# **CSCW** Basics

- Intro to Group Work
- Intro to Groupware
- Design of Groupware
- Evaluation of Groupware



# Learning Outcomes

- After attending this lecture and reading the additional literature, you should be able to:
  - Explain what groupware is
  - Recognise examples of groupware and
  - Use a taxonomy for categorising groupware applications based on space/time and richness

## Resources

- http://www.usabilityfirst.com/groupware/
- http://www.idbook.com/chapter4\_links.php



# In the beginning

- Douglas Engelbart and colleagues at Augmented Research Centre of Stanford Research Institute
  - Multimedia access to a networked computer system
    - The first mouse
    - Hypertext
    - Multiple Windows
    - On-screen video conferencing
  - Video available on http://sloan.stanford.edu/MouseSite/1968Demo.html



# Definition

- Groupware is a generic term for specialized computer aids that are designed for use by collaborative work groups...Groupware can involve software, hardware, services and group process support.
  - Groupware provides an interface to a shared environment.
  - Provides synergistic mechanisms for coordinating each user's actions with respect to the rest of the group and the system.
  - In contrast to individual data processing, with groupware collaboration / cooperation/communication are important issues.

# **Space-Time Matrix**



# What groupware have you used?

- Think about your experiences with groupware.
  - What groupware have you used?
  - In which categories do these fall?
- What would you say were particularly good or bad experiences?
  - As an individual
  - From a Team perspective

# Media richness theory

 Framework to describe a communication medium by its ability to reproduce the information sent over it



# Media richness

- Daft and Lengel define media richness as a function of
  - the medium's capacity for immediate feedback,
  - the number of cues and channels available,
  - language variety;
  - the degree to which intent is focused on the recipient

# **Different tasks**

#### Task taxonomy

- *Generating Tasks:* coming up with alternative solutions to a problem (as in brainstorming) or alternative options for action
- Intellective Tasks: solving problems with correct answers
- Judgement Tasks: deciding issues where there are no right answers
- Negotiation Tasks: resolving conflicts of interests or viewpoints
- The different types of task require different amounts of information, not just about the nominal content of the task, but also about peoples' feelings and attitudes.

# **Communication richness**

- Face-to-face
  Video
  Audio
- Text based
- However,
  - Touch?

- Smell?



# What should groupware do?

- Provide communication between group members
- Collaboration
  - Provide organisation and common understanding of the work processes and other people
    - Awareness support
  - Support decision making and problem solving

# Communication: being social

- How many friends do you have on Facebook, Skype, vs real life?
- How many contacts you have on your e-mail (vs. skype, facebook, vs. real life)?
- How much do they overlap?
- Are F2F rules and etiquette still applicable to online environment?
- Do different rules apply to different contexts?

# 2 Functions of conversation

- Referential part of the message
   The content of what we say
- Relational part of the message
  - The style of what we say
  - It reflects a perception of "Who I am", "Who you are" in "what context are we"

# **Conversational mechanisms**

- Various 'rules' are followed when holding a conversation, e.g. mutual greetings
  - A: Hi there
  - B: Hi!
  - C: Hi
  - A: All right?
  - C: Good, how's it going?
  - A: Fine, how are you?
  - C: OK
  - B: So-so. How's life treating you?

# Rules: turn taking

• Sacks et al. (1978) work on conversation analysis describe three basic rules:

Rule 1: the current speaker chooses the next speaker by asking an opinion, question, or request, looking at somebody

- Rule 2: another person decides to start speaking
- Rule 3: the current speaker continues talking

# **Conversational rules**

- Turn-taking used to coordinate conversation
  - A: Shall we meet at 8?
  - B: Um, can we meet a bit later?
  - A: Shall we meet at 8?
  - B: Wow, look at him?
  - A: Yes what a funny hairdo!
  - B: Um, can we meet a bit later?
- Back channeling to signal to continue and following
  - Uh-uh, umm, ahh

# More conversational rules

Farewell rituals

- Bye then, see you, yer bye, see you later....

- Implicit and explicit cues
  - e.g. looking at watch, fidgeting with coat and bags
  - explicitly saying "Oh dear, must go, look at the time, I'm late..."

# Breakdowns

### A: Can you tell me the way to get to Cinema X?

- B: Yes you go down here for 2 blocks, then take a right [pointing to the right]. Go on till you get to the lights, and then it's on the left
- A: Oh, so I go along here for a couple of blocks and then take a right and the cinema is at the lights [pointing ahead of him]
- B: No, you go on THIS street for a couple off blocks (gesturing more vigorously)
- A: Ahhhh! I thought you meant THAT one: so it's THIS one [pointing in the same direction as the other person]
- B: Uh-Uhm, yes that's right: THIS one.

# Breakdowns in conversation

- When someone says something that is misunderstood:
  - Speaker will repeat with emphasis: A: "this one?"
    - B: "no, I meant that one!"
  - -Use tokens:
    - Eh? Quoi? Huh? What?
    - Puzzled look

# What happens in social media conversations?

- Do same conversational rules apply?
- Are there more breakdowns?
- How do people repair them for:
  - Phone?
  - email?
  - Instant messaging?
  - texting?
  - Skyping?

# **Remote conversations**

- How to support conversations when people are 'at a distance' from each other
- Many applications have been developed
  - e.g., email, videoconferencing, videophones, videoconferencing, instant messaging, chatrooms
- Do they mimic or move beyond existing ways of conversing?

## Awareness

- Individuals working together need to be able to gain some level of <u>shared</u> knowledge about each other activities
- Involves knowing who is around, what is happening, and who is talking with whom
- It provides a context for people activity

Category	Element	Specific questions
Who	Presence	Is anyone in the workspace?
	Identity	Who is participating? Who is that?
	Authorship	Who is doing what?
What	Action	What are they doing?
	Intention	What goal is that action part of?
	Artifact	What objects are they working on?
Where	Location	Where are they working?
	Gaze	Where are they looking?
	View	Where can they see?
	Reach	Where can they reach?
How	Action history	How did that operation happen?
	Artifact history	How did this artifact come to be in this state?
When	Event history	When did that event happen?
Who (past)	Presence history	Who was here, and when?
Where (past)	Location history	Where has a person been?
What (past)	Action history	What has a person been doing?

## Awareness

- Group awareness
- Self-awareness
- Social awareness
- Task-specific awareness
- Situation-awareness
- http://cml.hci.uni-bamberg.de/buwarchive/publ/ijhci\_jrnl05\_gross\_et\_al\_awareness.pdf

# **Peripheral awareness**

- keeping an eye on things happening in the periphery of vision
- Overhearing and overseeing allows tracking of what others are doing without explicit cues

# F2F coordinating mechanisms

- Talk is central
- Non-verbal also used to emphasize and as substitute
  - e.g. nods, shakes, winks, glances, gestures and hand-raising
- Formal meetings
  - explicit structures such as agendas, memos, and minutes are employed to coordinate the activity

- Video Arms
- http://grouplab.cpsc.ucalgary.ca/papers/vi deos/index.html

# Synchronous CMC

- Conversations are supported in real-time through voice and/or typing and/or video
  - One-to-one?
  - One-to-many?
  - Many-to-one?
  - Many-to-many?

# Early videophones





# VideoWindow system

- (Bellcore, 1989) Shared space: conversation between people 50 miles away
- 3 x 8 ft 'picture-window' between two sites with video and audio



### Usage practices

- People spoke louder
- Talked constantly about the system
- Spoke more with others in the same room
- Moved towards the video to get closer to the people they wanted to address (making themselves invisible)
- No feedback on other people view
- No private conversation possible

### Portholes (Dourish and Bly, 1992)

•Regularly updated digitized images of people in their offices appeared on everyone's desktop machines throughout day and night



# Skype success

- Global household name
- Seeing others on screen enables more intimacy than audio phone
- Enables people to get to know each other better
- Less awkward for young children
   Like "to show, not tell" (Ames et al, 2010)



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### Access Grid

- •Very high quality audio
- •Big display to enable full-size people shots and simultaneous viewing of all remote sites
- •Multiple cameras to show groups and multiple viewpoints
- •Collaborative software to enable remote participants to share and interact with data
- •Usage of IP multicast, to enable bandwidthefficient networking

# Telepresence

- New technologies designed to allow a person to feel as if they were present in the other location
  - projecting their body movements, actions, voice and facial expressions to the other location or person
  - e.g. superimpose images of the other person on a workspace

# Hypermirror (Morikawa and Maesako)

 allows people to feel as if they are in the same virtual place even though in physically different spaces

1) People in different places are superimposed on the same screen to make them appear as if in same space



(woman in white sweater is in a different room to the other three)

# Creating personal space in Hypermirror



2) Two in this room are invading the 'virtual' personal space of the other person by appearing to be physically on top of them

3) Two in the room move apart to allow person in other space more 'virtual' personal space

# Everyone happy?

No, when the two people start talking to each other, the person standing virtually between them feels awkward



## A telepresence room



## **Collaborative virtual environments**





The rooftop garden in BowieWorld, a Collaborative Virtual environment (CVE), supported by Worlds.com. Users take part by "dressing up" as an avatar. There are 100s of avatars to choose from, including penguins and real persons. Once an avatar has entered a world they can explore it and chat to other avatars.

Source: www.worlds.com/bowie

# Second life

- A virtual world with a separate economy

   Virtual cities with shops, jobs
  - Spaces and bodies are bought for money
  - Virtual University Red light district
- http://secondlife.com/

# 3D virtual worlds

- Second Life (2007)
  - Over 8 million users
- What kinds of conversation take place in these environments?



@2007 Linden Research, Inc. | We're Hiring!







Downloads.

Police Blotter Knowledge Base



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	Information about getting and using the Second Life Viewer source code. Source   Mailing List   Issue Tracker   Documentation	<ul> <li>Exchange Risk API - For third-party L\$ exchanges.</li> <li>Registration API - Register SL Residents from a web page.</li> <li>Map API - Embed SL maps in your site.</li> <li>Inventory API - Provides information on agent inventory.</li> <li>Name API - Embed SL maps in your site.</li> </ul>	
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	Community Resources Portal	Search API - Search for events, groups, people, places.     Snapshot API - Info from snapshots sent from the Viewer.	
	Resources to help you successfully promote your Second Life presence to both new and existing users.	Volunteer Portal	
	QA Portal	Learn more about Volunteering in Second Life and access shared volunteer resources.	
	Help out with quality assurance! = Issue Tracker - The basics of reporting bugs = <u>Prevides Grid</u> - For testing new server software	Resultant reg reasons runs   Resultant-created reg runs	
	Localization Portal	Resources for businesses and promoting Second Life and your content. = Second Life Work • FAQ	
	Learn more about the resources and localization projects. Project:IISn   LSL Portal Translation Project   Helpful Resources	Second Life Education • Institution Directory Business Blogs   Community Development   Mailing Lists   Periodicals   Videos	
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# Second Life today

http://www.techradar.com/news/internet/wl

• Example of importance of usabilitysociability balance

# **Facebook and Twitter**

- Used in emergencies, demos, etc.,
  - e.g., users spread up-to-the minute info and retweet about how a wildfire or gas plume is moving
  - but can also start or fuel rumors, by adding news that is old or incorrect
  - At times more confusing than helpful

### **Asynchronous Communication**

- Communication takes place remotely at different times
- Email, newsgroups, computer conferencing, IBM Babble
- Benefits include:
  - Read any place any time
  - Flexible as to how to deal with it
  - Powerful, can send to many people
  - Can make saying things easier
- Problems include:
  - FLAMING!!!
  - Spamming
  - Message overload
  - False expectations as to when people will reply

# **Coordination mechanisms**

- When a group of people act or interact together they need to coordinate themselves

   – e.g., playing football, navigating a ship
- They use:
  - verbal and non-verbal communication
  - schedules, rules, and conventions
  - shared external representations

# Clearboard (Ishii et al, 1993)

 ClearBoard - transparent board that shows other person's facial expression on your board as you draw





# **Shared Objects**

- Collaborative editors (see week 2)
  - Asynchronous
    - Google documents
    - MSWord
    - Wikipedia
  - Synchronous
    - Google documents
    - Synchronous Asynchronous Structured Shared Editor (Sasse)
    - Shared Whiteboard (Clearboard)
    - Has to deal with problems of concurrency



# Schedules, rules and conventions

- Schedules used to organize regular activities in large organizations
- Formal rules, like the writing of monthly reports enable organizations to maintain order and keep track
- Conventions, like keeping quiet in a library, are a form of courtesy to others

Workflow management/ coordination systems

- Form based systems

   Model the dataflow within organisations
- Calendar systems

   Contingency checking
- Workflow systems
  - Automate business process
  - Automatically implement policies and best practice

# Shared external representations

- Common method used to coordinate collaborative activities,
  - e.g., checklists, tables, to-do lists
- They can provide external information on:
  - who is working on what
  - When it is being worked on
  - where it is being worked on
  - when a piece of work is supposed to be finished
  - whom it goes to next

# Technologies to support coordination

- There are a variety of software tools designed to support scheduling, planning and coordinating
  - e.g., group calendars, electronic schedulers, project management tools, and workflow tools
- Need to get balance between human and system control
  - too much system control and the users will rebel
  - too little control and the system breaks down

# **Decision Making**

- Business Intelligence Tools
- Multi-Dimensional Analysis
- Data Mining
- Information Visualisation
  - Spotfire



# Summary

- Groupware is used to support COMMUNICATION and COLLABORATION
- F2F Social mechanisms needs to be embed or extended
- Keeping aware of what others are doing and letting others know what you are doing are important aspects of collaborative working and socialising

# **Further Reading**



 Sharp, Rogers and Preece – Interaction Design, 2012, Chapter 4