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## Evaluation of groupware

CT334/434: CSCW

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## CSCW Basics

- Intro to Group Work
- Intro to Groupware
- Design of Groupware
- Evaluation of Groupware ←

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## Learning Outcomes

- After attending this lecture and reading the additional literature, you should be able to:
  - Explain what evaluation is
  - Understand what/when/how evaluation can be performed
  - Understand what type of knowledge can be derived by different evaluation methods

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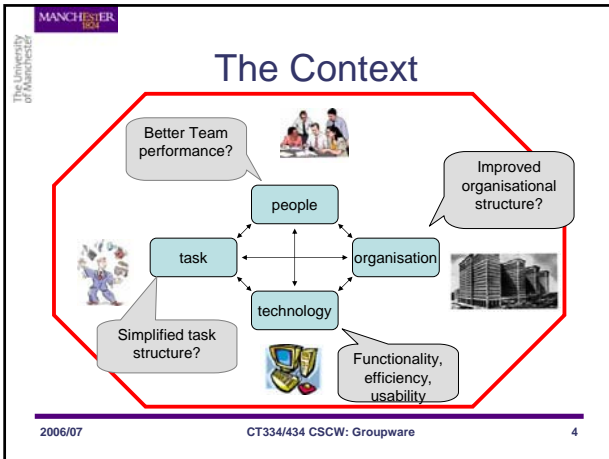
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## A difficult task

- The evaluation of CSCW systems is difficult, because
  - Many different factors affect their success
  - many disciplines study these factors
  - the interaction occurs over long time periods

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## What to evaluate?

1. Does it work? (*functionality*)
2. Does it work well enough? (*efficacy*)
3. Is it workable with? (*usability*)
4. Does it follow the *standards* laid down by various bodies? (*standards*)
5. What does it do to those who work with it? (*individual effect*)
6. What does it do to their work? (*group effects*)
7. What does it do to those they work with and for? (*organisational effects*)
8. What does it do to the world beyond work? (*societal effects*)

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## Evaluation criteria

- **Functionality:** reliability, robustness, efficiency, technical novelties
- **Efficacy:** does the system do what is intended/needed?
- **Usability:** interaction design issues
- **Standards:** consistency with requirements of various standards-making bodies
- **Individual effect:** psychological issues
- **Group effect:** socio-political issues
- **Organisational effect:** profit, security, changes
- **Societal effect:** cost/benefit, changes, socio-political issues

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## When to evaluate?

- **Concept evaluation**
  - Analyse potential impact of new socio-technical system on the basis of scenarios
  - Before implementation -> requirements (four principles of groupware design)
- **Prototype evaluation**
  - Test if the applications function as they were planned and whether user-interfaces are usable
  - During implementation -> grounded design decisions
- **Operational evaluation**
  - Evaluate impact of technology on work setting: communication, social interaction, quality of work and organisational efficiency
  - After implementation -> adoption knowledge & requirements for new technology

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## HutchWorld

- Virtual Worlds to enhance social support and information exchange among caregivers and patients
  - **Information services:** contact information, links to the institution's web site and related web sites, Seattle guides for transportation, shopping and restaurants.
  - **Social services** Bulletin Board Service, notes, gifts and email exchange, real time communication in 3D environment and text chat area.
  - **Diversionary services** users can make music together by interacting with sculptures in a 3D environment, create a personal journal, web browse and play games.
- Microsoft Research & Fred Hutchinson Cancer Research Center



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## HutchWorld (2)

- **Concept evaluation**
  - Meetings with patients, caregivers & medical staff early in design
  - Observations in hospitals, schools, and research facilities
  - What: functionality, usability, individual and group effects
    - Physical world metaphor, social support, restricted entry
- **Prototype evaluation**
  - Early prototype tested on site with real users
    - Organisational effect: problems with technology deployment (staff training)
    - Functionality: chat-room did not achieve critical mass, asynchronous communication was needed
    - Individual/group effect: users felt obliged to talk
  - Later prototype tested at Microsoft
    - Usability
- **Operational evaluation**
  - portal version: limited field trial



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## How to evaluate?

- **Inspection methods:** evaluators 'inspect' an interface according to a set of criteria
  - Heuristics (HCI)
- **User observations:** evaluators observe users performing tasks within a semi-controlled setting
  - User testing (HCI)
  - Laboratory experiments (cognitive/social psychology)
- **Verbal methods:** evaluators ask users their opinion
  - Interviews, Questionnaires, Focus Groups and Customer Feedback (social psychology & marketing)
- **Field studies:** evaluators study people interacting within their world
  - Ethnography (HCI)
  - Conversation Analysis and Interaction Analysis (Ethnomethodology)

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## Heuristic evaluation

- Evaluation by experts according to, guidelines for good design, or checklists of usability.
  - Inexpensive, fast and easy
  - Too general; tend mainly to address usability
  - Group/societal/organisational effects may be lost
  - Research on community is working on heuristics for sociability

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## Heuristics for CSCW

1. Provide the means for intentional and appropriate verbal communication
2. Provide the means for intentional and appropriate gestural communication
3. Provide consequential communication of an individual's embodiment
4. Provide consequential communication of shared artifacts (i.e. artifact feedthrough)
5. Provide protection
6. Management of tightly and loosely-coupled collaboration
7. Allow people to coordinate their actions
8. Facilitate finding collaborators and establishing contact

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## Laboratory experiments

- Collect quantitative data about selected factors, attempting to control other influences
- Hypotheses testing
  - Compare prototypes (prototype evaluation)
  - Study social dynamics (operational evaluation)
- Decontextualised and artificial setting
  - Difficult to select a representative sample
  - Short observation




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## Laboratory settings




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## Verbal methods

- Questionnaires, interviews, focus groups
- Can be used to investigate several dimensions
  - individual/social/organisational/societal effects
- Self-reports
- Useful at every stage of the evaluation cycle

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## Questionnaire: example

- Collaborative writing
  - 41 participants
  - 3 groupware
  - 83% word
  - Benefits
    - better product
  - Drawbacks
    - Making the task more difficult

Reasons	N	Position		
		First	Second	Third
Discuss the document's content	38 (34%)	Email (32%)	Meeting (25%)	Phone (25%)
Discuss the document's structure	35 (38%)	Meeting (40%)	Email (38%)	Phone (23%)
Discuss the division of work	33 (40%)	Meeting (59%)	Email (21%)	Phone (17%)
Write the text	31 (59%)	Email (59%)	Meeting (21%)	Other (17%)
Edit the text	36 (59%)	Email (59%)	Meeting (23%)	Other (14%)
Resolve conflicts	33 (37%)	Meeting (37%)	Email (33%)	Phone (17%)

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## Ethnography

- Contextual approach that requires a prolonged period of immersion in the social setting being studied
- Special skills are required to the researchers
  - they should become 'part of the team' or
  - 'hang around' without interfere
- Huge amount of data is collected
  - audio and videotapes, field notes, descriptions and diagrams of the work setting, and samples of various artefacts
- Useful to investigate group/organisational/societal effects

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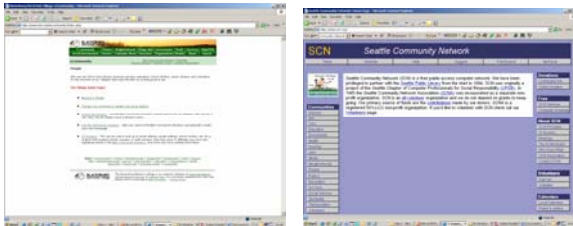
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## Ethnography: example



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## Conversation/Interaction Analysis

- Study real group interactions as revealed by their conversation and actions
- Data driven;
- Used on video-conferencing, e-mail,
- Understand what people do, not why they do it
- Useful to investigate group/organisational/ societal effects

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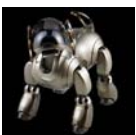
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## Example



- On-line Aibo Discussion Forum
  - Technological essences + 75% -8
  - Life like essences + 48 -12
  - Mental states + 60 - 4
  - Social rapport + 59 - 8
  - Moral standing + 12 -2

WHAT!?! They Actually THREW AWAY aibo, as in the GARBAGE?!! That is outrageous! That is so sick to me! Goes right up there with Putting puppies in a bag and than burying them! OHH I feel sick...

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## Summing up

- CSCW evaluation is complex
  - Several evaluation criteria
  - Several methods
    - Inspection
    - User observations
    - Verbal methods
    - Field study

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## Conclusion

- Multiple methods should be used to evaluate CSCW
- Choice depends on the questions to be addressed and the training and skills of the researchers

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## Additional readings

- **Preece - chapter 10 -**
- **Hutchworld: Lessons Learned.** Cheng, et. al.  
<http://research.microsoft.com/scg/papers/hutchw2000.pdf>
- **Evaluation of cooperative systems project**  
<http://www.comp.lancs.ac.uk/computing/research/cseg/projects/evaluation/index.html>

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