

Shared Workspaces: Behavioural Foundations

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References

Tang, J.C. **Findings from Observational Studies of Collaborative Work.** International Journal of Man-Machine Studies, 34(2), February 1991.

Pinelle, D., Gutwin, C. and Greenberg, S. (2003) **Task Analysis for Groupware Usability Evaluation: Modeling Shared-Workspace Tasks with the Mechanics of Collaboration.** ACM Transactions on Human Computer Interaction, 10(4), December, 281-311. Read Sections 1 - 4, with Section 4 being the most important one.

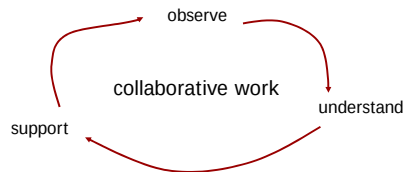
Gutwin, C. and Greenberg, S. **Design for Individuals, Design for Groups: Tradeoffs between power and workspace awareness.** In Proceedings of the ACM Conference on Computer Supported Cooperative Work, p207-216, ACM Press. 1998

Xerox PARC. **Observations on the Use of Shared Drawing Spaces.** Video, Duration 14:24. 1990.

Baker, K., Greenberg, S. and Gutwin, C. (2001) **Heuristic Evaluation of Groupware Based on the Mechanics of Collaboration.** In M.R. Little and L. Nigay (Eds) Engineering for Human-Computer Interaction (8th IFIP International Conference, EHCI 2001, Toronto, Canada, May), LNCS Vol 2254, p123-139, Springer-Verlag.

Motivation

Needs of a group are different
→ Should be reflected in technology
→ Need to examine what IS different
→ Need to understand differences



Findings from observational studies of collaborative work (Tang, 1991)

Video analysis



Findings from observational studies of collaborative work (Tang, 1991)

Function/Action	List	Draw	Gesture
Store Information			
Express Ideas			
Mediate interaction			

Analysis Framework
→ Simplified
→ Categories not distinct



Findings from observational studies of collaborative work (Tang, 1991)

Main findings

- (1) Hand gestures communicate information
- (2) Process of creating & using drawings conveys important information
- (3) Drawing space is used to mediate interaction
- (4) Fluent mix of drawing space activity
- (5) Spatial orientation structures activity

Findings from observational studies of collaborative work (Tang, 1991)



Findings from observational studies of collaborative work (Tang, 1991)

- (1) Hand gestures
- Express ideas
 - Demonstration
 - Mediate interaction



Findings from observational studies of collaborative work (Tang, 1991)

- (1) Hand gestures -- Problems

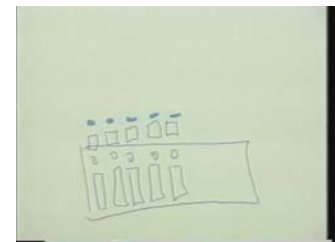


Findings from observational studies of collaborative work (Tang, 1991)

- (2) Process holds important information
- express ideas vs. store information
 - context is important to drawing

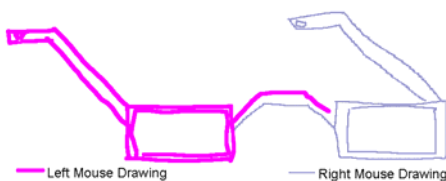
Problems:

- timing!



Findings from observational studies of collaborative work (Tang, 1991)

- (3) Drawing space is used to mediate interaction
- proximity
 - work closely / avoid collision
 - concurrent access
 - awareness of input



Findings from observational studies of collaborative work (Tang, 1991)

- (4) Fluent mix of drawing space activity

Problems:

- Computers separate



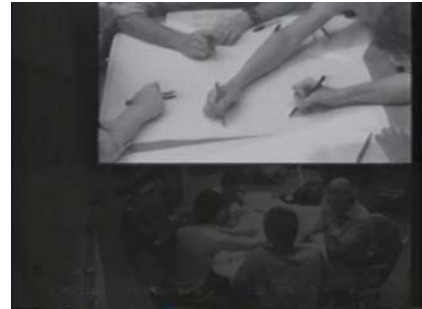
Findings from observational studies of collaborative work (Tang, 1991)

(5) Spatial orientation structures activity



Findings from observational studies of collaborative work (Tang, 1991)

(5) Spatial orientation structures activity



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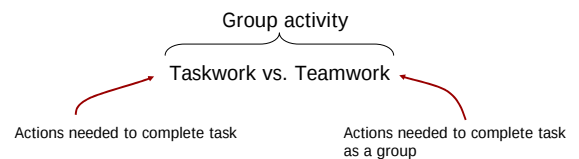
(5) Spatial orientation structures activity



Task Analysis for Groupware Usability Evaluation ... (Pinelle et al., 2003)

Motivation:

–Modeling schemes for discount groupware usability analysis



Task Analysis for Groupware Usability Evaluation ... (Pinelle et al., 2003)

Mechanics of Collaboration

Basic operations of teamwork - the small-scale actions and interactions that group members must carry out in order to get a task done collaboratively

Task Analysis for Groupware Usability Evaluation ... (Pinelle et al., 2003)

Mechanics of Collaboration

Explicit Communication – intentional & planned

Task Analysis for Groupware Usability Evaluation ...
(Pinelle et al., 2003)

Mechanics of Collaboration

Explicit Communication – intentional & planned

Spoken Messages



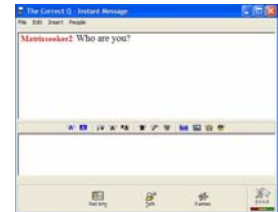
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Mechanics of Collaboration

Explicit Communication – intentional & planned

Spoken Messages

Written Messages



Task Analysis for Groupware Usability Evaluation ...
(Pinelle et al., 2003)

Mechanics of Collaboration

Explicit Communication – intentional & planned

Spoken Messages

Written Messages

Gestural Messages

Deictic Messages

Manifesting Messages



Task Analysis for Groupware Usability Evaluation ...
(Pinelle et al., 2003)

Mechanics of Collaboration

Explicit Communication – intentional & planned

Information Gathering – decoupled communication

Basic Awareness



Task Analysis for Groupware Usability Evaluation ...
(Pinelle et al., 2003)

Mechanics of Collaboration

Explicit Communication – intentional & planned

Information Gathering – decoupled communication

Basic Awareness

Feedthrough



Task Analysis for Groupware Usability Evaluation ...
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Explicit Communication – intentional & planned

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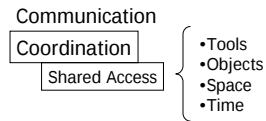
Consequential Communication

Overhearing

Visual Evidence

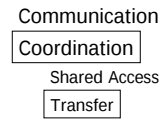
**Task Analysis for Groupware Usability Evaluation ...
(Pinelle et al., 2003)**

Mechanics of Collaboration



**Task Analysis for Groupware Usability Evaluation ...
(Pinelle et al., 2003)**

Mechanics of Collaboration



**Design for Individuals, Design for Groups.. (Gutwin,
Greenberg, 1998)**

Motivation:

- Synchronous distributed GW: mixed-focus situation
- Tradeoff: Individual vs. Group needs

**Design for Individuals, Design for Groups.. (Gutwin,
Greenberg, 1998)**

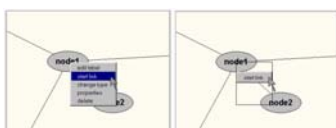
Problem 1: Workspace Navigation



**Design for Individuals, Design for Groups.. (Gutwin,
Greenberg, 1998)**

Problem 2: Symbolic Manipulation

- shortcuts
- minimal feedback



**Design for Individuals, Design for Groups.. (Gutwin,
Greenberg, 1998)**

Problem 3: View Representation



**Heuristic Evaluation of Groupware
based on the Mechanics of Collaboration** (Baker et al., 2001)

- Discount Evaluation
- Evaluation according to usability principles
- Here: real-time collaboration, distance separated

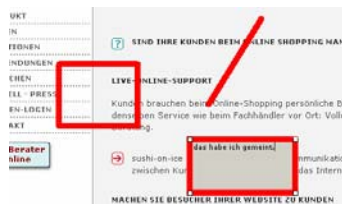
**Heuristic Evaluation of Groupware
based on the Mechanics of Collaboration** (Baker et al., 2001)

1. Provide the means for intentional and appropriate verbal communication



**Heuristic Evaluation of Groupware
based on the Mechanics of Collaboration** (Baker et al., 2001)

2. Provide the means for intentional and appropriate gestural communication



**Heuristic Evaluation of Groupware
based on the Mechanics of Collaboration** (Baker et al., 2001)

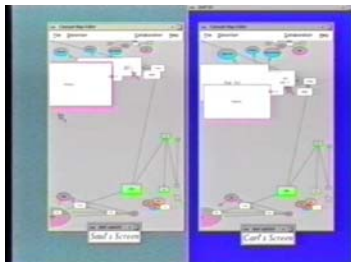
3. Provide consequential communication of an individual's embodiment

- Explicit subtle visual and verbal cues
- E.g. location, gaze and views, actions, presences, identities



**Heuristic Evaluation of Groupware
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4. Provide consequential communication of shared artifacts



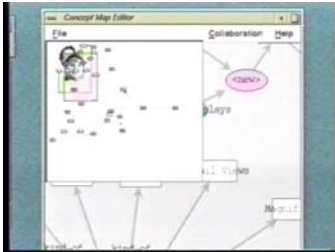
**Heuristic Evaluation of Groupware
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5. Provide protection 🗝

- Concurrent access
- Notice effects of other actions
- Undo
- Version Control
- Turn-taking

**Heuristic Evaluation of Groupware
based on the Mechanics of Collaboration** (Baker et al., 2001)

6. Manage the transitions between tightly and loosely-coupled collaboration



**Heuristic Evaluation of Groupware
based on the Mechanics of Collaboration** (Baker et al., 2001)

7. Support people with the coordination of their actions



**Heuristic Evaluation of Groupware
based on the Mechanics of Collaboration** (Baker et al., 2001)

8. Facilitate finding collaborators and establishing context

