Same time, different spaces

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

Same time, different spaces

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


Same time, different spaces

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


http://research.microsoft.com/pubs/118110/ESP_Video.mov
Same time, different spaces

- Commercial physical telepresence
  - Buyer provides own iPad
    - iPad Air 2 recommended, not included.
    - Wide Angle Lens: Magnetic, included free.
    - Audio Kit: Optional accessory.
    - Charging Dock: Optional accessory.
    - Motorized Height: Stand or sit.
    - Downward Camera: Mirror on the iPad’s back camera.
    - 6-8 hr Battery: Recharges in 2.
    - Self-Balancing: Stable.
    - Dual Kickstands: Paths anywhere.
    - Standing: 62” (158 cm)
    - Sitting: 47” (119 cm)
  - http://www.doublerobotics.com

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
  - ClearBoard-0 [1:57–2:32]
    - Glass panel separating two co-located users
  - http://tangible.media.mit.edu/project/clearboard/

Note the progression through level of prototype: inexpensive mechanical (“paper” prototype), analog video-based, computer-based
**Same time, different spaces**

- **ClearBoard-1** [2:45–]
  - Projected displays with mirror-reversed video
  - Drawing in colored paint

![ClearBoard-1](http://tangible.media.mit.edu/project/clearboard/)

- **ClearBoard-2** [9:32–10:11]
  - Projected displays with mirror-reversed video
  - Drawing using computer paint program
    - Slightly angled panel
      - Less arm fatigue, but,…
      - User is perceived to be “below”

![ClearBoard-2](http://tangible.media.mit.edu/project/clearboard/)
Same time, different spaces

- Communicating presence in shared tasks
    - Virtual embodiment to support remote interaction
    - Overlay of remote user’s arms
  - Mixed presence
    - Other users are local and remote

(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

http://grouplab.ucalgary.ca/Publications/2004-VideoArmsVideo.CSCW[1:00–2:54]

http://projects.csail.mit.edu/soylent/
(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


Same time, same space

- Classroom, brainstorming,…
  - Electronic Meeting Systems (EMS)
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

Group Process losses  
Nunamaker et al.

- Air time fragmentation
  - Time broken up among participants
- Attenuation blocking
  - Members kept from contributing when comment is fresh, forget/suppress later
- Concentration blocking
  - Members concentrate on remembering comments until they can contribute
- Attention blocking
  - New comments not generated because attending to others
- Failure to remember
- Conformance pressure
- Evaluation apprehension
- Free riding
- Cognitive inertia
- Socializing
- Domination
- Information overload
- Coordination problems
- Incomplete use of information
- Incomplete task analysis
EMS Potential effects

- Process support (communication infrastructure)
  - Group memory
  - Anonymity
  - Parallel communication
  - Media effects
- Task support
  - E.g., databases, spreadsheets
- Task structure
  - E.g., domain models
- Process structure
  - E.g., following agenda, using a talk queue

EMS Approach

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

- Leader creates session and sets agenda

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EMS Example
GroupSystems ThinkTank

- Leader manages session; e.g., sets permissions, can turn on/off anonymity
  - If “View Name Tags” is off when contribution is made, it is remains anonymous, even to leader
EMS Example
GroupSystems ThinkTank
www.groupsystems.com
→ thinktank.net

- Participants brainstorm ideas

- Organize ideas into categories
EMS Example

GroupSystems ThinkTank

- Add comments to an idea

EMS Example

GroupSystems ThinkTank

- Reorder ideas to prepare for voting
  - Simple vote or rate based on multiple criteria
EMS Example

- Vote
  - Low/med/high
  - Sliding scale
  - N-point scale
  - True-false
  - Point allocation from budget

EMS Example

- View results
  - Chart
  - Table
EMS Example
GroupSystems ThinkTank

- View results
  - 2×2 chart to compare criteria
  - Table

EMS Example
GroupSystems ThinkTank

- Collect action items
  - Shared planning spreadsheet
EMS Example
GroupSystems ThinkTank

- Generate reports