Pervasive and ad-hoc services

Pervasive/ubiquitous collaborative systems (1/3)

M2R MOSIG UIS

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Topic

Pervasive/ubiquitous collaborative systems

[Streitz 1999]

Topic

Pervasive/ubiquitous collaborative systems

Collaborative systems

Motivations

Human beings are social animals *[Aristotle ~350 BC]*

Collaborative systems

Motivations

Work with others

Collaborative systems

Motivations

Work with others

Communication

Collaborative systems

Motivations

Work with others

Entertainment

Communication

Collaborative systems

Motivations

Work with others

Entertainment

Communication

Socialization

Collaborative systems

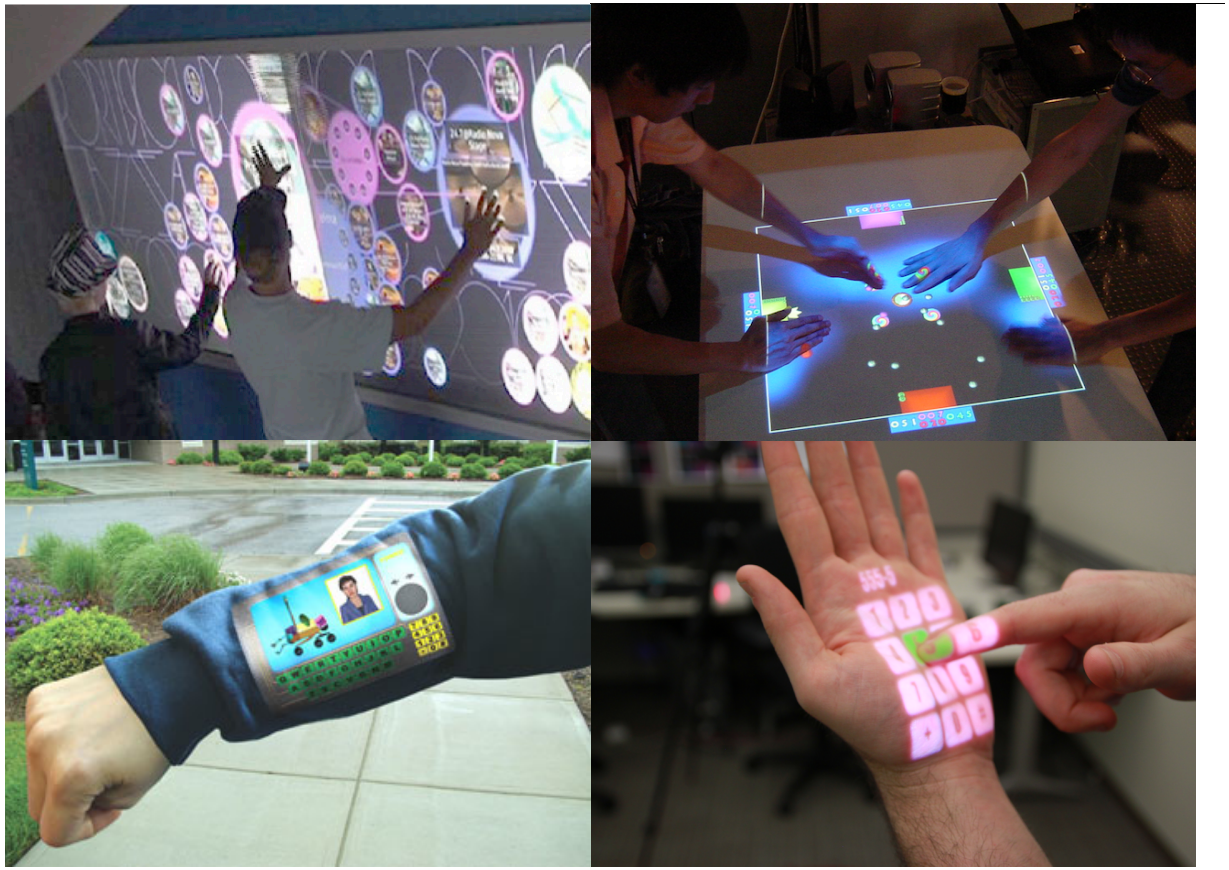
Motivations

Ubiquity: computational resources everywhere

Collaborative systems

Motivations

Ubiquity: computational resources everywhere



Collaborative systems

Motivations

Connected everywhere

- Wifi
- 3G, LTE networks
- LAN, xDSL
- Satellite
- etc

Collaborative systems

Consequently

People uses the computational resources to

- Work together
- Communicate
- Play with others
- Socialize
- etc

Collaborative systems

Consequently

People uses the computational resources to

- Work together
- Communicate
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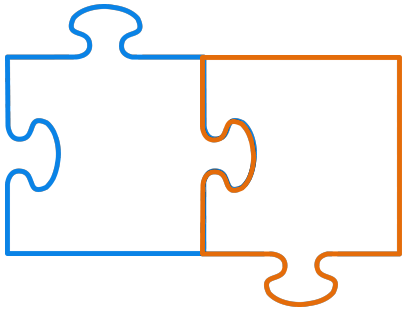
- Socialize
- etc

- Studied by the CSCW community

Computer-Supported Cooperative Work

Two complementary visions, multiple research goals

- Multi-disciplinary research field

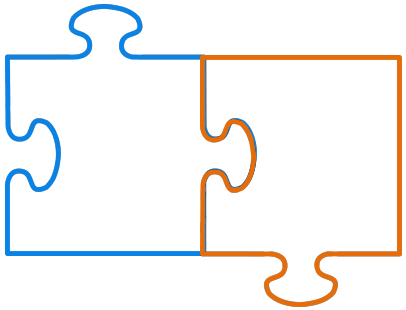


Computer-Supported Cooperative Work

Two complementary visions, multiple research goals

- Multi-disciplinary research field

science



- To conceive software that supports

group

Computer-Supported Cooperative Work

Two complementary visions, multiple research goals

- Multi-disciplinary research field

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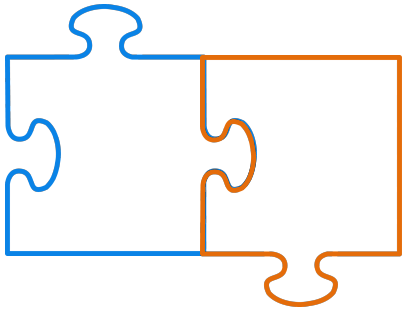
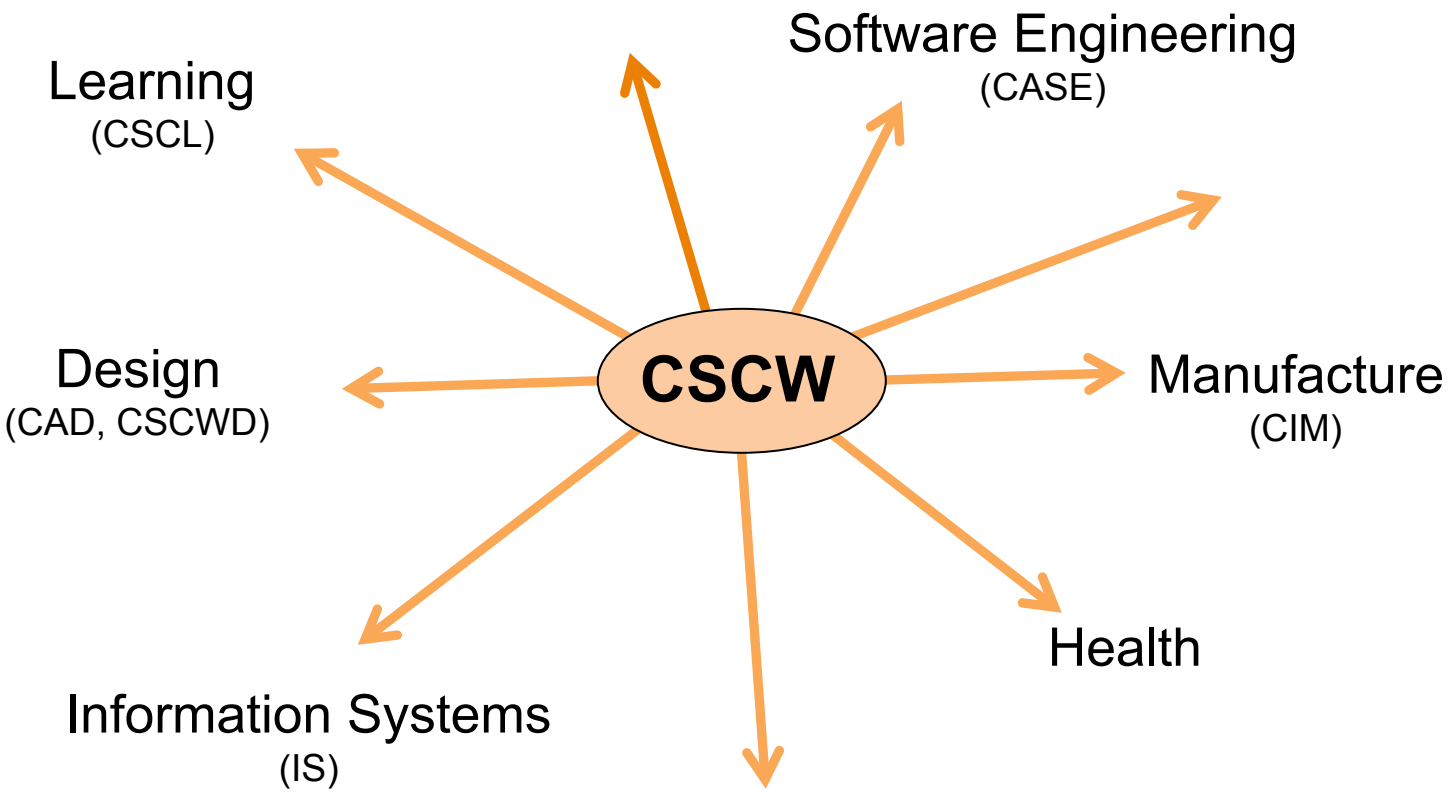


- To understand how groups work for groupware design group
- To conceive software that supports

Application domains of CSCW



[Grudin 1994] [Bannon 1992]

Content

I. CSCW principles: Collaboration in space & time
II. Building groupware
III. Collaboration and pervasive interactive surfaces
IV. Multimodal and Multi-user interaction
V. Collaboration in mobility & tangible interaction

Content

I. CSCW principles: Collaboration in space & time
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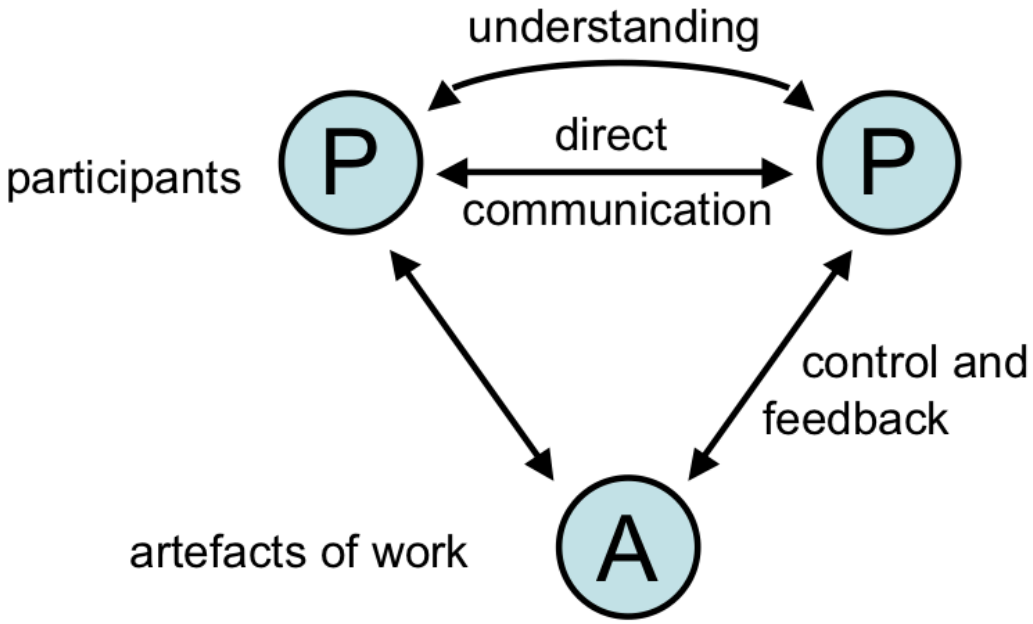
Multi-user interaction

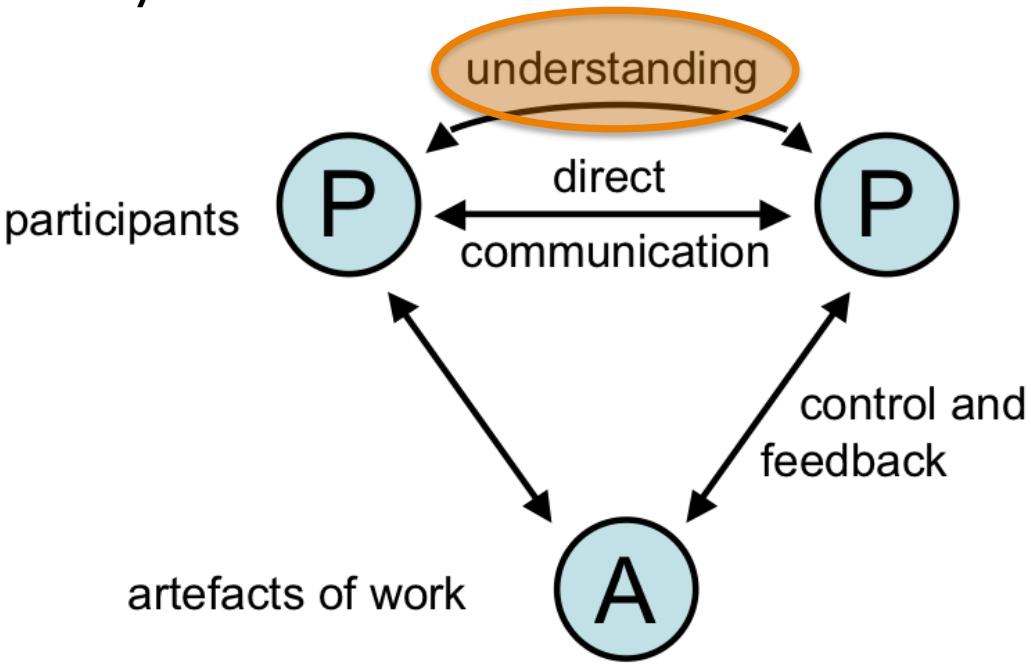
Dix' taxonomy



[Dix 1993]

Multi-user interaction

Dix' taxonomy

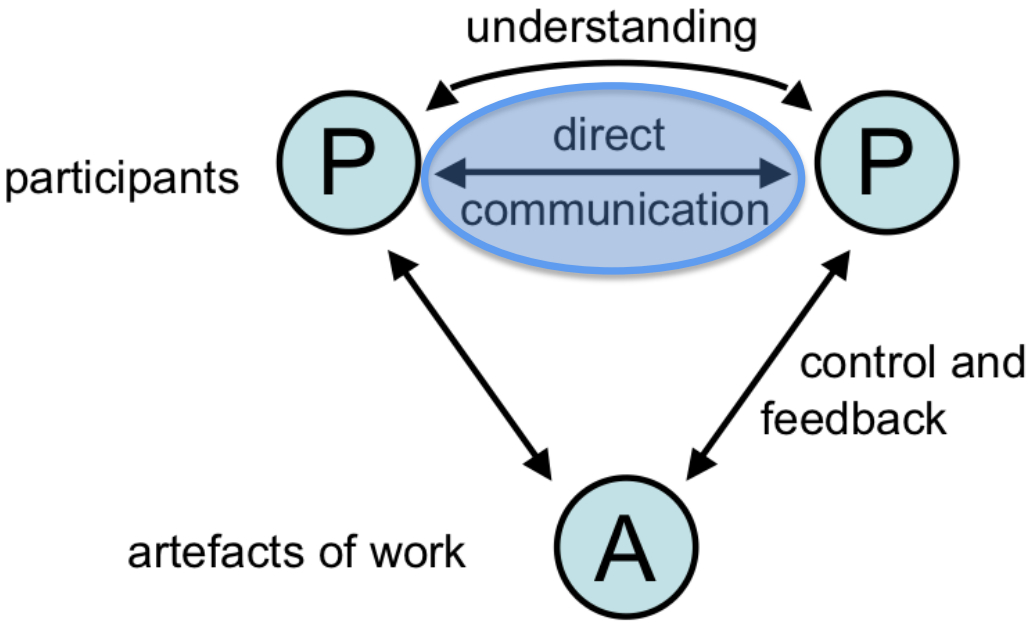


- Meeting and decision-support system

[Dix 1993]

Multi-user interaction

Dix' taxonomy

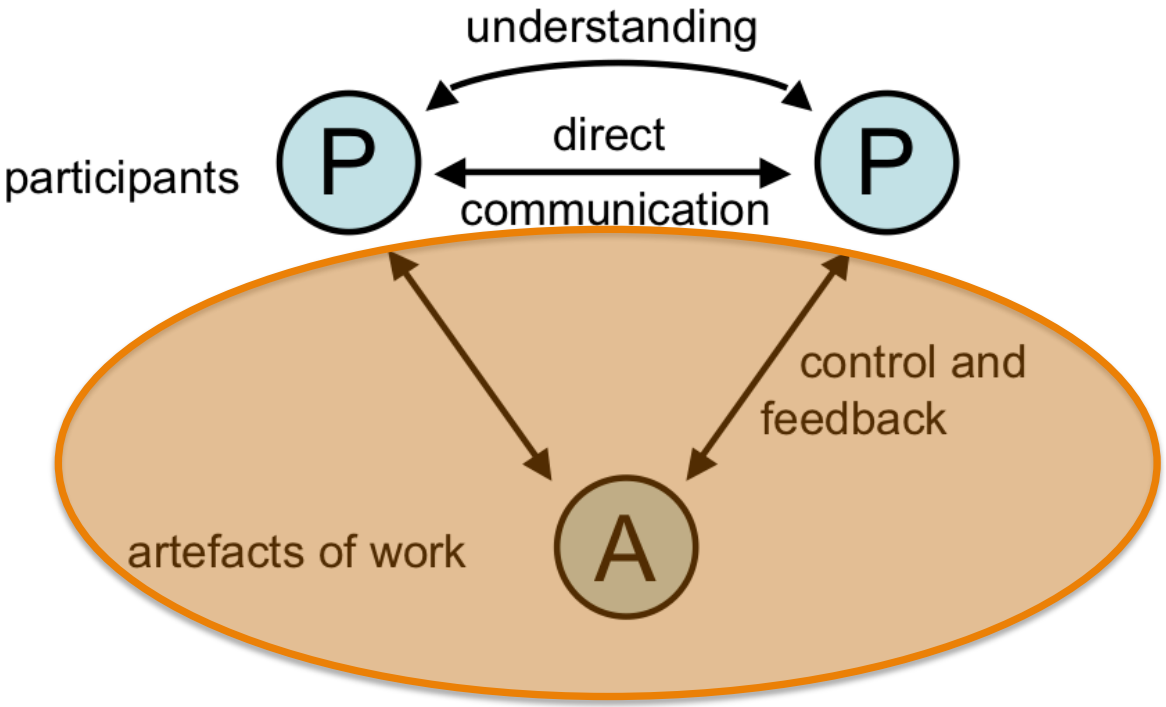


- Meeting and decision-support system
- Computer-Mediated Communication

[Dix 1993]

Multi-user interaction

Dix' taxonomy

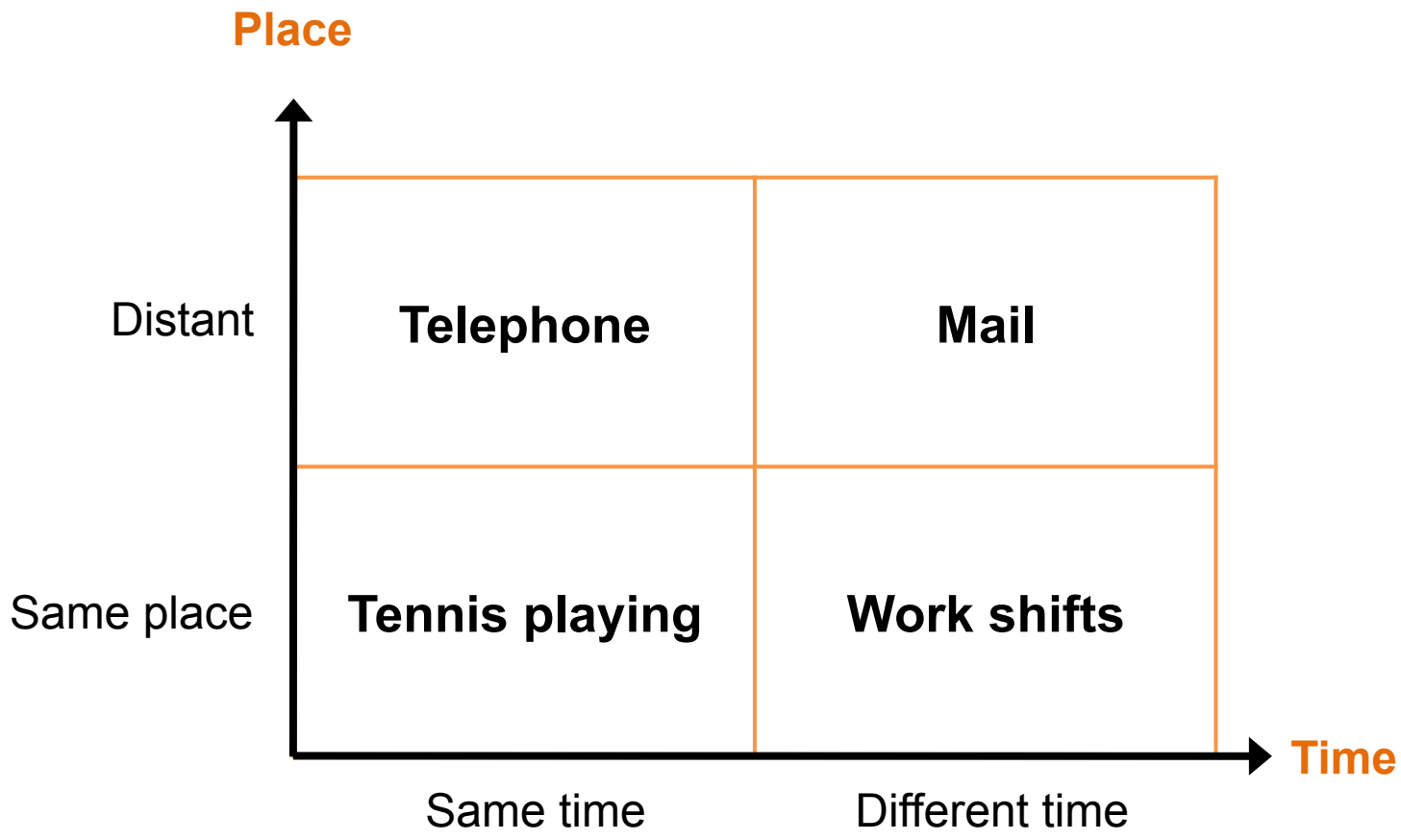


- Meeting and decision-support system
- Computer-Mediated Communication
- Shared application and artifacts

[Dix 1993]

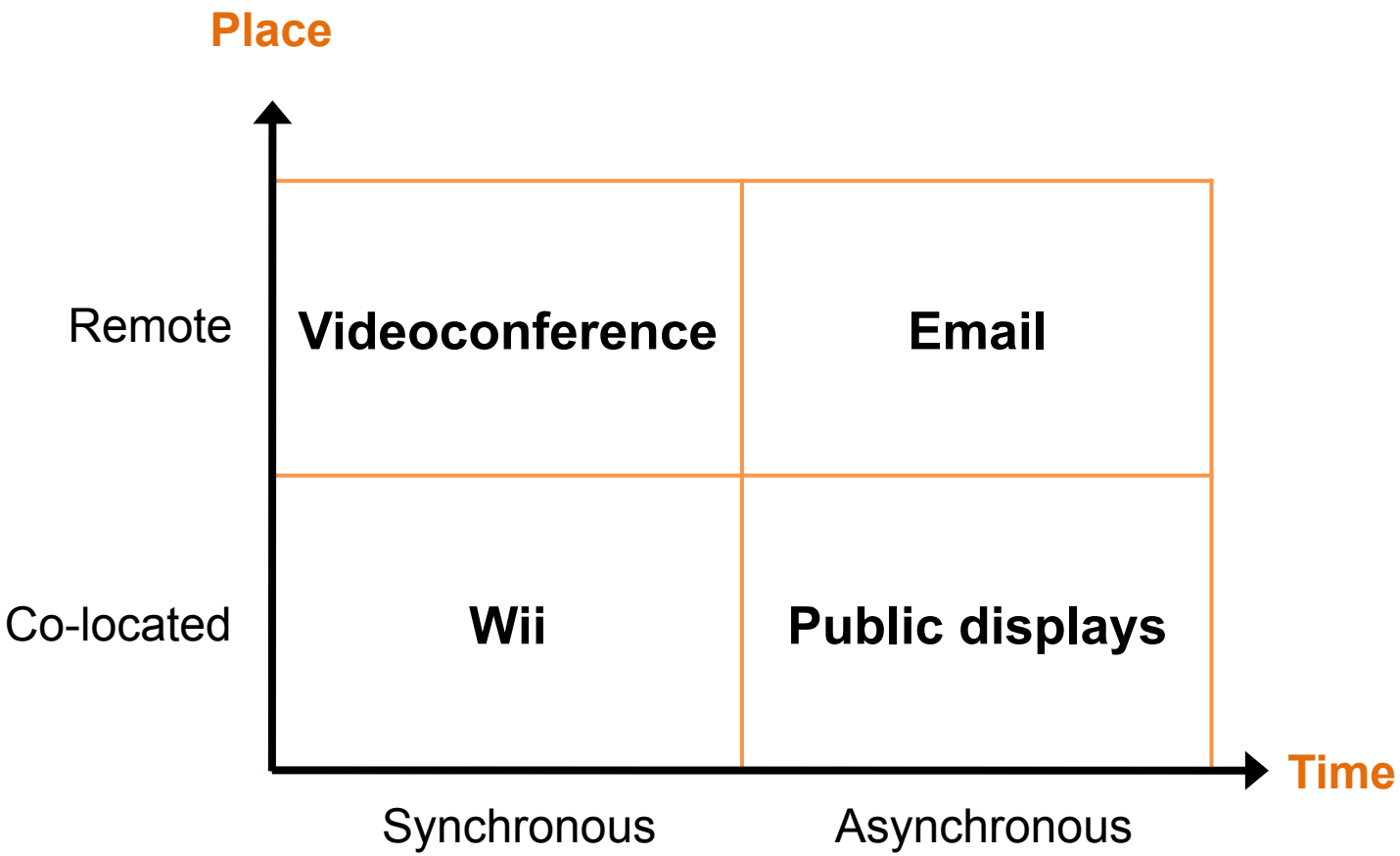
Space/Time matrix

- Physical world



Space/Time matrix

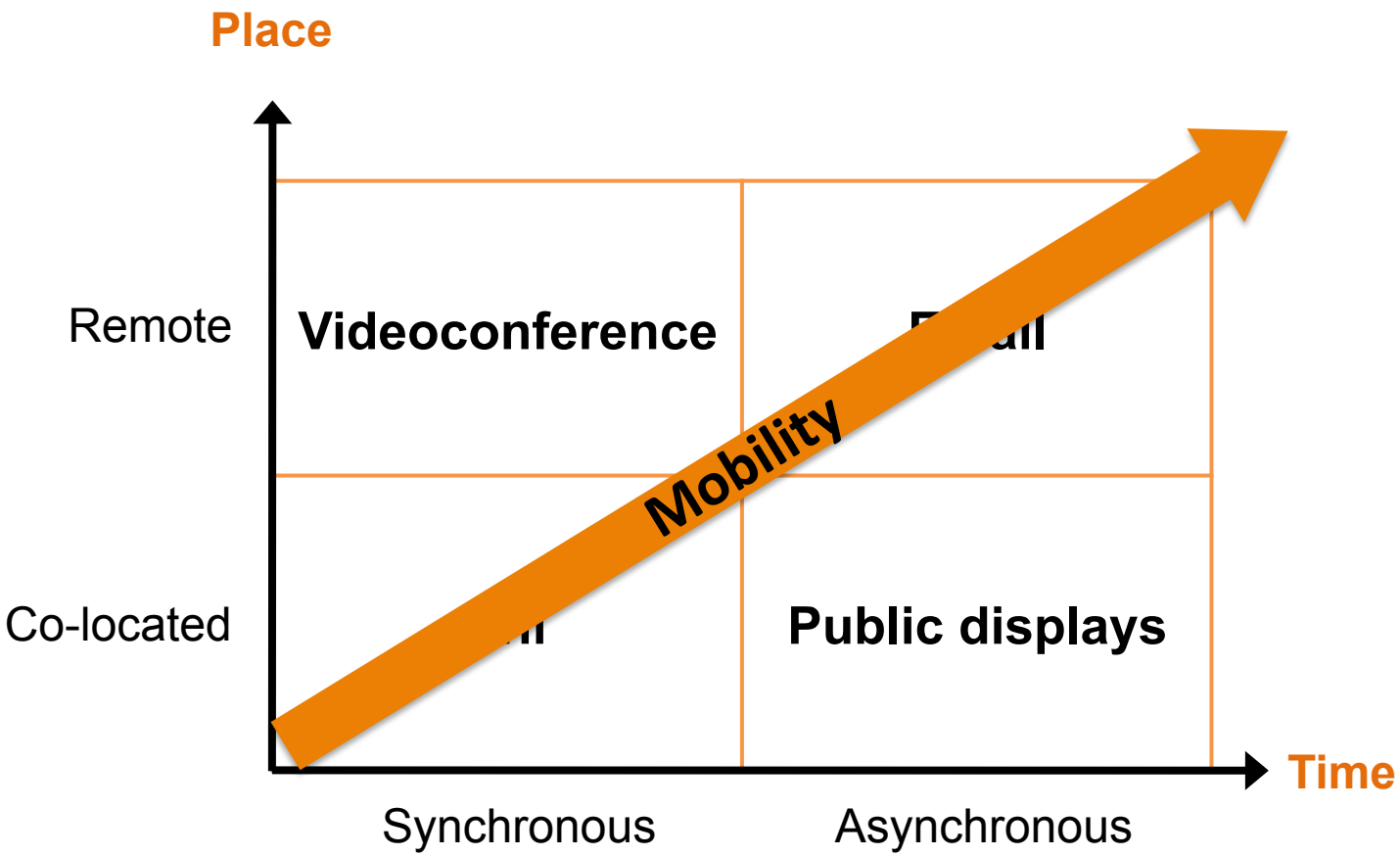
- Digital world



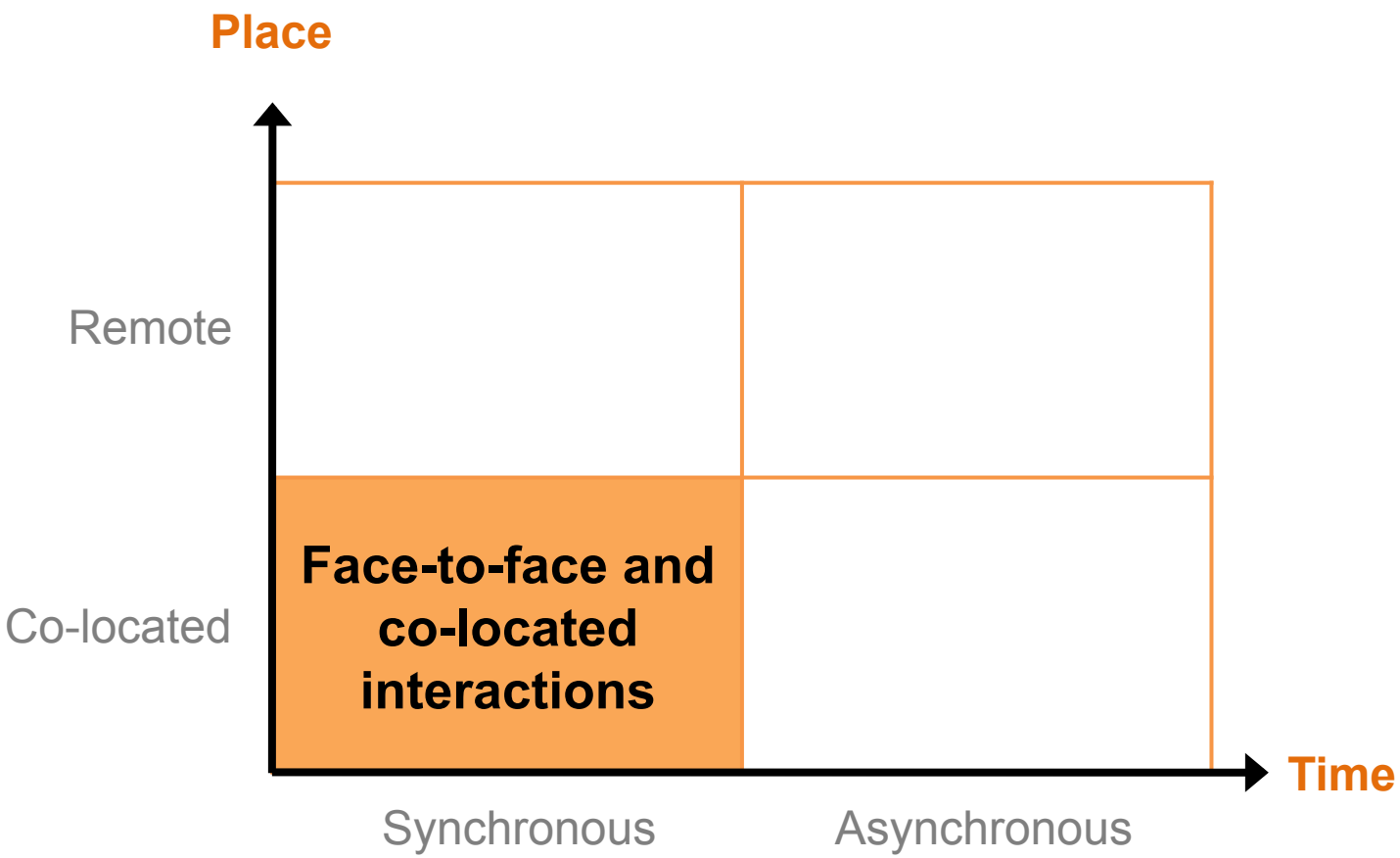
[Ellis 1991]

Space/Time matrix

- Digital world



Space/Time matrix



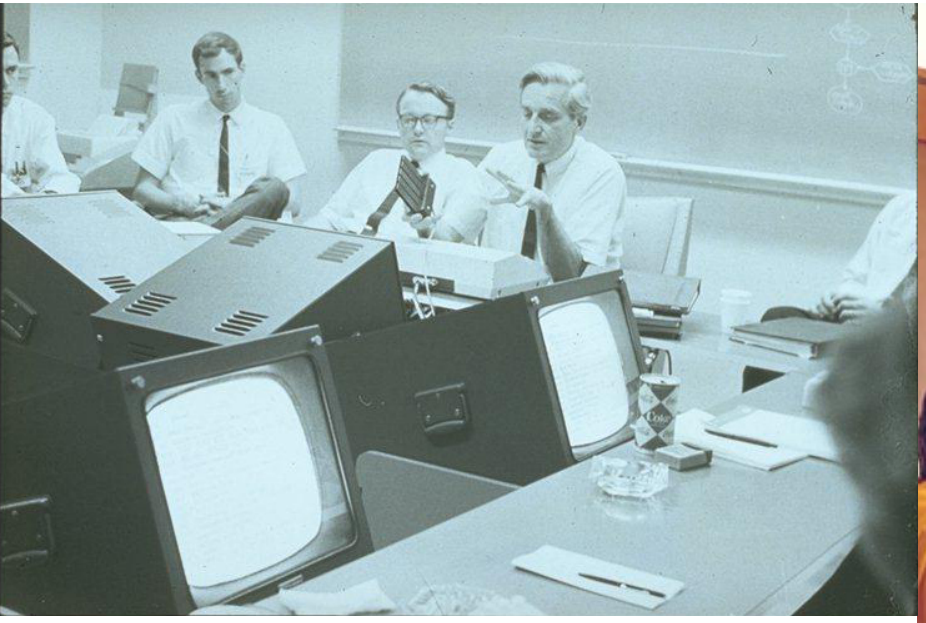
Meeting rooms

F2F

[Engelbart 1967]

Meeting rooms

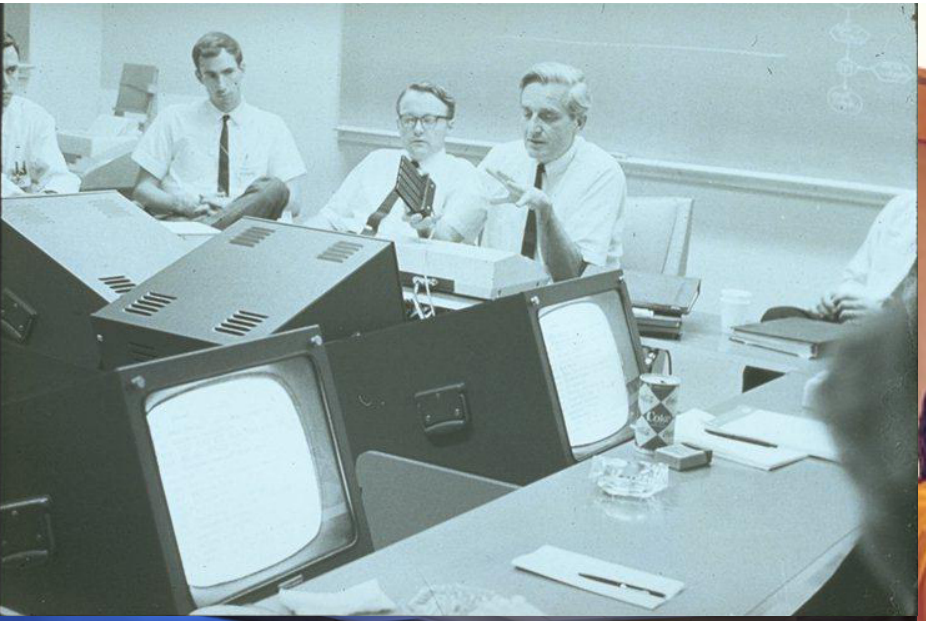
[Engelbart 1967]



Colab [Stefik 1987]

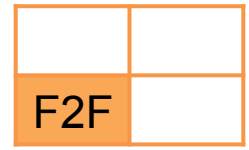
Meeting rooms

[Engelbart 1967]



Colab [Stefik 1987]

Tandberg T3 [Tandberg 2008]



Meeting rooms

Goals

- Support production of ideas
- Assist decision-making and planning (GDSS)

Functions

- Data sharing (e.g. shared workspace)
- Brainstorming tools (e.g. whiteboard)
- Organization and structuration tools
- Decision tools
- Communication tools
- etc

Single Display Groupware

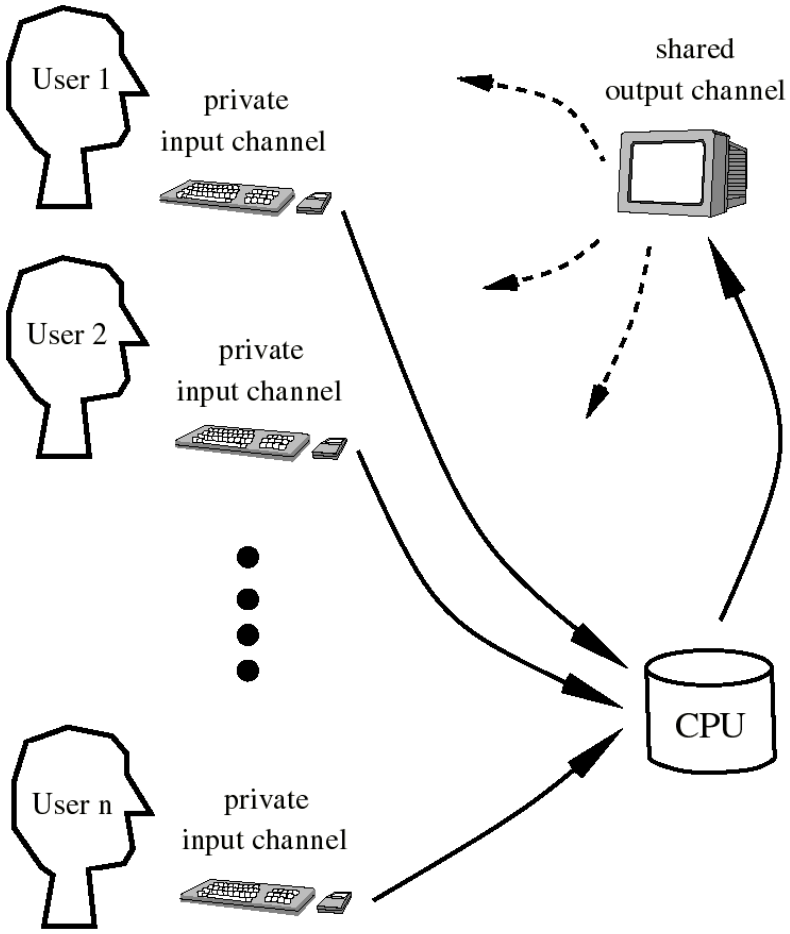
F2F

PC sharing

[Tse 2004]

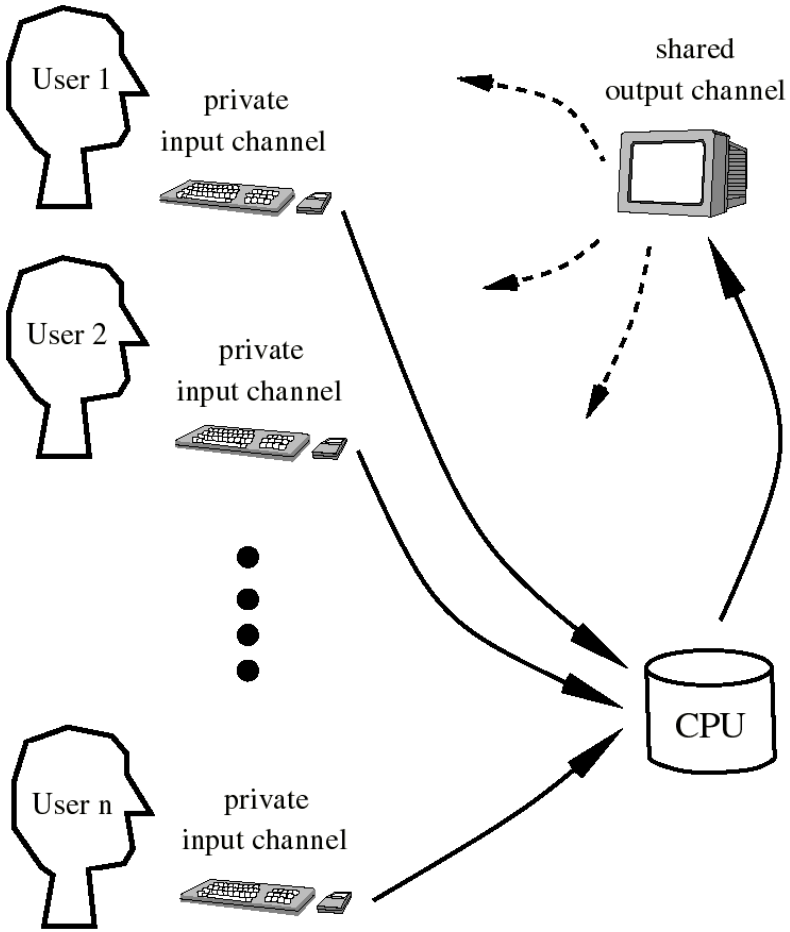
F2F

Single Display Groupware



[Bederson 1999]

Single Display Groupware



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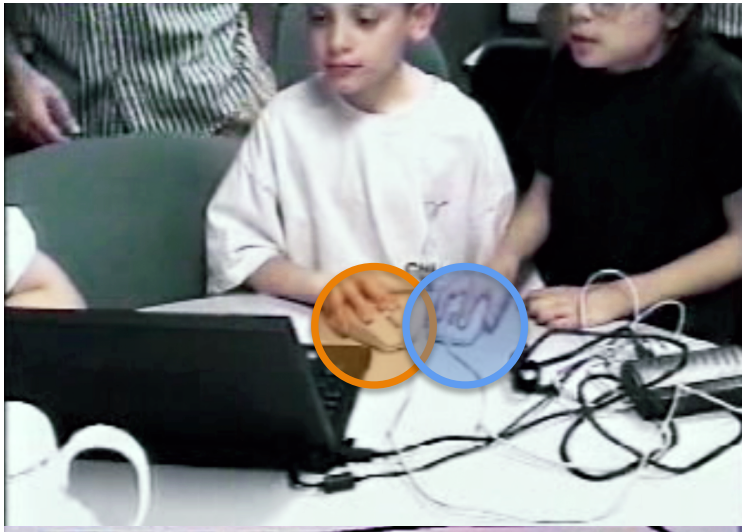
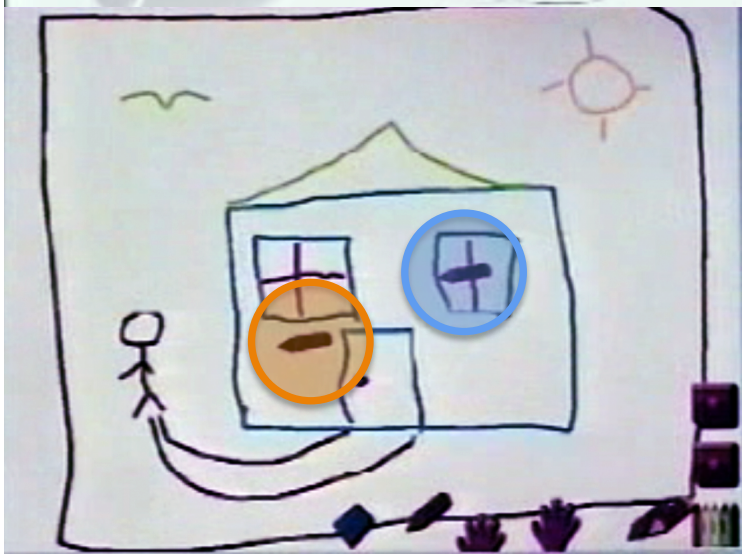




Kidpad [Bederson 1999]

F2F

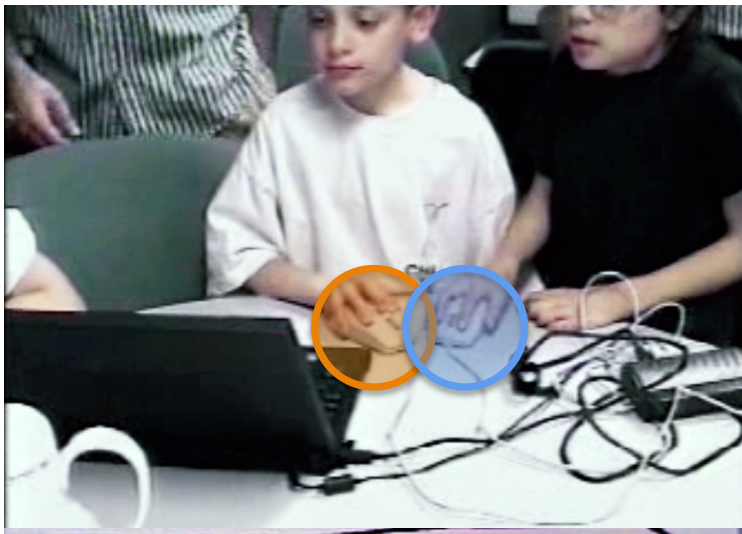
Single Display Groupware

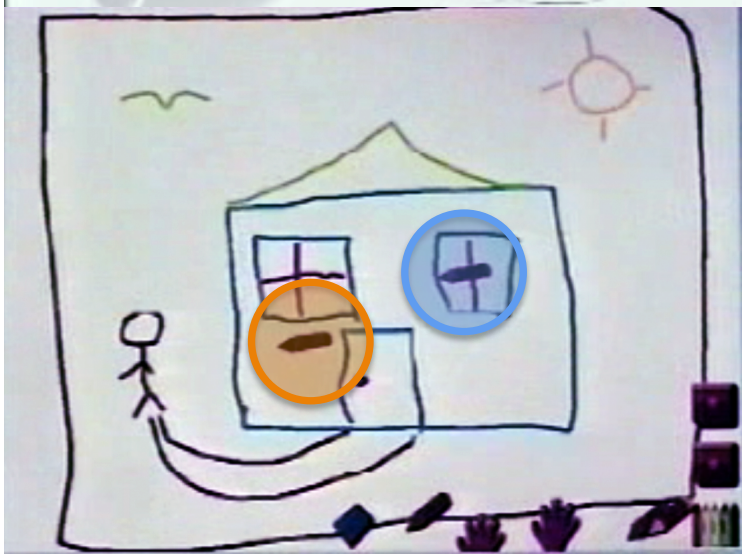
Shared and private resources

- e.g. one display, two mice
- Restricted screen space

Shared user interface

- One user at-a-time
- vs. simultaneous actions





Kidpad [Bederson 1999]

F2F

Single Display Groupware

Coupled navigation

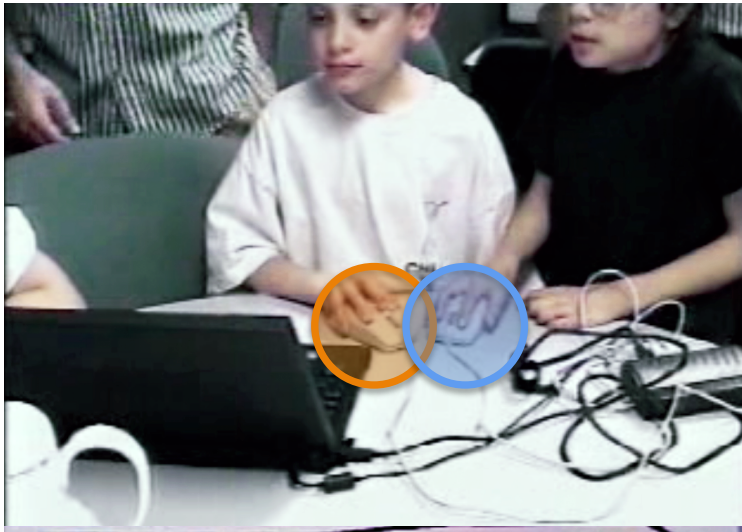
- Private space vs. public

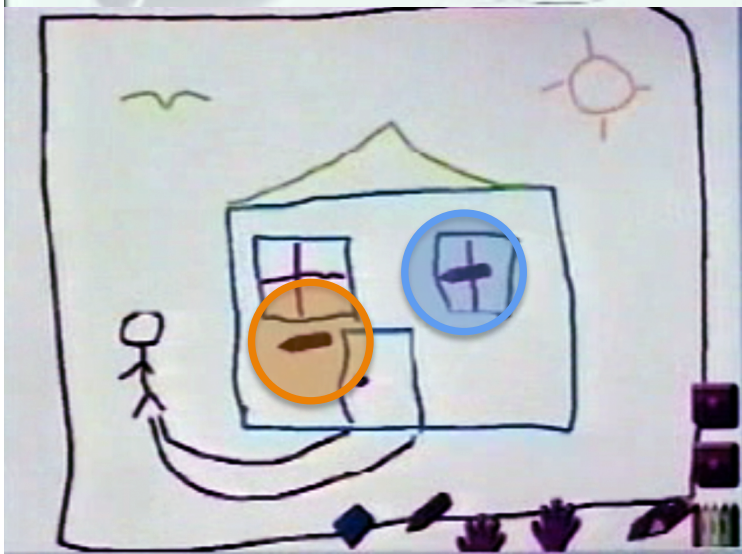
Shared feedback

- Global state only
- No user differentiation

Side-by-side interaction

- Non-verbal cues
- Social protocols





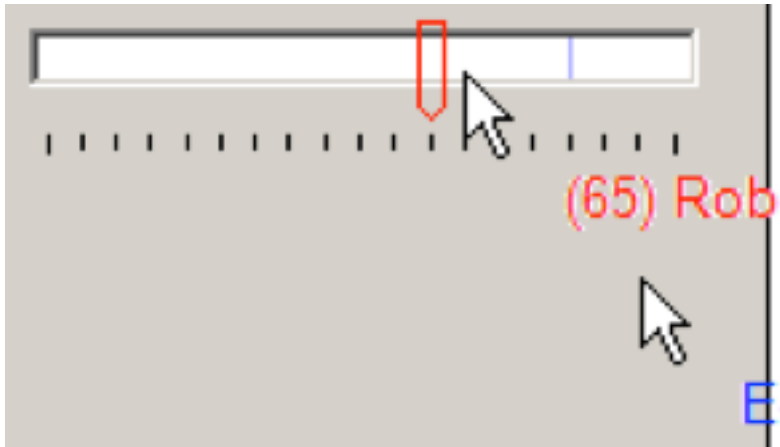
Kidpad [Bederson 1999]

Single Display Groupware

F2F

User-differentiated UI

- Same widget, different behaviours



SDG Toolkit [Tse 2004]

Collaboration tables

F2F

Traditional tables naturally support collaboration

- Face-to-face collaboration
- Reaching on the workspace
- Simultaneity
- Physical objects
- Large work-surface

[Wang 2004]

Interactive tables

Allows direct manipulation of digital artefacts

Properties

- Interpersonal interaction
- Fluid transitions
- Personal and group work
- External work support
- Physical vs. digital object
- Arrangement of users
- Simultaneous users

[Scott 2003], Digitable [LIG]

F2F

Interactive walls

Allows direct manipulation of digital artefacts

Properties

- Orientation
- Very large work-surface
- Personal and group space
- Division of labor

[Streitz 1999] [Seifried 2012]

Interactive walls

Allows direct manipulation of digital artefacts

Properties

- Orientation
- Very large work-surface
- Personal and group space
- Division of labor

➪ Public displays

[Streitz 1999] [Seifried 2012]

Single Display Groupware

F2F

PC sharing

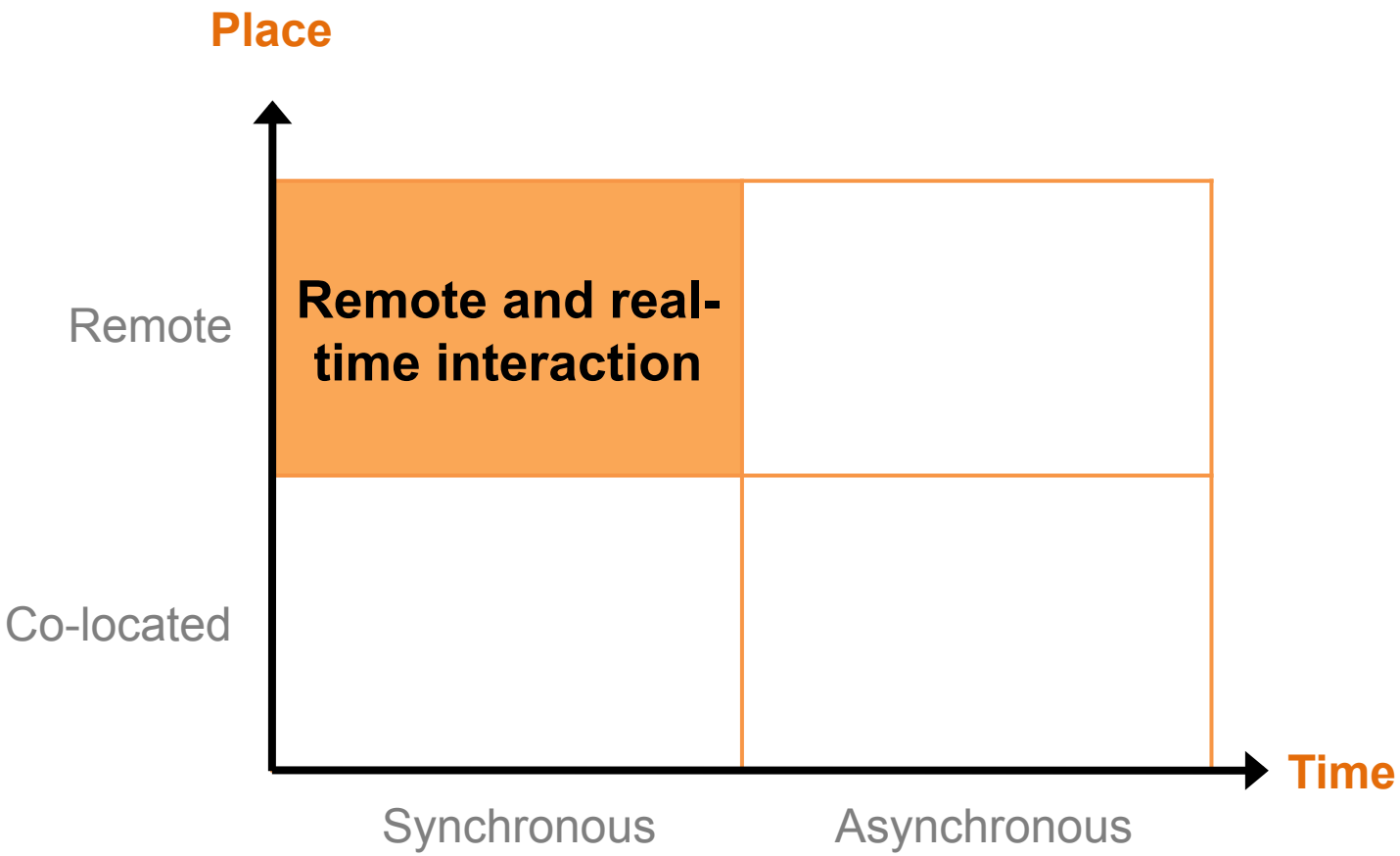
Home video game console

- Multi-player games
- Embedded sensors
- Multi-modal

Wii [Nintendo]

Kinect [Microsoft]

Space/Time matrix



Communication systems

Videoconference

- Image quality
- Latency issues
- Emotions
- Context ?
- Reciprocity ?
- Eye-contact ?

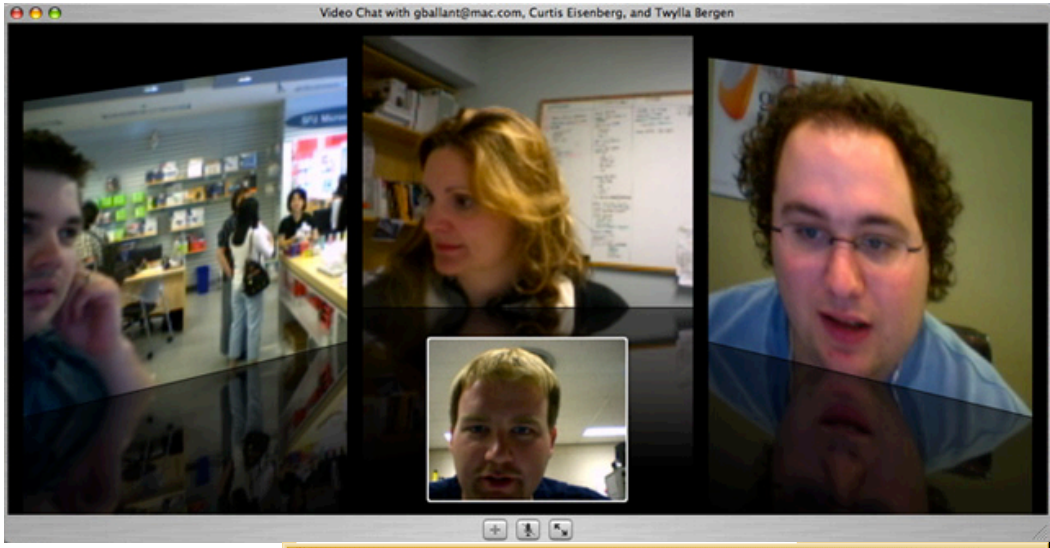
iChat [Apple]

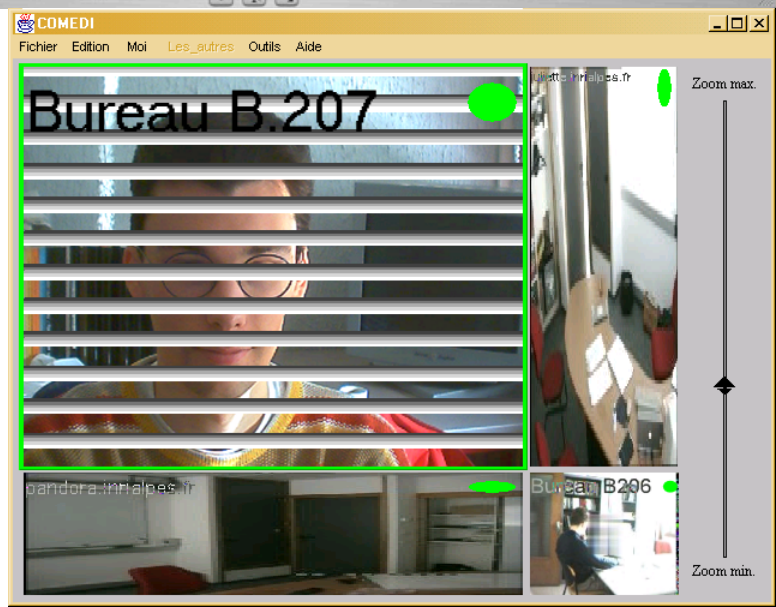
RRTI

Communication systems

Mediaspace

- Informal interactions
- Feeling of cohesion
- Activity indicators
- Intrusive ?



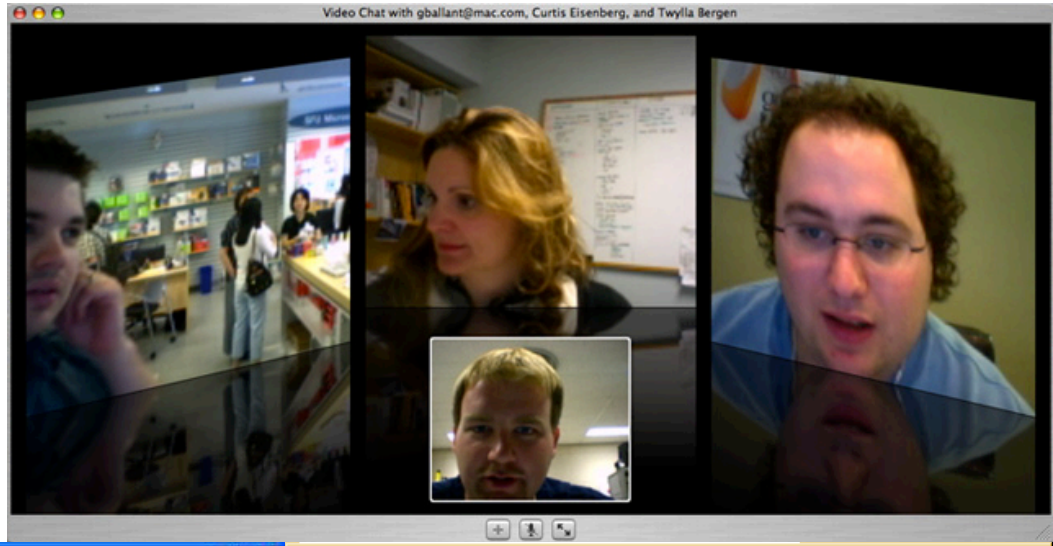


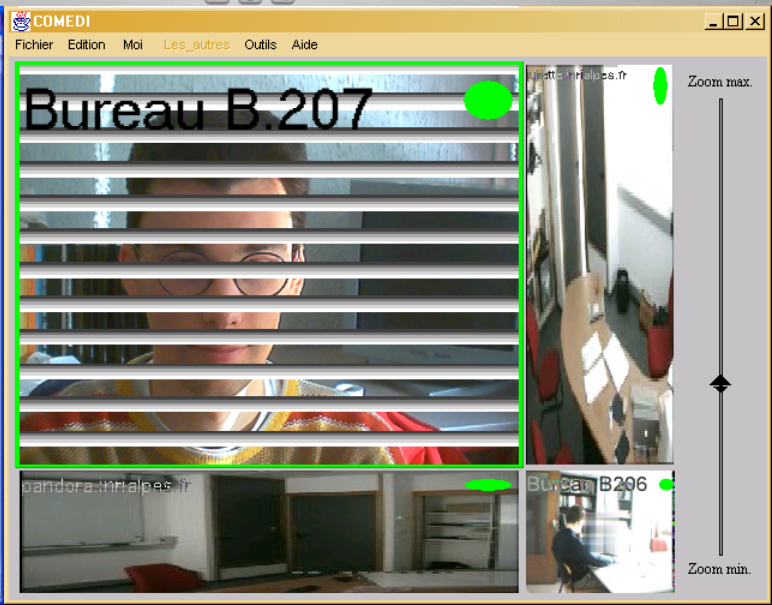
COMEDI [Coutaz 1999]

Communication systems

Online discussions

- Casual
- Communities
- Disturbance ?





MSN [Microsoft]

Communication systems

RRTI

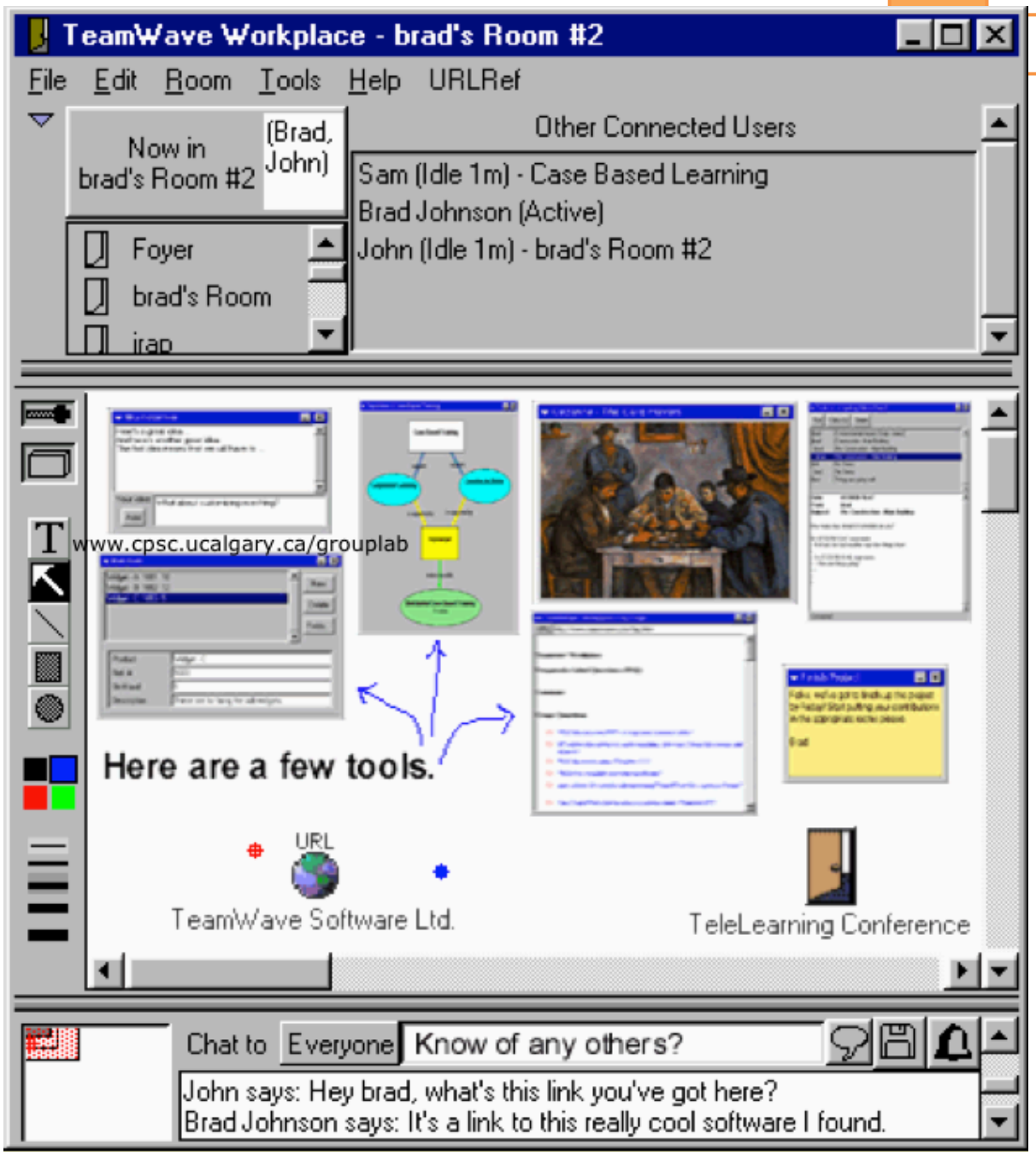
Virtual worlds

- 3D spaces
- Space and places
  - Rooms
- Embodiment
- Navigation issues

Second Life

RRTI

Shared workspaces



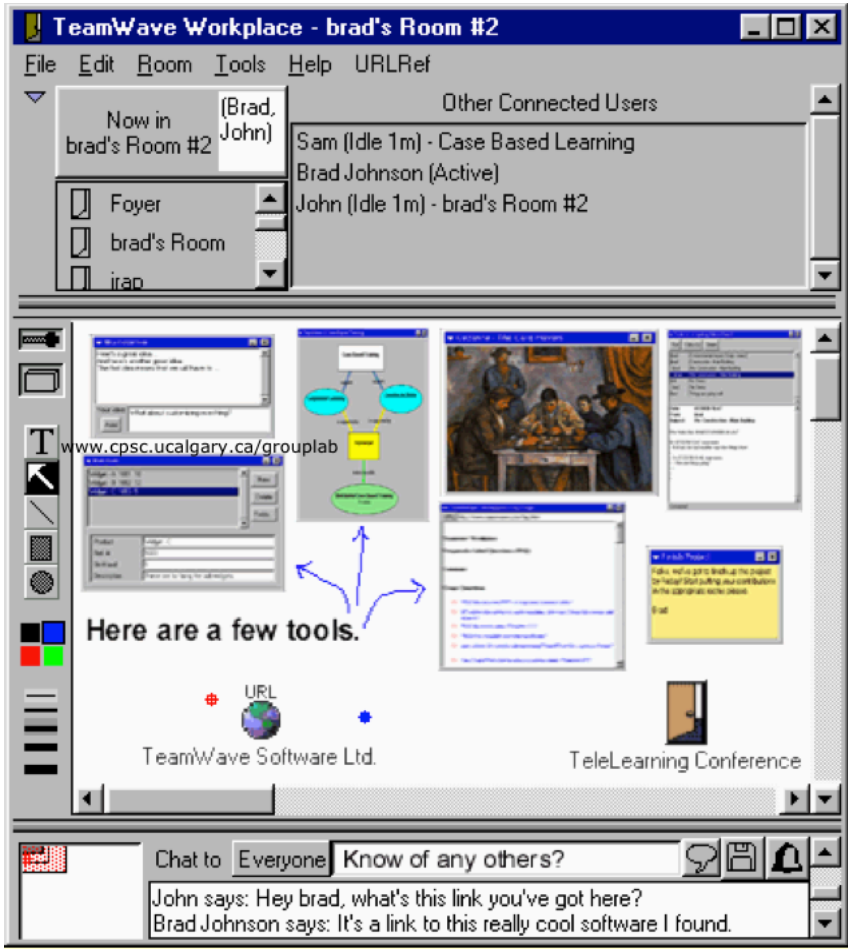
[Roseman 1996]

RRTI

Shared workspaces

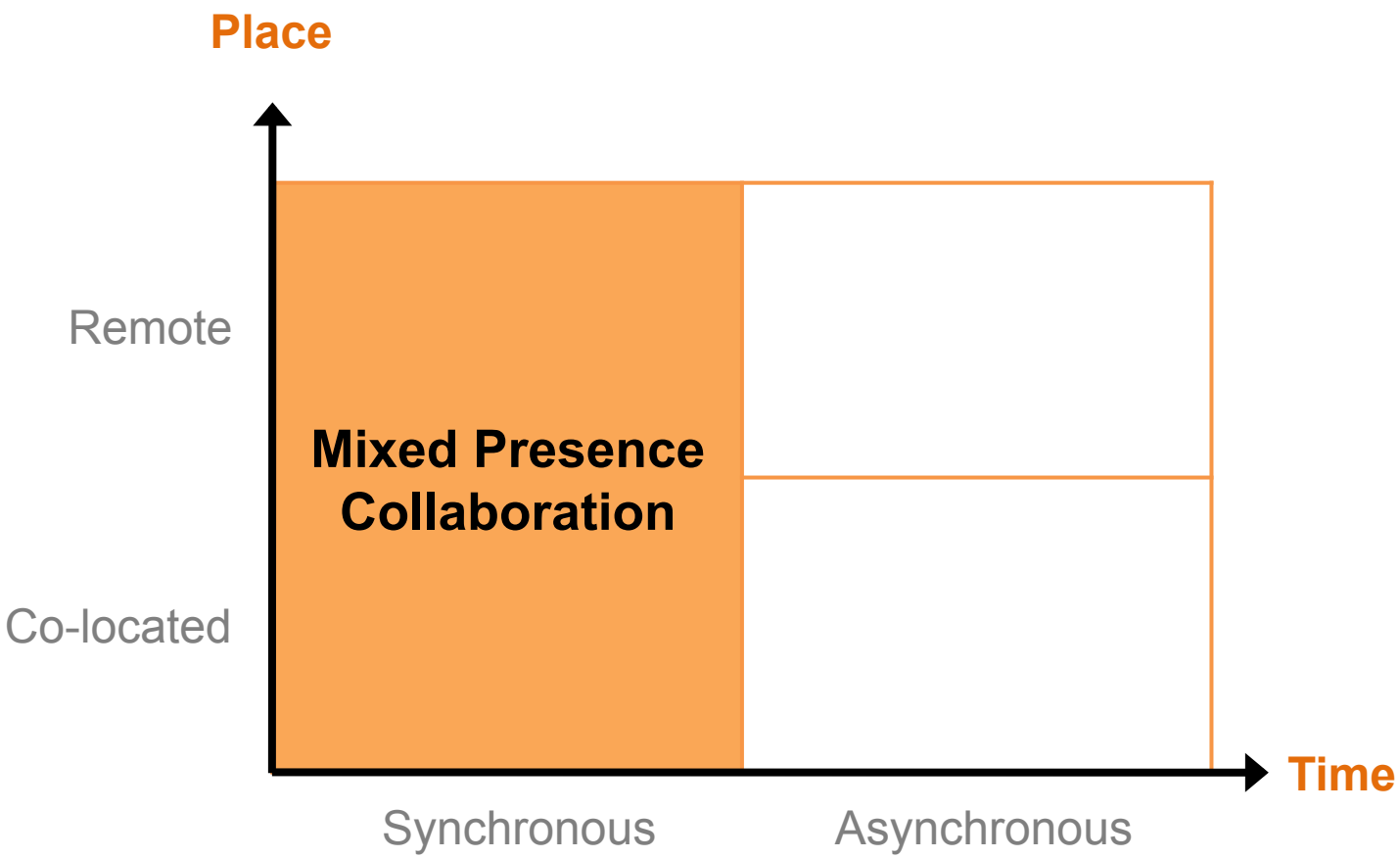
Work on same object

- One object, several users
- Multiple views
  - Group awareness
- Coupling
  - Loose vs. strict
- Division of labor
  - Roles



[Roseman 1996]

Space/Time matrix



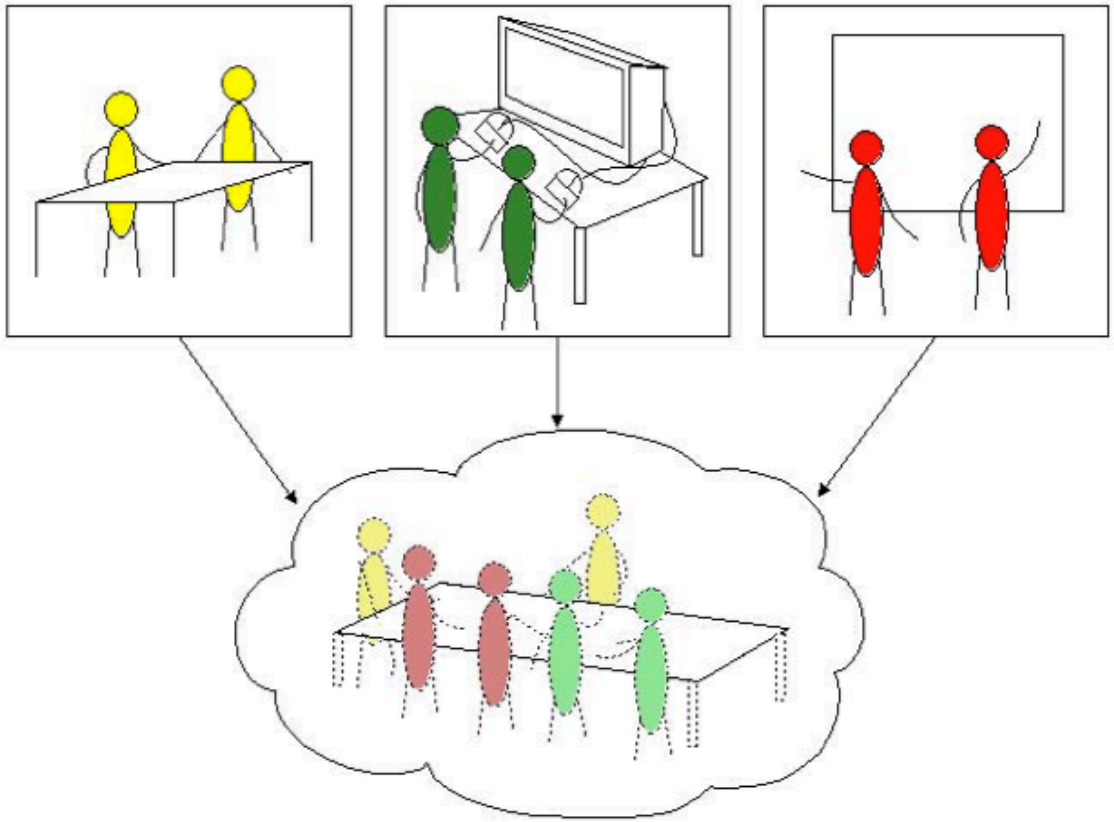
Mixed Presence Groupware

MPC

Real-time

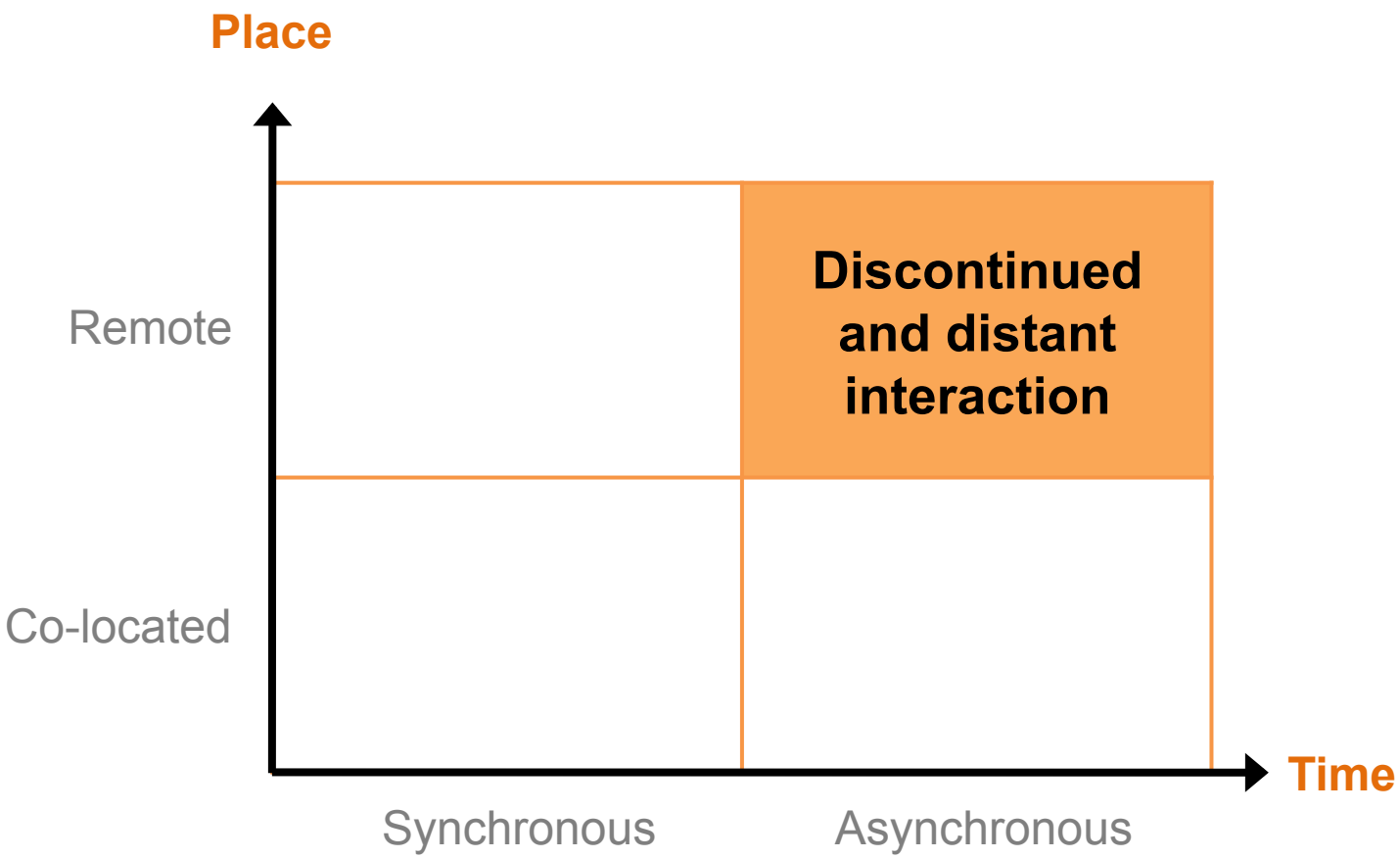
Shared visual workspace

- Support both remote and co-located
- Heterogeneity
- Seating rules
- Indicators of social presence



[Tang 2004]

Space/Time matrix



DDI

Asynchronous communication

Email

- one-to-one, one-to-many
- Social issues : intrusive
- Privacy ?
- Social engineering

Blog, wiki

- Participative
- Communities
- Access control ?

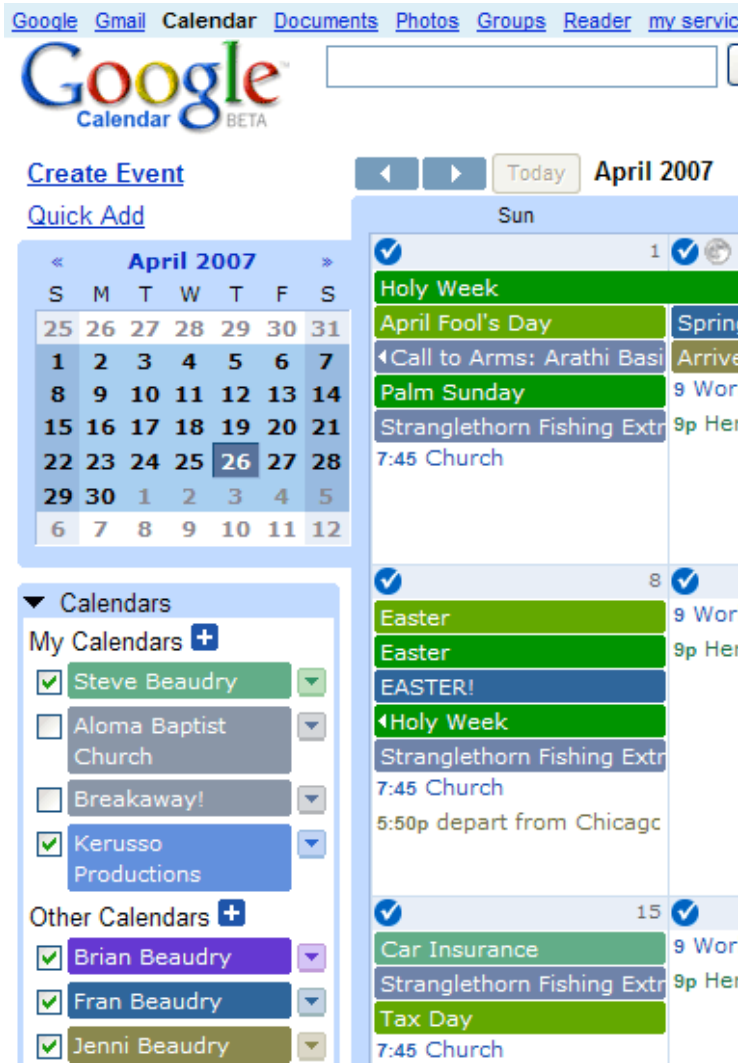
Social networks

DDI

Shared calendars

Coordination management

- Sharing easier
- Automatic scheduling
  - Matching agenda
- Control ?
- Privacy ?



DDI

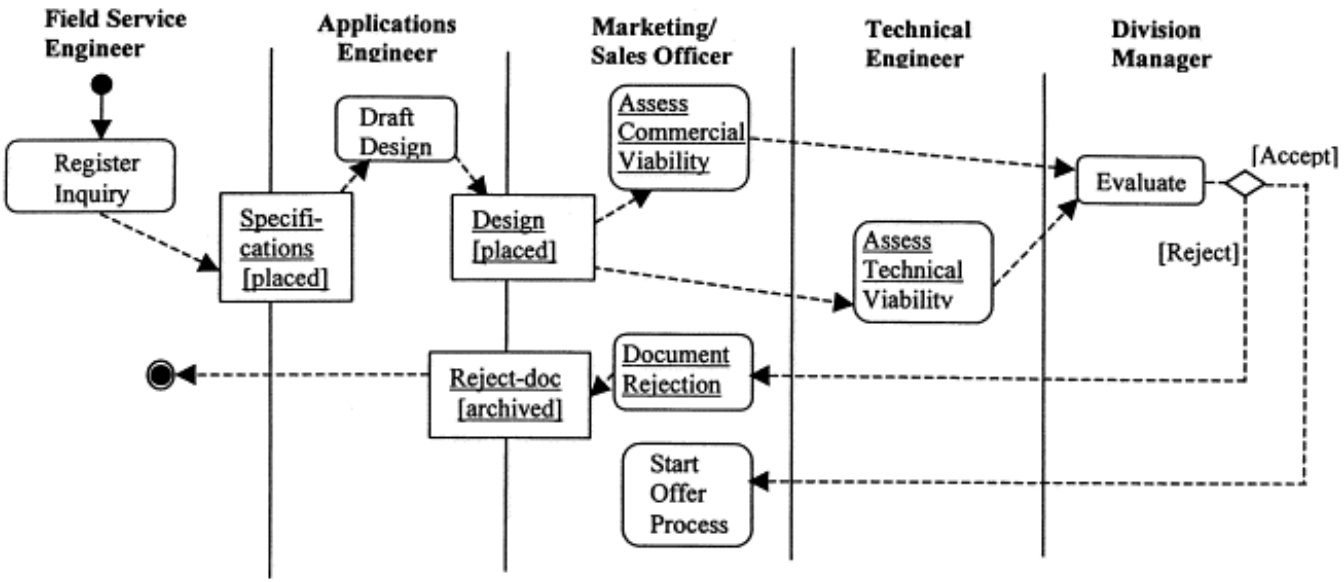
Workflow

Coordination of activities

Integration and harmonious adjustment of individual work efforts toward the accomplishment of a larger goal

Process management

- Sequence of connected steps
- Triggers



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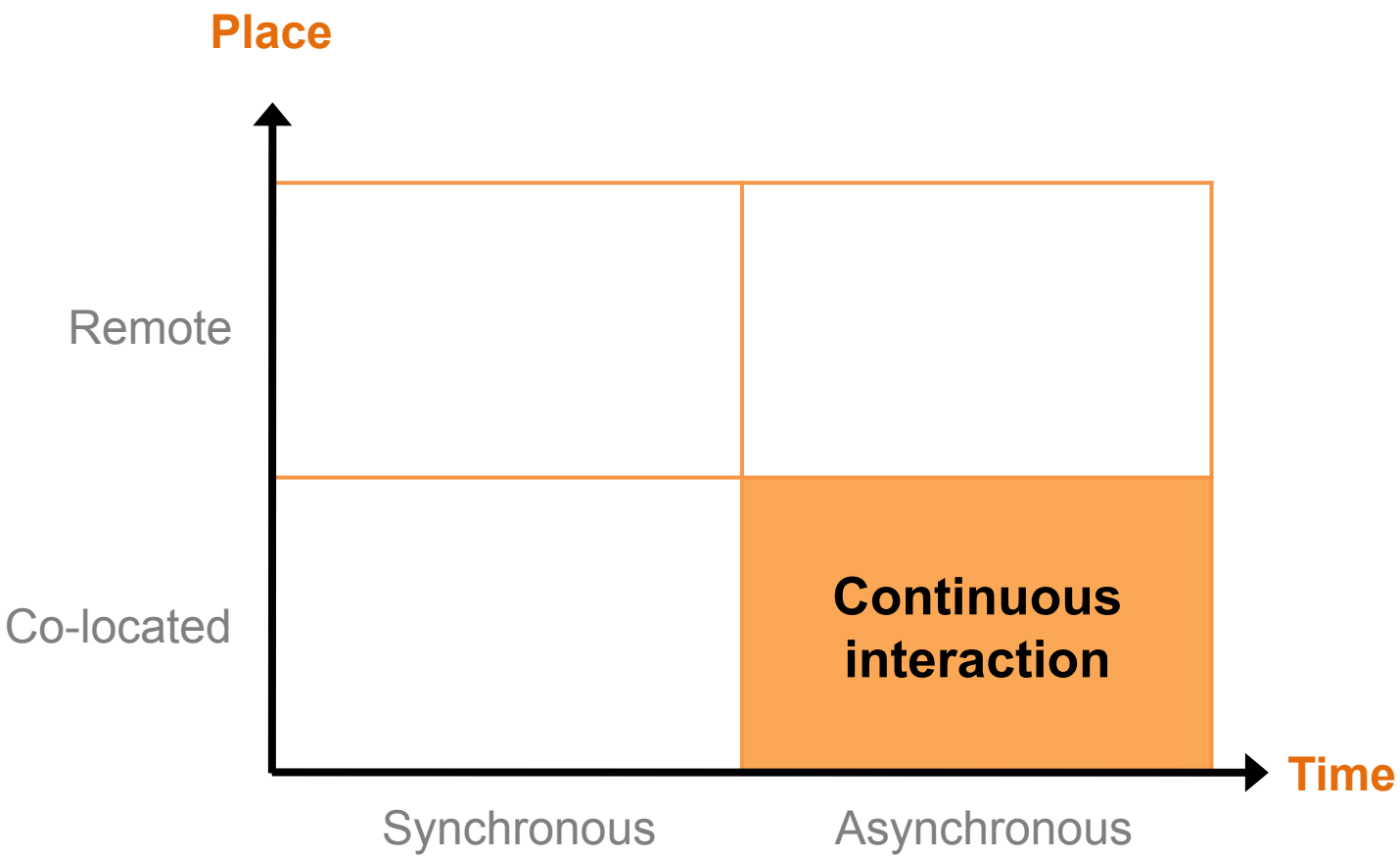


Control rooms

Work shifts

- Continuous task
- Information passing
- Traces of actions

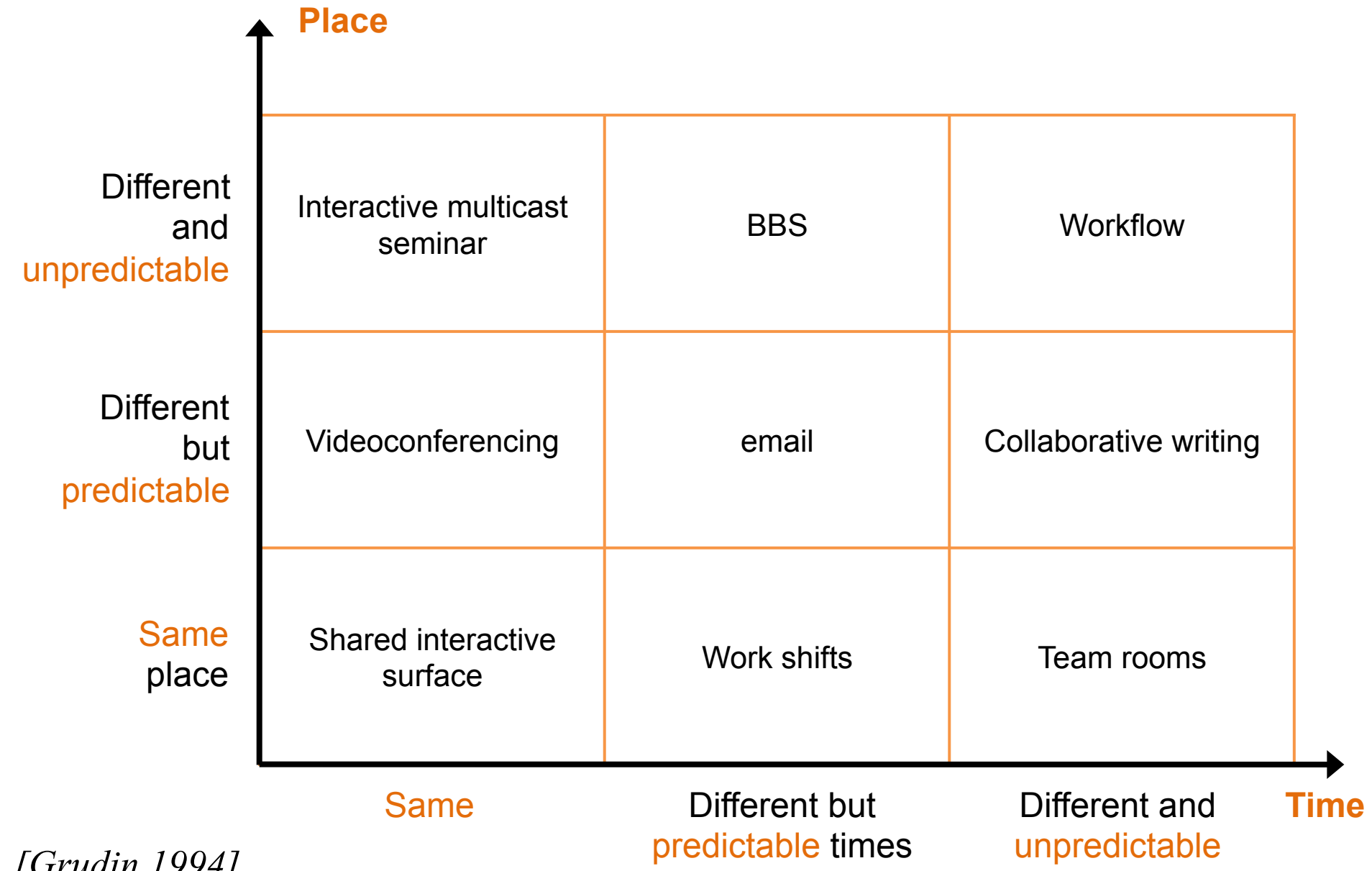
Power plant control room

Public displays

- Interaction history
- Social learning
- Social experience of gaming
- Honeypot effect

Chained Displays [Koppel 2012]

Extended Space/Time matrix



[Grudin 1994]