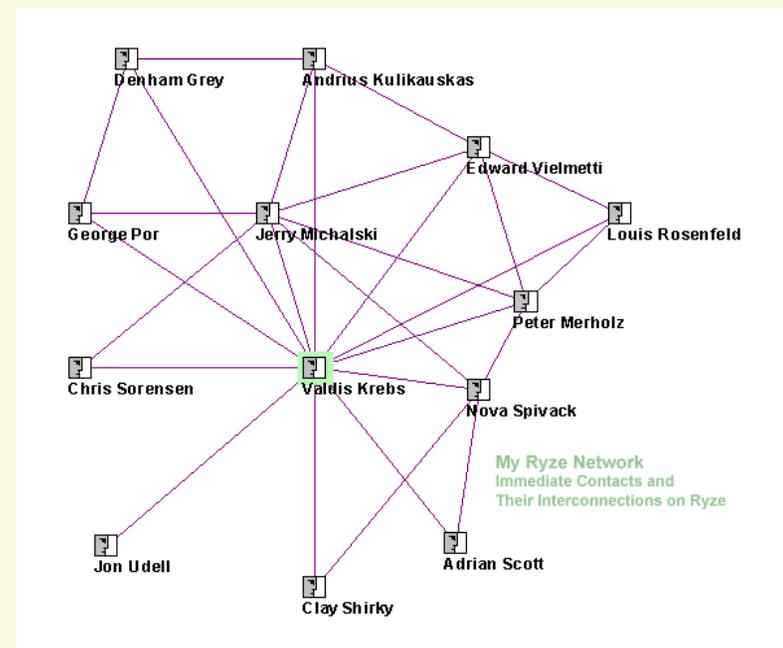


Social & Knowledge Networks

Some systems explicitly model personal connections between individuals.

Users can search for an employee with the right expertise, *and* a common contact who can mediate.

E.g. Ryze



Trends

 There is a trend toward “do everything” systems like Autonomy:

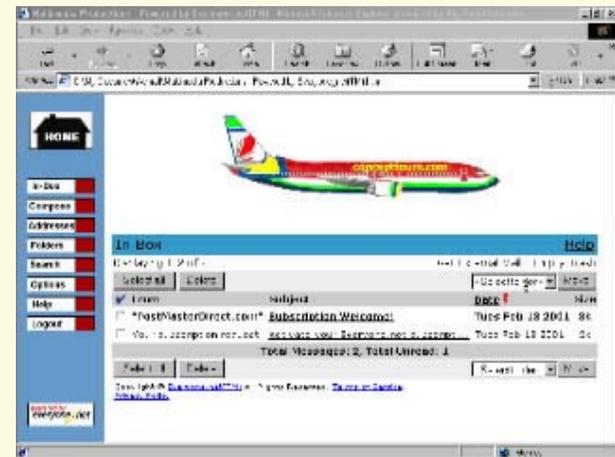
 Autonomy includes:

- * Automatic expertise profiling
- * Social networks (communities of practice)
- * Document clustering and categorizing
- * Search and browse
- * Automatic cross-referencing & hyperlinking

 i.e. no boundary between “content management” and “people management”

Wither Email?

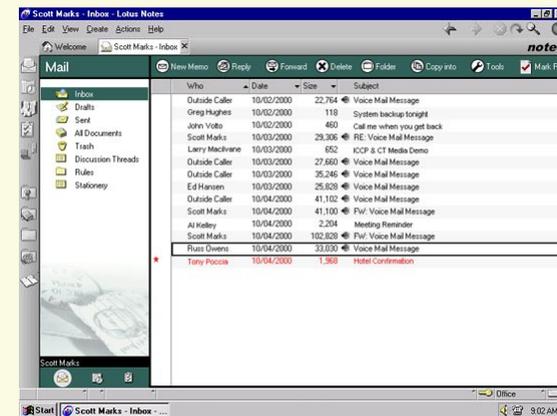
- ☞ There is a lot of research on "Email++"
 - * Automatic organization
 - * Task management
 - * Other functions: contacts, reminders
- ☞ Multimedia email: Can include sound, video, images.
 - * But who really does this?
 - * Photos, style sheets, sound and image emoticons,



Extensible Groupware: Lotus Notes

Notes is a product that combines standard office software (email, calendar, contacts etc.) with a scriptable database backend.

Easy to create new apps: PERT charts, novel workflow, custom shared authoring...



"most successful groupware system to date"

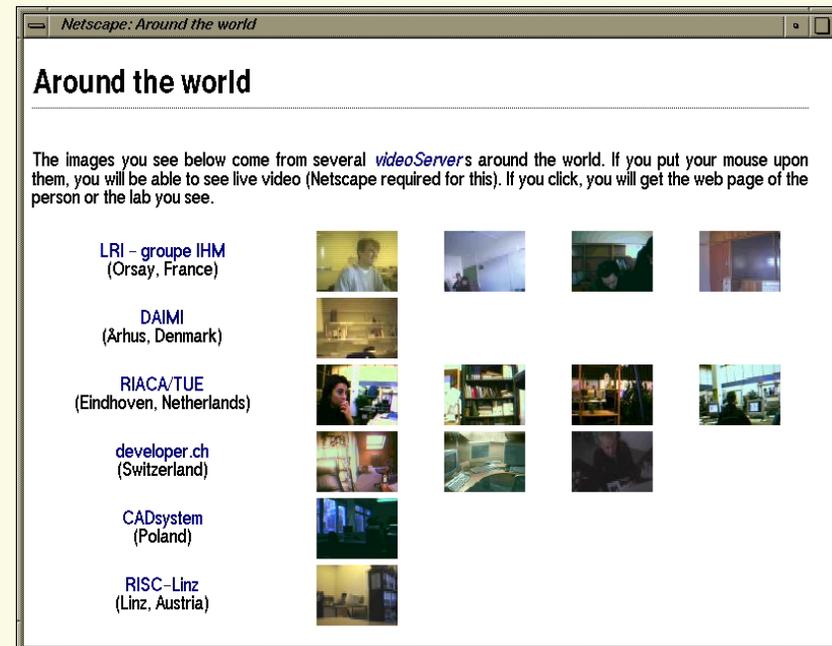
Synchronous Groupware

📄 Desktop Conferencing (MS Netmeeting)

📄 Electronic Meeting Rooms (Access Grid)

📄 Media Spaces
(Xerox PARC)

📄 Instant Messaging



Video

📄 Eye contact problems:

- * Offset from camera to screen
- * "Mona Lisa" effect



📄 Gesture has similar problems: trying pointing at something across a video link.

Sound

☰ Good for one-on-one communication



☰ Bad for meetings. Spatial localization is normally lost. Add to network delays and meeting regulation is very hard.

Turn-taking, back-channeling

-  In a face-to-face meeting, people do a lot of self-management.
-  Preparing to speak: lean forward, clear throat, shuffle paper.
-  Unfortunately, these are subtle gestures which don't pass well through today's technology.
-  Network delays make things much worse.

Breakdowns

- ❏ Misunderstandings, talking over each other, losing the thread of the meeting.
- ❏ People are good at recognizing these and recovering from them "repair".
- ❏ Mediated communication often makes it harder.
- ❏ E.g. email often escalates simple misunderstandings into flaming sessions.

Usage issues

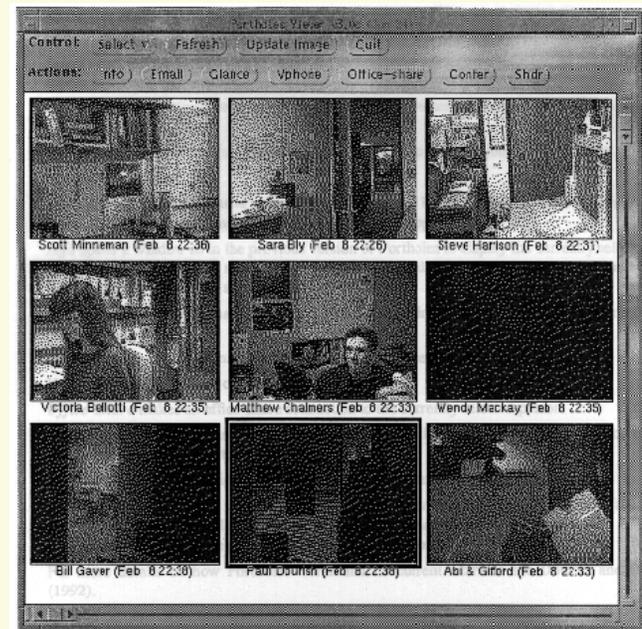
- ☞ Our model of tele-communication is episodic, and derives from the economics of the telephone.
- ☞ Communication in the real world has both structured and unplanned episodes. Meeting by the Xerox machine.
- ☞ Also, much face-to-face communication is really side-by-side, with some artifact as the focus.

Solutions

Sharing experiences is very important for mutual understanding in team work (attribution theory).

So context-based displays (portholes) work well.

Video shows rooms and hallways, not just people or seats.



Solutions

📄 Props (mobile presences) address many of these issues. They even support exploration.



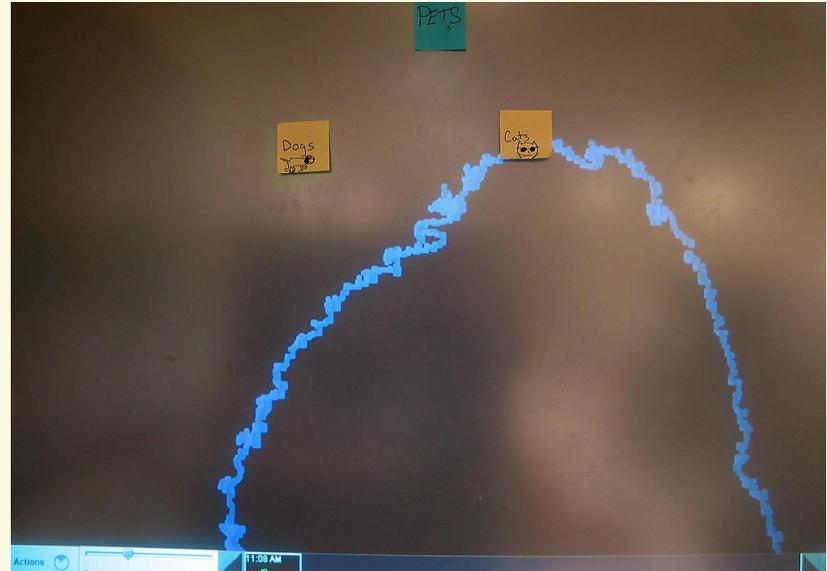
Solutions

📄 Ishii's Clearboard: sketching + presence



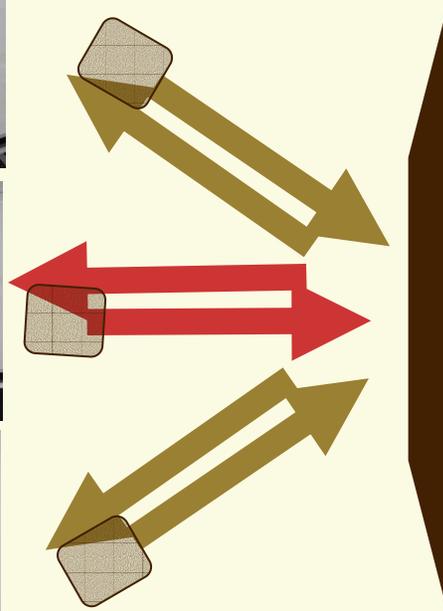
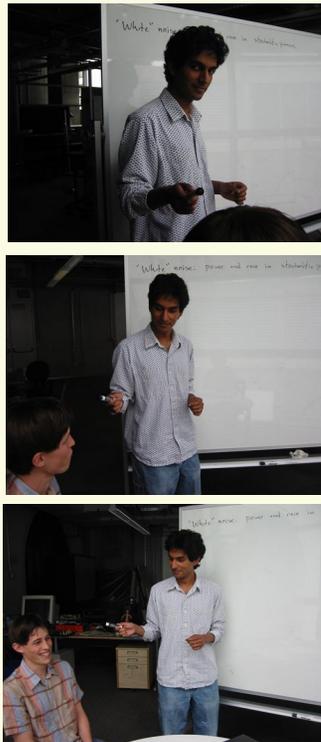
Solutions - Outpost (Berkeley)

- Post-it capture system for web site design.
- For collaboration, add pen traces and user shadows (to add awareness).



Solutions - Multiview (here)

Uses directional screen technology + projectors to provide each viewer with a unique, and spatially-correct view.



Break

Face-to-Face: the ultimate?

 It depends.

 Conveys the maximum amount of information, mere presence effects are strong. But...

 People spend a lot of cognitive effort managing perceptions of each other.

 In a simple comparison of F2F, phone and email, most subjects felt *most* comfortable with the *phone* for routine communication.

Face-to-Face: the ultimate?

Kiesler and Sproull findings:

- * Participants talk more freely in email (than F2F).
- * Participation is more equal in email.
- * More proposals for action via email.
- * Reduced effects of status/physical appearance.

But

- * Longer decision times in email.
- * More extreme remarks and flaming in email.



Face-to-Face: the ultimate?

☞ Kiesler and Sproull found that email-only programming teams were more productive than email+F2F teams in a CS course.

☞ There you want coordination, commitment, recording.

☞ Conclusion: Match the medium to the mission



Grudin: Eight challenges for CSCW

1. Disparity between those who benefit from the App, and those who have to work on it.
 - 📄 e.g. secretary uses calendars to schedule meeting, but others must maintain calendars.

2. Critical mass, Prisoner's Dilemma

- * Need full buy-in to automate scheduling, similarly with Lotus Notes.



Grudin: Eight challenges

3. Disruption of social processes:

- * people are flexible, adaptive, opportunistic, **improvisors**, sometimes imprecise. Many CSCW systems are not.



4. Exception Handling:

- * People react to interruptions or exceptions and dynamically re-plan what to do. Most software doesn't plan, so exception-handling must be anticipated and pre-programmed.

Grudin: Eight challenges

5. Unobtrusive accessibility:
- * Group features should complement individual work functions, and be easily accessible



6. Difficulty of evaluation:
- * Collaborators add uncertainty! Hard to isolate the parameters you want to study. WOZ can help.

Grudin: Eight challenges

7. Failure of intuition:

- * Group processes (and social psychology) are often counter-intuitive. This leads to mistakes both by adopters and designers.



8. The adoption process:

- * Very hard to get people to voluntarily change their habits. Incentives are often needed. Otherwise follows a (slow) adoption curve.

Beyond communication

- ☞ How can computers assist cooperative work beyond communication?
- ☞ Can they “understand” conversation?
- ☞ Speech-act based systems like the Coordinator attempted to do so.
- ☞ General understanding is too hard. But business communication is mostly about propose-accept-acknowledge sequences.

CSCCL: Computer-Supported Collaborative Learning

-  Sub-area of CSCW concerned with learning and collaboration.

-  Peer interaction is a powerful source of learning, especially in universities.

-  Three powerful models:
 - * TVI, DTVI: recorded instructor, team review
 - * Peer instruction: pauses for group discussion
 - * PBL: Problem-based learning, team problem-solving

Summary

- Asynchronous groupware: email, newsgroups, workflow, swiki, knowledge repositories.
- Synchronous groupware: desktop, conference room, media spaces.
- Issues with videoconferencing.
- Alternative systems for remote presence.
- Face-to-face vs. email
- Grudin's 8 challenges for CSCW
- Beyond communication: smart groupware
- CSCL