

COMS W4170

Collaboration 2

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Same time, different spaces

- Videoconferencing
 - What's missing?
 - Spatial relationships among participants
 - Participants represented by separate, movable devices:
A. Sellen, W. Buxton & J. Arnott, J. Using spatial cues to improve videoconferencing.
Proc. CHI '92
www.youtube.com/watch?v=n-W7QTXG4G8
 - Side conversations
 - Participants can communicate privately: L. Berc et al., Argo,
Proc. UIST '95



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Same time, different spaces

- Videoconferencing → Telepresence
 - R. Fish, R. Kraut, B. Chalfonte, Video Window, *CSCW 1990*
 - Lifesize video
 - Attempt to mimic “copresence”
 - S. Ort-Escalano, et al., Holoportation, *UIST 2016*
 - Live, 3D scanned participants
 - <https://www.microsoft.com/en-us/research/project/holoportation-3/>



<https://youtu.be/7d59O6cfaM0>

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Same time, different spaces

- Videoconferencing → Telepresence
 - Cisco TelePresence IX5000
 - Lifesize video (3 1080p 70" screens)
 - 3 4K cameras
 - Attempts to create symmetric shared experience

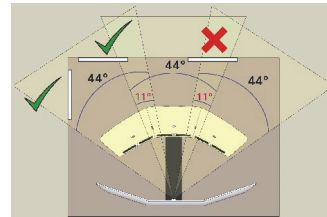


<http://www.cisco.com/c/en/us/products/collaboration-endpoints/immersive-telePresence/index.html>

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Same time, different spaces

- Videoconferencing → Telepresence
 - Cisco TelePresence IX5000
 - “Whiteboard mode” dewarping



Each whiteboard must be wholly visible to ≥ 1 camera



<http://www.cisco.com/c/en/us/products/collateral/collaboration-endpoints/ix5000-series/collaboration-beyond-the-boardroom.html>

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Same time, different spaces

- Embodied Social Proxy
 - Connect hub-satellite teams
 - Multiple cameras
 - Speakers
 - Cart for added physical presence
 - Adjustable height



G. Venolia, J. Tang, R. Cervantes, S. Bly, G. Robertson, B. Lee, and Kori Inkpen, *CHI 2010*

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Same time, different spaces

■ Commercial physical telepresence

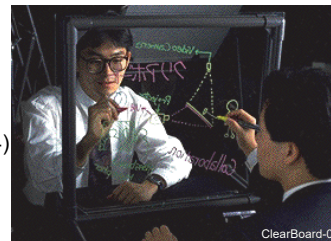
- Buyer provides own iPad



Same time, different spaces

■ Communicating *presence* in shared tasks

- H. Ishii et al., ClearBoard (90–94)
 - Goal: Seamless interaction in shared, but distributed, space
 - Gaze awareness
 - Interacting *through* not *with* computers
 - Users draw on physically or virtually shared screen



Note the progression through levels of prototype: inexpensive mechanical ("paper" prototype), analog video-based, computer-based

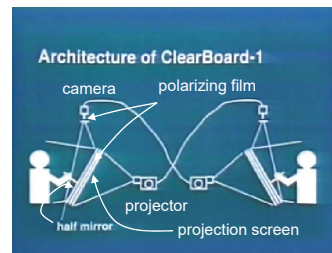
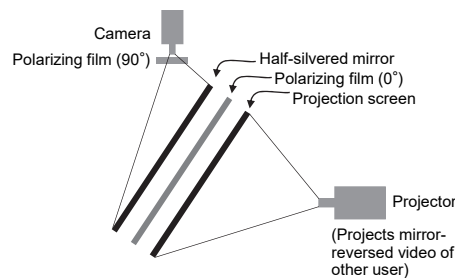
■ ClearBoard-0 [1:57–2:32]

- Glass panel separating two co-located users

<http://tangible.media.mit.edu/project/clearboard/>

Same time, different spaces

- ClearBoard-1 [2:45–3:15]
 - Projected displays with mirror-reversed video
 - Drawing with markers

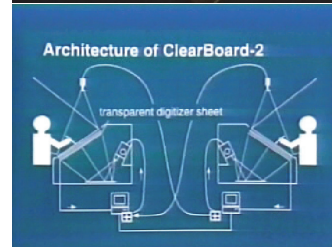


<http://tangible.media.mit.edu/project/clearboard/>

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Same time, different spaces

- ClearBoard-2 [9:08–10:11]
 - Projected displays with mirror-reversed video
 - Drawing using computer paint program
 - Slightly angled panel
 - Less arm fatigue, but,...
 - User is perceived to be "below"



<http://tangible.media.mit.edu/project/clearboard/>

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Same time, different spaces

- Communicating presence in shared tasks

- A. Tang, C. Neustaedter, and S. Greenberg, VideoArms: Supporting Remote Embodiment in Groupware, *Proc. CSCW 2004*



<https://www.youtube.com/watch?v=rP346-ZpYm8>
[0:58-2:52]

- Virtual embodiment to support remote interaction
 - Overlay of remote user's arms
- Mixed presence**
 - Other users are local and remote

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(Not quite) same time, different spaces

- Using Mechanical Turk workers (turkers) from within a program
 - TurKit: Human Computation Algorithms on Mechanical Turk
 - G. Little, L. Chilton, M. Goldman, R. Miller, *UIST 2010*
 - Soylent: A Word Processor with a Crowd Inside."
 - M. Bernstein, G. Little, R. Miller, B. Hartmann, M. Ackerman, D. Karger, D. Crowell, K. Panovich, *UIST 2010*

Automatic clustering generally helps separate different kinds of records that need to be edited differently, but it isn't perfect. Sometimes it creates more clusters than needed, because the differences in structure aren't important to the user's particular editing task. For example, if the user only needs to edit near the end of each line, then differences at the start of the line are largely irrelevant, and it isn't necessary to split based on those differences. Conversely, sometimes the clustering isn't fine enough, leaving heterogeneous clusters that must be edited one line at a time. One solution to this problem would be to let the user rearrange the clustering manually, perhaps using drag-and-drop to merge and split clusters. Clustering and selection generalization would also be improved by recognizing common text structure like URLs, filenames, email addresses, dates, times, etc.



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Find
Fix
Verify

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<http://projects.csail.mit.edu/soylent/>

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(Not quite) same time, different spaces

- Making Mechanical Turk realtime
 - Crowds in Two Seconds: Enabling Realtime Crowd-Powered Interfaces
 - M. Bernstein, J. Brandt, R. Miller, D. Karger, *UIST 2011*



<http://groups.csail.mit.edu/uid/other-pubs/uist2011-adrenaline.pdf>

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Same time, same space

- Classroom, brainstorming,...
 - Electronic Meeting Systems (EMS)
 - J. Nunamaker et al., *CACM* 34(7), July 1991, 40–61.



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Group Process gains Nunamaker et al.

- More information
 - A group as a whole has more info than any one member
- Synergy
 - A member uses info in a way that the original holder did not because that member has different info/skills
- More objective evaluation
 - Groups are better at catching errors than individuals who proposed ideas
- Stimulation
 - Working as part of a group may stimulate/encourage performance
- Learning
 - Members may learn from/imitate more skilled members to improve performance

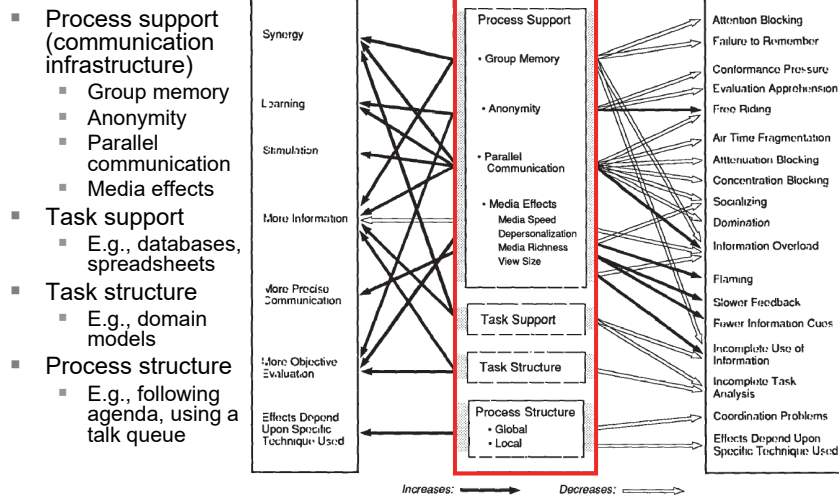
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Group Process losses Nunamaker et al.

- | | |
|--|---------------------------------|
| ▪ Air time fragmentation <ul style="list-style-type: none">▪ Time broken up among participants | ▪ Conformance pressure |
| ▪ Attenuation blocking <ul style="list-style-type: none">▪ Members kept from contributing when comment is fresh, forget/suppress later | ▪ Evaluation apprehension |
| ▪ Concentration blocking <ul style="list-style-type: none">▪ Members concentrate on remembering comments until they can contribute | ▪ Free riding |
| ▪ Attention blocking <ul style="list-style-type: none">▪ New comments not generated because attending to others | ▪ Cognitive inertia |
| ▪ Failure to remember | ▪ Socializing |
| | ▪ Domination |
| | ▪ Information overload |
| | ▪ Coordination problems |
| | ▪ Incomplete use of information |
| | ▪ Incomplete task analysis |

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EMS Potential effects *Nunamaker et al.*



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EMS Approach

- Leader
 - Develops agenda, manages session
- Participants
 - Generate ideas (brainstorm)
 - Refine ideas
 - Organize and prioritize ideas
 - Evaluate ideas
 - Build consensus

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