Evaluation of groupware

CT334/434: CSCW

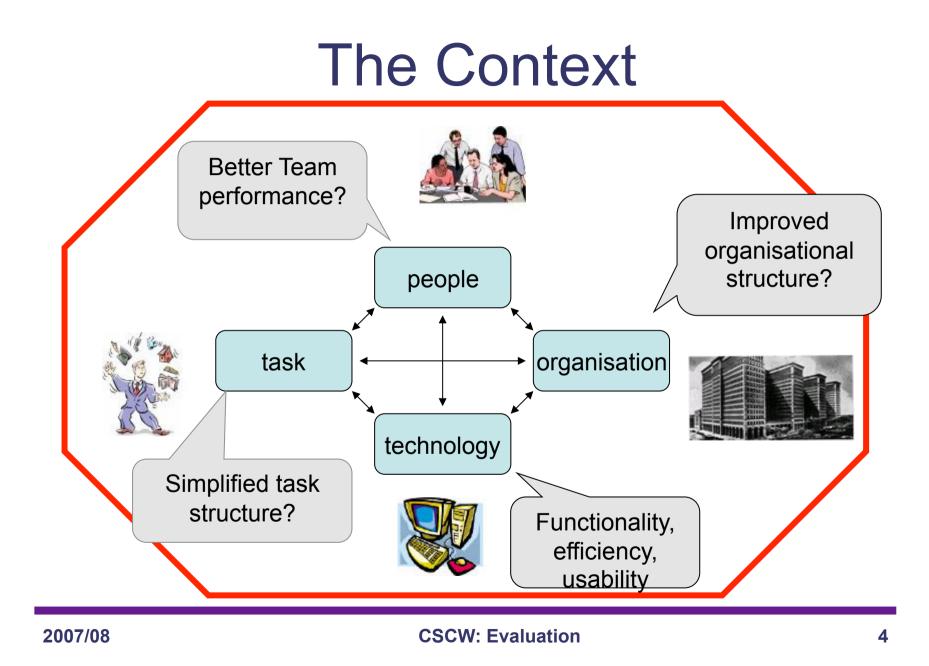
CSCW Basics

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



Learning Outcomes

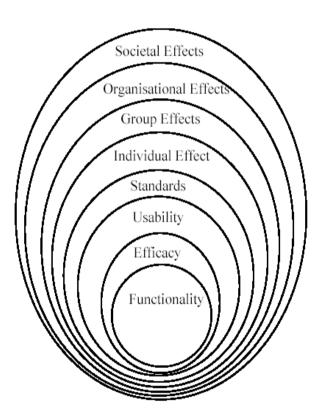
- After attending this lecture and reading the additional literature, you should be able to:
 - Explain what evaluation is
 - Understand what/when/how evaluation can be performed
 - Understand what type of knowledge can be derived by different evaluation methods



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

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)

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

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

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



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



CSCW: Evaluation

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)

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

Heuristics for CSCW

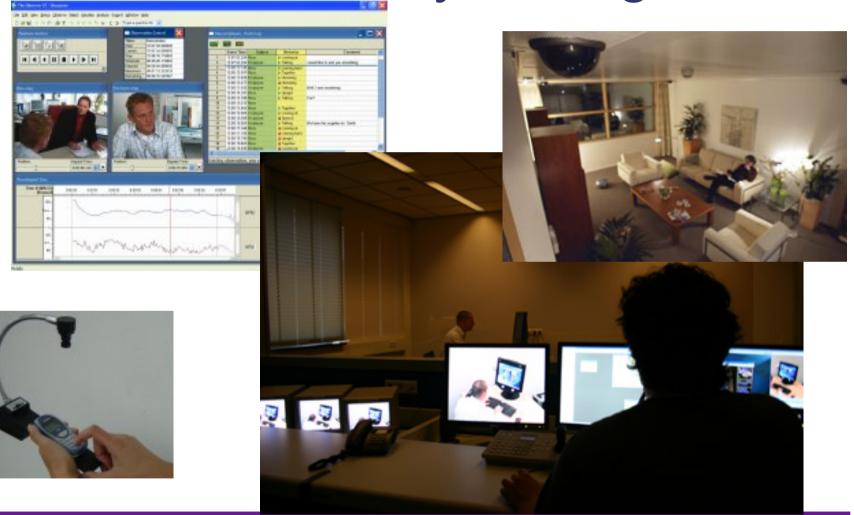
- 1. Provide the means for intentional and appropriate verbal communication
- 2. Provide the means for intentional and appropriate gestural communication
- 3. Provide consequential communication of an individual's embodiment
- 4. Provide consequential communication of shared artifacts (i.e. artifact 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

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



Laboratory settings



CSCW: Evaluation

On-line experiments

- Participants are 'observed' while performing task on-line (e.g., community
 - Control on sample (registration, invitation by e-mail)
 - Logging behaviour
 - Hypotheses can be tested by assigning participants to different experimental conditions

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

Questionnaire: example

Collaborative writing

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

Reasons	Ν	Position					
		First	Second	Third			
Discuss the document's content	38	Email	Meeting	Phone			
		(34%)	(32%)	(25%)			
Discuss the document's structure	35	Meeting	Email	Phone			
		(38%)	(35%)	(19%)			
Discuss the division of work	33	Meeting	Email	Phone			
		(40%)	(38%)	(23%)			
Write the text	31	Email	Meeting	Other			
		(50%)	(21%)	(17%)			
Edit the text	36	Email	Meeting	Other			
		(50%)	(23%)	(14%)			
Resolve conflicts	33	Meeting	Email	Phone			
		(37%)	(33%)	(17%)			

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

Ethnography: example

	Blacksburg Electronic Village: eCommunity - Microsoft Internet Explorer	<u>_ 8 ×</u>						
	File Edit View Favorites Tools Help				ternet Explorer			<u>_ 8</u> >
	🌀 Back 🔻 🕗 👻 😰 🏠 🔎 Search 🦙 Favorites 🧭 👻 🌭 💿 👻 🛄 🏛					(4		
	Address 🕘 http://www.bev.net/ecommunity/index.php	💌 🔁 Go 🛛 Links 🎽			🧐 🎽 🍣 🖉 🖌 🗾	2		
Image: State of the	Google= 💽 🚱 Search Web 👻 🚳 🖻 58 blocked 🔞 AutoFill 📴 Optix 🎽 🛲 🕼 🐼 🖓 🍐 🌽 🗡 🐋	2 M 🖗				N	• 0• / A X/ - • 00 67	
<text><text><text><section-header><text><text><text><text><list-item></list-item></text></text></text></text></section-header></text></text></text>		<u>_</u>	Google Community Netwo	ork 💌 🐯 Search Web 💌 💱 🗟	58 blocked 🗄 AutoFil 🛃 Opt	x " MADCOW - 🕹 🗇 🔇		*
Name Name Name Name <	BLACKSBURG electronic village							
Name Name Name Name <			ISCN	Seattle	Community	[,] Network		
Propie Built of the state is drawn water								
<text><text><list-item></list-item></text></text>			Teinet	WebMail	Help	Suggest	FreeSpeech	NetGuide
Solution with the second product of the	People							
In the provide of the part of the the base of the part of the								
 In the state of th			Free					
 • correct vitant • correct vitant	The Village Home Pages							Chimic Bonabon
Change use parsanged of under your main data seases Communities and sease in the Bad Community Directory and selence in the SCO Community Direc	Become a Villager		Esercie Community Network	profit organization. SCN	is an all-volunteer organ	nization and we do not o	lepend on grants to keep	Free
Advision	Change your password or undete your email address		Communities					SCN Services
Acts monthal all algorithms and address with all allows and allows and address with all algorithms and address with algor					i-profit organization. If y	ou a like to volunteer wi	th SCN check out our	Computer Giveaway
 a) the contrast Directory: Ad your and to be BeV Community Directory and optionally grate your and to be BeV Community Directory and optionally grate your and be BeV Community Directory and optionally grate your and be BEV Community Directory and optionally grate your and be BEV Community Directory and optionally grate your and be BEV Community Directory and optionally grate your and be BEV Community Directory and optionally grate your and be BEV Community Directory and optionally grate your and be BEV Community Directory and optionally grate your and be BEV Community Directory and optionally grate your and be BEV Community Directory and optionally grate your and be BEV Community Directory and optionally grate your and be BEV Community Directory and optionally grate your and be BEV Community Directory and optionally and be BEV Community Directory and optional liability and directory and optionally and be BEV Community Directory and Directory and Directory and Directory and Directory and Directory Directory and Directory Directory and Directory D								
Tour numbersees. 	 Join the Computity Directory - Add your name to the REV Computity Directory and optionally create 		Civic					
 • Un Directory of the datasets, postel address, postel address,			Education					
Image: Incompany directory, and some may have unlabele information: Image: Incompany directory, and some may have unlabele information: Image: Incompany directory, and some may have unlabele information: Image: Incompany directory, and some may have unlabele information: Image: Incompany directory, and some may have unlabele information: Image: Incompany directory, and some may have unlabele information: Image: Incompany directory, and some may have unlabele information: Image: Incompany directory, and some may have unlabele information: Image: Incompany directory, and some may have unlabele information: Image: Incompany directory, and some may have unlabele information: Image: Incompany directory, and some may have unlabele information: Image: Incompany directory, and some may have unlabele information: Image: Incompany directory, and some may have unlabele information: Image: Incompany directory, and some may have unlabele information: Image: Incompany directory, and some may have unlabele information: Image: Incompany directory, and some may have unlabele information: Image: Incompany directory, and some may have unlabele information: Image: Incompany directory, and some may have unlabele information: Image: Incompany directory, and some may have unlabele information: Image: Incompany directory, and some may have unlabele information: Image: Incompany directory, and some may have unlabele information: Image: Incompany directory, and some may have unlabele information: Image: Incompany directory, and some may have unlabele information: Image: Incompany directory, and some may have unlabele information: Image: Incompany direct	VT Directory - This can be used to look up an email address, postal address, phone number, etc. for a							
Image: Information if intervention of the interventintervention of the intervention of the inte	Virginia 1ech student, facuity member, or start member. Note that some VI amilities may have also registered entries in the <u>BEV Community Directory</u> , and some may have unlisted information.							
Internet Excension Under Excension Under Excension SCA Association Internet Internet Internet Internet								Who Does What
Initial Contract Statute Initial Contraction Initiantion Initial Contraction <td>Nome LeCommunity EVicitors ENcloberhoods EVIIIace Mail EGovernment EYouth EServices</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>SCN Association</td>	Nome LeCommunity EVicitors ENcloberhoods EVIIIace Mail EGovernment EYouth EServices							SCN Association
Image: Second State of the second s	Help Atts/Entertainment Seniors Calendar/News Education Organizations Health About BEV Search BEV Volunteer at BEV Contact BEV							Contact SCNA
Intrastructure & Section (* Vision Tach, For comments regarding this Web site, place and a message to <u>BZ Comments</u>). Direct Data Patients Patients Sign Upl Volunteer Social Services Social Services Splituality Local Calendars Local Calendars Intrastructure & Description Volunteer Volunteer Description Description Image: Services Image: Services Splituality Local Calendars Local Calendars Volunteer Volunteer Volunteer Volunteer Pace 8. Justice Pace 8. Justice			People					
indefeadors Volunteer Social Services Social Services Sprittuality Local Calendars Transportation Volunteer Volunteers Peace & Justice	Infrastructure & Services of Virginia Tech. For comments regarding this Web site.		Politics					
Social Services Spirituality Transportation Volunteers Internet	pression a message to <u>activations</u> . <u>Privaty Polity</u>							
Spittually Calendars Transportation Voluters Voluters Peace & Justice								
Transportation Local Calendars Volunteers Peace & Justice								Calendars
Volunteers Peace & Justice								Local Calendars
								Peace & Justice
	an (1)	Internet	<u>ی</u>					internet
			🏄 Start 🛛 🥶 🕑 🗷 🚱	w = 💭 🛯 🕫 🕑	🔌 Inbox - Micr 🛛 💽 Microsoft F	o 🧃 7 Intern 🔻 🗀 2 W	indow 🔻 [🔛 Adobe Reader 🛛 🛋 Do	

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

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



Summing up

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

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

Additional readings

- Preece chapter 10 -
- Hutchworld: Lessons Learned. Cheng, et. al. <u>http://research.microsoft.com/scg/papers/</u> <u>hutchvw2000.pdf</u>
- Evaluation of cooperative systems project

http://www.comp.lancs.ac.uk/computing/ research/cseg/projects/evaluation/index.html