

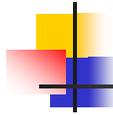


Human-Computer Interaction IS4300



Quiz #7

- What is CSCW?



P6 – Computer Prototyping

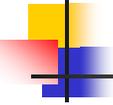
Due *next class*

- Must
 - Be easily installable on CCIS lab machines
 - Work for your three sample tasks
 - *Without you being there to help!*
- Set up a separate web page with
 - A link to your prototype (your prototype must remain frozen and accessible at this location for two weeks after the due date).
 - Startup instructions. Specify the platform and browser requirements for your prototype. Give any special instructions for installing and starting it up.
 - Briefing (from P5).
 - Description of 3 tasks (from P5)
- Send me a link to this page!

3



CSCW



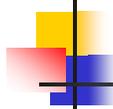
Computer-Supported Cooperative Work (CSCW)

- Def.: “the study of how people work together using computer technology”
- Examples of systems?
 - email
 - shared databases/hypertext
 - video conferencing
 - chat systems
 - real-time shared applications
 - collaborative writing, drawing, games



Groupware

- *Groupware* denotes the technology that people use to work together
 - “systems that support groups of people engaged in a common task (or goal) and that provide an interface to a shared environment.”
- *CSCW* studies the use of groupware
 - “CSCW is the study of the tools and techniques of groupware as well as their psychological, social, and organizational effects.”



Collaboration

- Physical work environments
 - several people working on personal workstations
- Frequently people need to cooperate
 - create/modify documents, drawings, designs
- Two key ways
 - at different times (asynchronously)
 - see changes previous workers have made
 - simultaneously (synchronously)
 - actions taken by user must be seen immediately



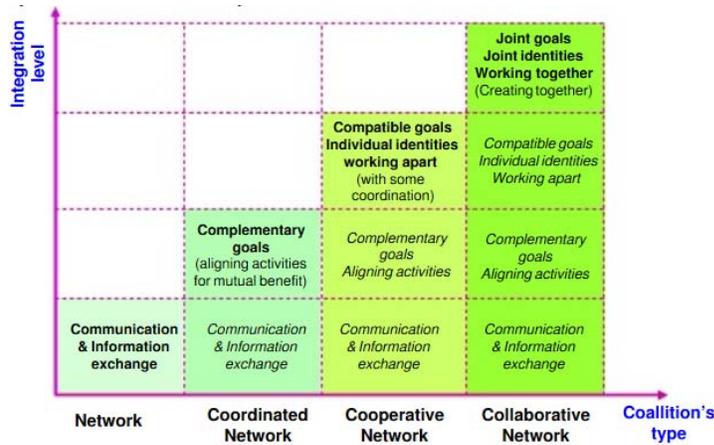
Collaboration

Shuman & Twobly, The Real Power of Collaboration, 2009

- Collaboration is a purposeful, strategic way of working that leverages the resources of each party for the benefit of all by coordinating activities and communicating information within an environment of trust and transparency.

Taxonomy of Collaboration

Camarinha-Matos, et al, 2006



CSCW apps aka Groupware

	same place	different place
synchronous communication	<ul style="list-style-type: none"> • smart meeting rooms • shared PCs/editors 	<ul style="list-style-type: none"> • SMS, IM • MUDs • Shared work surfaces • Shared PCs/editors • Shared calendar
asynchronous communication	<ul style="list-style-type: none"> • argumentation • co-authoring (word) • PARC Tab 	<ul style="list-style-type: none"> • email • bulletin board, USENET

↔

Types of Cooperation

Dix

- Focused partnerships
 - users who need each other to complete a task
 - often a document or image to work on
 - e.g., joint authors of a paper
- Lecture or demo
 - person shares info. with users at remote sites
 - questions may be asked
 - may wish to keep history and be able to replay

Types of Cooperation (cont.)

- Conference
 - group participation distributed in space
 - at same time or spread out over time
- Structured work process
 - a set of people w/ distinct roles solve task
 - e.g., hiring committee accepts applications, reviews, invites top for interviews, chooses, informs
 - aka "work flow" or "task flow"

Types of Cooperation (cont.)

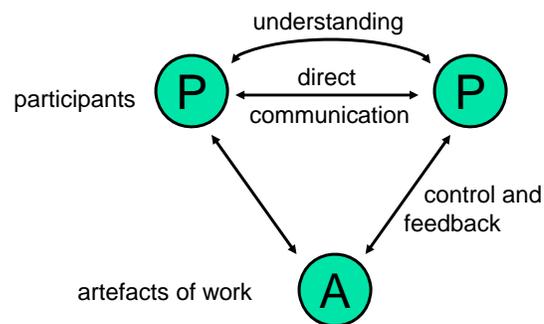
- Meeting and decision support
 - meeting w/ each user working at a computer
 - e.g., PDA Brainstorming tool

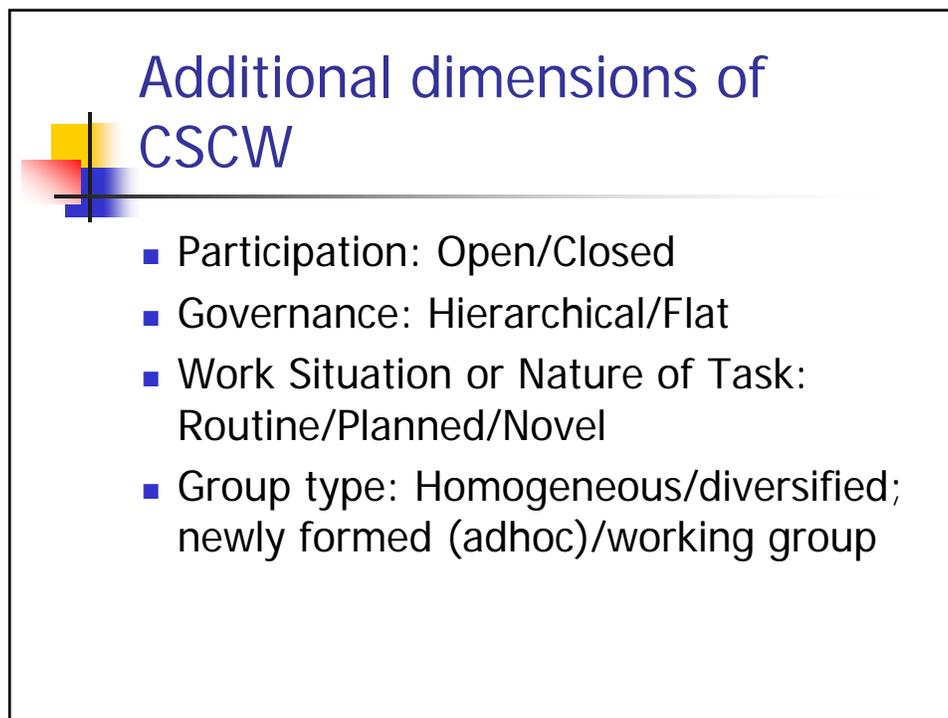
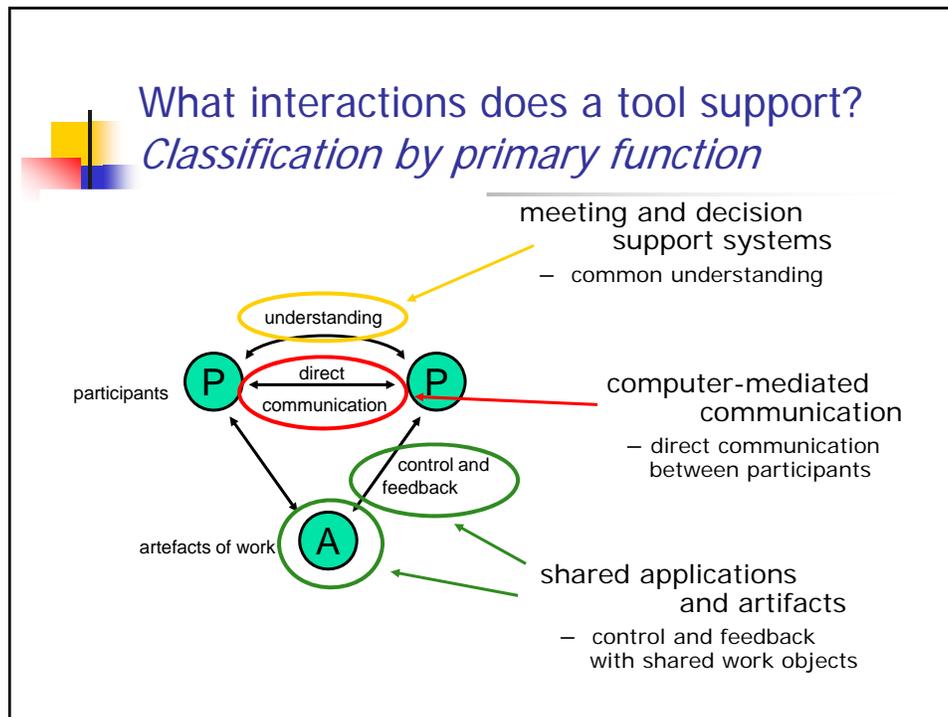
Classification by Function

Cooperative work involves:

Participants who are working

Artifacts upon which they work



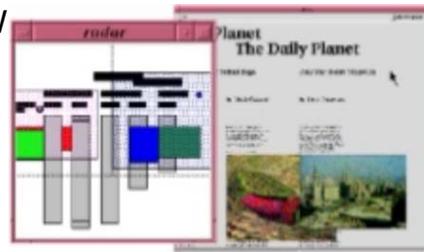


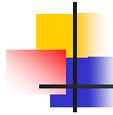
Awareness in Synchronous Remote CSCW

- Social
 - Who is here? What are their roles?
- Task
 - What do I know about the task and its structure?
- Workspace
 - What are others doing?

Workspace Awareness

- What information should be captured?
- How displayed to other users?
- Same task same view (WYSIWIS)
- Same task different view
- Radar view
- Multiple WYSIWIS
 - See what others see





Summary: some dimensions of CSCW classification

- Collaboration
 - Basic, Coordination, Cooperation, Collaboration
- Place/Time
- Function
 - Direct communication, shared understanding, control & feedback
- Participation: Open/Closed
- Governance: Hierarchical/Flat
- Work Situation: Routine/Planned/Novel
- Group type: Homogeneous/diversified; newly formed (adhoc)/working group
- Awareness (remote/sync): Social / Task / Workspace

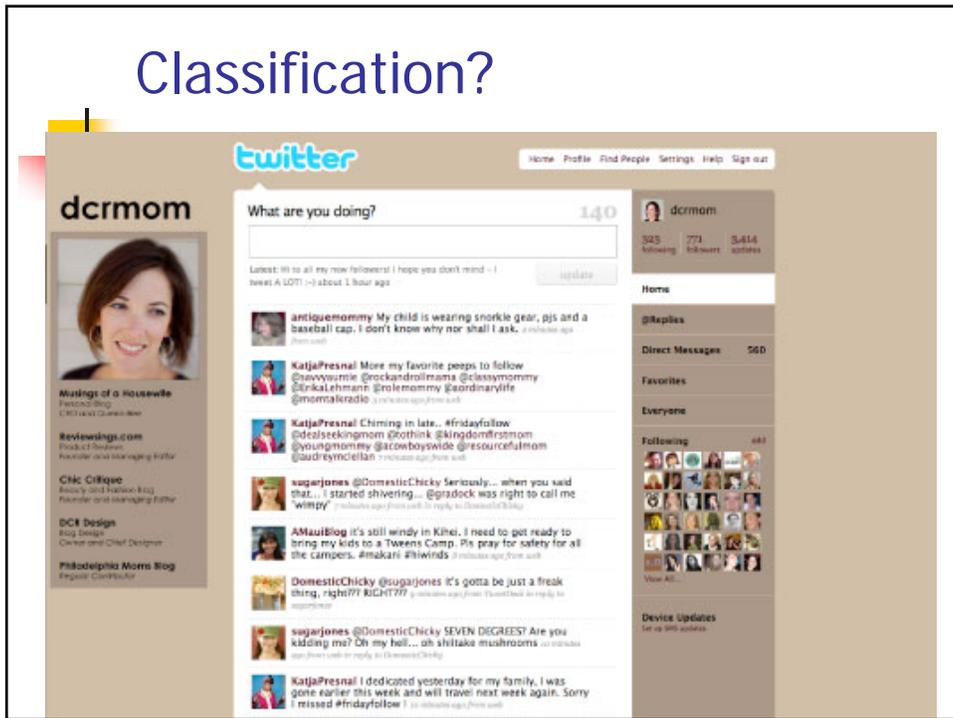


Esoteric Examples...

Classification?



Classification?



Classification? *Coursera*

The screenshot shows the Coursera interface for the course 'Archaeology's Dirty Little Secrets'. At the top, there are navigation tabs: ACTIVE, ENROLLED, ABOUT COURSE, LECTURES, ANNOUNCEMENTS, and FORUM. The 'ABOUT COURSE' tab is selected. Below the tabs, there is a video player showing an archaeological excavation site with a 'Preview' button. To the left of the video, there is a course description: 'Admit it – you wanted to be an archaeologist when you grew up... This course builds on that enthusiasm, while radically expanding your notions about just what archaeology is and just what archaeologists do. Workload: 4-6 hours/week'. Below the description, there is a section titled 'About the course' with the text: 'In this class, we will ask and answer a series of questions about the role and practice of archaeology in the world today. If archaeologists are trained to'. At the bottom, it says 'Content provided by Coursera.org ©'. On the left side of the page, there is a sidebar with the course title, dates (Jun 03,13 to Jul 29,13), the Brown University logo, and social media icons for Google+, Facebook, Twitter, and LinkedIn. There is also a small image of a person's face with a green border.

Classification? *Google docs*

The screenshot shows a Google Docs document with a bar chart comparing the performance of two processors: XPS 14 and Inspiron 640m. The chart has two groups of bars for each processor. The legend indicates the following categories: Processor Arithmetic (GPs) in blue, Processor Multi-Media (MPs) in red, Multi-Core Efficiency (GEM) in orange, and Physical Disk (MB/s) in green. The XPS 14 group shows higher values for all categories compared to the Inspiron 640m group. The document text is partially visible, mentioning 'important documents through the simple act of logging in to a' and 'ate my homework excuse looks less and less like a viable'.

Processor	Processor Arithmetic (GPs)	Processor Multi-Media (MPs)	Multi-Core Efficiency (GEM)	Physical Disk (MB/s)
XPS 14	~35	~60	~10	~70
Inspiron 640m	~15	~25	~5	~40

Classification? Telepresence

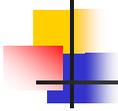


From Left: AnyBots QB, RoboDynamics TILR, Gostai Jazz Connect, Mantaro's Mantaro Bot, and VGO

SOCIAL MEDIA EXPLAINED

TWITTER I'M EATING A #DONUT
 FACEBOOK I LIKE DONUTS
 FOURSQURE THIS IS WHERE I EAT DONUTS
 INSTAGRAM HERE'S A VINTAGE PHOTO OF MY DONUT
 YOUTUBE HERE I AM EATING A DONUT
 LINKED IN MY SKILLS INCLUDE DONUT EATING
 PINTEREST HERE'S A DONUT RECIPE
 LAST FM NOW LISTENING TO "DONUTS"
 G+ I'M A GOOGLE EMPLOYEE WHO EATS DONUTS.

via THEMETAPICTURE.COM



CSCW Exercise – Part 1

- Form teams
- Brainstorm a new groupware extension for one of your projects (10 mins)
- Sketch the UI
- Classify it



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HARVARD UNIVERSITY

meeting and decision support systems

argumentation tools
meeting rooms
shared work surfaces

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Three types of systems

- argumentation tools
 - *asynchronous co-located*
 - recording the arguments for design decisions
- meeting rooms
 - *synchronous co-located*
 - electronic support for face-to-face meetings
- shared drawing surfaces
 - *synchronous remote*
 - shared drawing board at a distance

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Clearboard

Evolution of Our Media Design

Seamless Collaboration Media

Design

Analysis

Use Design

ClearBoard-2 with TeamPaint

ClearBoard-1

TeamWorkStation-2 with ClearFace

TeamWorkStation



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Issues for cooperation

Argumentation tools

- concurrency control
 - two people access the same node
 - one solution is node locking
- notification mechanisms
 - knowing about others' changes

Meeting rooms

- floor holders one or many?
 - floor control policies
- who can write and when?
 - solution: locking + social protocol
- group pointer
 - for deictic reference (this and that)



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shared applications and artifacts

shared PCs and windows
shared editors, co-authoring tools
shared diaries
communication through the artefact



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Shared Applications and Artifacts

Compare purpose of cooperation:

- meeting rooms and decision support systems
 - develop shared understanding
- shared applications and artefacts
 - work on the same objects

technology similar but primary purpose different

many different modalities (time/space matrix)

- shared windows – synchronous remote/co-located
- shared editors – synchronous remote/co-located
- co-authoring systems – largely asynchronous
- shared diaries – largely asynchronous remote
- shared information – any, but largely asynchronous



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Shared editors - multiple views

Options:

- same view or different view
- single or separate insertion points

Single view
⇒ scroll wars

Multiple views
⇒ loss of context with *indexicals*

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loss of WYSIWIS ...

We will look at some of the options and how they affect the style of cooperation. Thinking about the shared view vs. different view options, it at first seems obvious that we should allow people to edit different parts of a document. This is certainly true while they are working effectively independently.

More adaptable systems are needed to allow for the wide variation between groups, and within the same group over time. We will look at some of the options and how they affect the style of cooperation. Thinking about the shared view vs. different view options, it at first seems obvious that we should allow

your screen your colleague's screen

‘I don't like the line at the top’
‘but I just wrote that!’

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Communication through the artifact

When you change a shared application:

- you can see the effect – *feedback*
- your colleagues can too – *feedthrough*

feedthrough enables ...
communication through the artifact

Examples of feedthrough?

Integrating communication and work

Added:

- deixis* – reference to work objects
- feedthrough* – for communication through the artefact

Classification by Shared information

Granularity of sharing

- chunk size
 - small – edit same word or sentence
 - large – section or whole document
- update frequency
 - frequent – every character
 - infrequent – upon explicit 'send'

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implementing groupware

feedback and network delays
 architectures for groupware
 feedthrough and network traffic
 toolkits, robustness and scaling

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Feedback and network delays

The diagram illustrates the flow of data and feedback in a client-server architecture. It shows a user interacting with a local machine (client) which is connected to a remote machine (server) via a network. The remote machine runs a remote application. The diagram is annotated with numbers 1 through 9 to indicate the sequence of events:

- 1: user types
- 2: client sends data to server
- 3: server receives data
- 4: server processes request
- 5: server sends response
- 6: client receives data from server
- 7: client sends data to server
- 8: server receives data
- 9: screen feedback to user

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Types of architecture

centralized – single copy of application and data

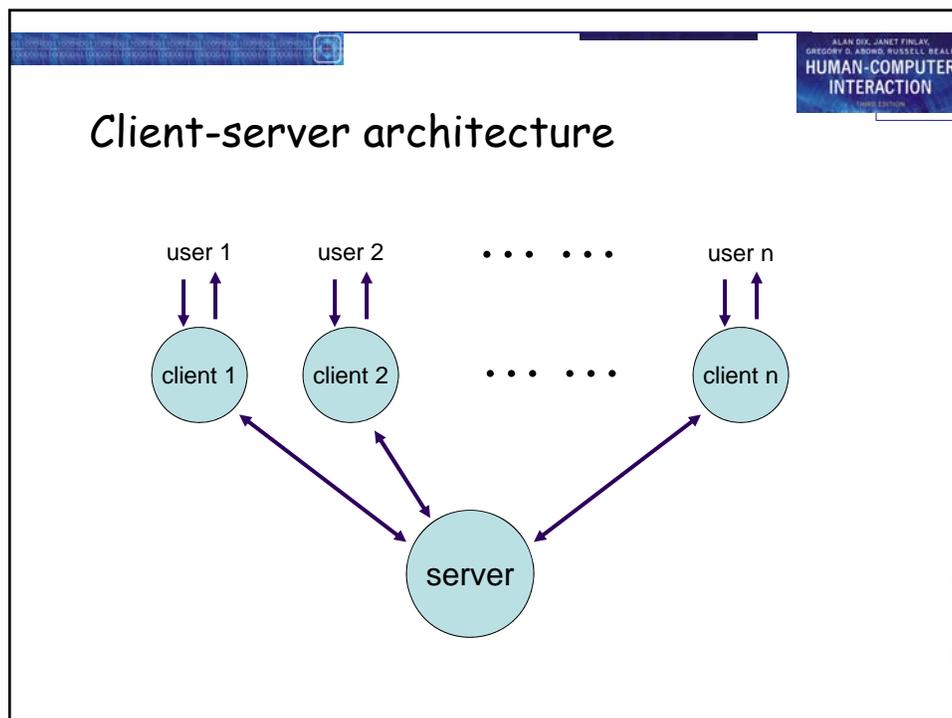
- client-server – simplest case
 - N.B. opposite of X windows client/server
- master-slave special case of client-server
 - N.B. server merged with one client

replicated – copy on each workstation

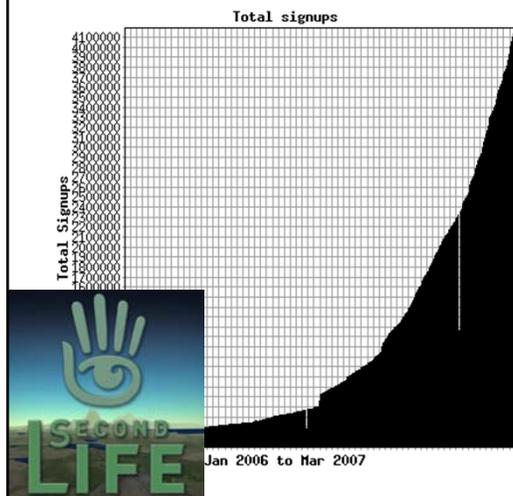
- also called peer-peer
- + local feedback
- race conditions

Often 'half way' architectures:

- local copy of application + central database
- local cache of data for feedback
- some hidden locking



Example – Synchronous CSCW: Second Life



- Launched 2003
- Linden Lab
- 36M accounts
- 24 terabytes of server data
- \$3.6B spent on virtual assets
- 217k years of user time





Second Life Interaction

- Text-based communication
 - Local chat for public localized conversations between two or more avatars
 - talk 20 m, shout 96 m
 - IM for private conversations, either between two avatars, or between the members of a group.
- Voice chat
 - Rudimentary lip sync & gesture

Issues with Social Networking

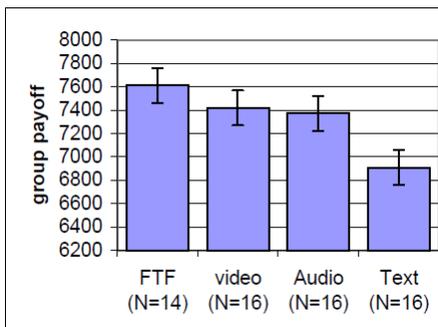
SecondLife, FaceBook, etc.

- Can these technologies replace human-human interaction?
 - can you send a “handshake” or a “hug”
 - how does intimacy survive?
- Are too many social cues lost?
 - facial expressions and body language for enthusiasm, disinterest, anger
 - will new cues develop? e.g., :)



Trust in CMC (Olsens, UMich)

- Outcome:
 - social dilemma game
- Study 1
 - F2F best
 - VMC = f2f, but took longer
 - Text Chat never trust
- Study 2
 - CMC getting acquainted leads to higher trust



Exertion Interfaces (Mueller)



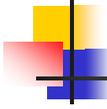
Exertion Interfaces (Mueller)



Social Bond

Statement	Exertion (Average Rating)	Non-Exertion (Average Rating)
I got to know the other player	2.6	2.3
The game created some sort of social bonding between me and the other player	3.6	2.8

Qualitative self-report measures of social bonding – greater for exertion interface compared to desktop keyboard interface.

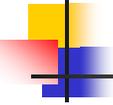


CSCW Exercise - Part II

- Same teams
- Sketch the implementation (issues?)
- How would you perform a summative evaluation?



Groupware Success & Failures



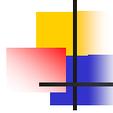
Groupware Successes / Failures?

- Email
 - ubiquitous (your grandparents have it?)
- Newsgroups and mailing lists
- Videoconferencing
 - growing slowly but steadily
- IM/SMS



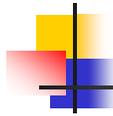
Groupware Failures

- Why does groupware fail? (Grudin)
 - disparity between workers & beneficiaries
 - threats to existing power structures
 - insufficient critical mass
 - violation of social taboos
 - rigidity that counters common practice or exceptions



Success/Failure of Groupware

- Depends on competing alternatives
 - collaborators down the hall or across country?
- If users are committed to system, etiquette & conventions will evolve
 - tend to arise from cultural & task background
 - users from different orgs or cultural contexts may clash
- Synchronous systems that work well for 2 users may be less effective w/ more users

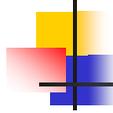


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66



To do

- Read
 - Cognitive models (Dix Ch 12).
 - Heuristic Evaluation (review Dix Ch 7; Pinelle paper on heuristic evaluation of games)
- Finish P6