

9 Cooperative Learning

9.1 Groups, Communication, and Collaboration



9.2 CSCW and CSCL

9.3 Virtual cooperative learning environments

9.4 Physical cooperative learning environments

9.5 Collaboration scripts in CSCL

References:

J. Haake/G. Schwabe/M. Wessner (Hrsg.): CSCL-Kompendium, Oldenbourg
2004 (Kap. 1.3, 1.5)

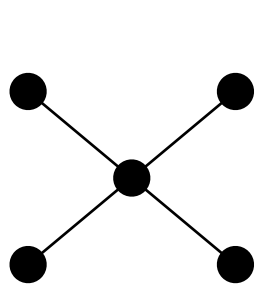
Clark/Mayer Chapter 11

What is a Social Group?

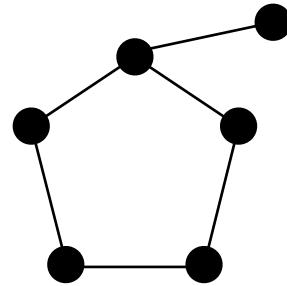
- "Groups satisfy individual needs as well as the needs of a community." (Döring)
 - Socio-emotional level: Group identity, transmission of social norms and values, social support
 - Factual-instrumental level: Partitioning of labor, transfer of knowledge
- Criteria (Döring 2003) (in contrast to transient interaction constellations):
 - Permanent (possibility of) communication
 - Separation from environment
 - Internal structure of group
 - Feeling of connectedness within group
 - Cooperation and mutual support
- Primary groups: High socio-emotional binding (family, friends)
- Learning groups are "secondary groups":
 - Group structure needs to be established
 - **Therefore: Support connection establishment**

Group Structures

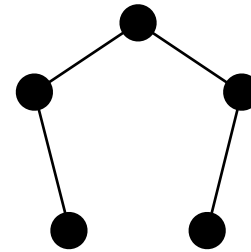
- Communication networks



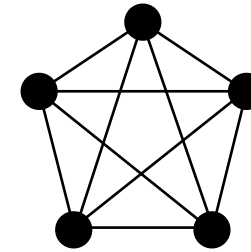
Wheel



Circle



Chain



Network

Leavitt (1951)

Centralized (e.g. wheel):

- Effective for simple tasks (e.g. information search)
- Low satisfaction (except of center position)

Decentralized (e.g. circle, chain, network)

- Better for complex tasks
- Well-stabilized group may tend to again use centralized structures

Consequence:

Support decentralized structures, support negotiation of roles

Group Productivity

- *Potential productivity* is determined by:
 - Requirement level of group task
 - Human resources
 - » Individual knowledge and skill
 - » Influences of interaction
- Process loss:
 - e.g. organizational problems, nervousness, tiredness
- *Real productivity*:
 - Potential productivity minus process loss

Steiner (1972)

Task Types and Group Work

4 dimensions for the definition of task types:

- Divisibility of task
 - Maximization vs. optimization
 - Relationship between individual and group performance
 - additive (e.g. brainstorming)
 - compensatory (e.g. estimation tasks)
 - disjunctive (e.g. mental exercise tasks)
 - conjunctive (e.g. playing music jointly)
 - scope of discretion for group
 - Inter-Dependancy of group members
 - Cooperation
 - Competition
 - Mixture (may imply dilemma)
- Try to avoid competitive structures to ensure success of group work.

Steiner (1972)

Group Dynamics and Group Work

- *Social facilitation and inhibition:*
Group work may have positive or negative impact of productivity
- Reasons for bad group productivity:
 - Loss of motivation: *social loafing / free riding*
 - Reluctance due to *evaluation apprehension*
 - *Production blocking* by non-optimal co-ordination of individual contributions
- Computer-supported collaboration:
 - Filtering of additional and meta information, e.g. anonymization
 - Anonymity often considered as uncomfortable in group situations
 - New obstacles, e.g. fear of creating data traces

Consequences:

- Co-operative tasks
- Reduce competition
- Avoid anonymity

Identity and Group Participation

- Majority influences
 - e.g. Asch experiment 1951 (acceptance of false majority opinion)
- Minority influences
 - Consistent position, presented by authoritative person
 - Polarization, categorization
- Social Identity Theory (SIT) (Tajfel, Turner 1979)
 - Participation in social groups as important part of self concept
 - Preference for own group (*in-group bias*)
(Empirical evidence: Even in completely arbitrary formed groups)
 - Participation in various social groups
 - *Saliency*: Visibility of a certain social group
 - » Strengthens perception of difference to other groups

Consequences:

- Social stimuli (age, gender) as help for categorization
- Avoid salient situations for inter-group discrimination

Phases of Group Development

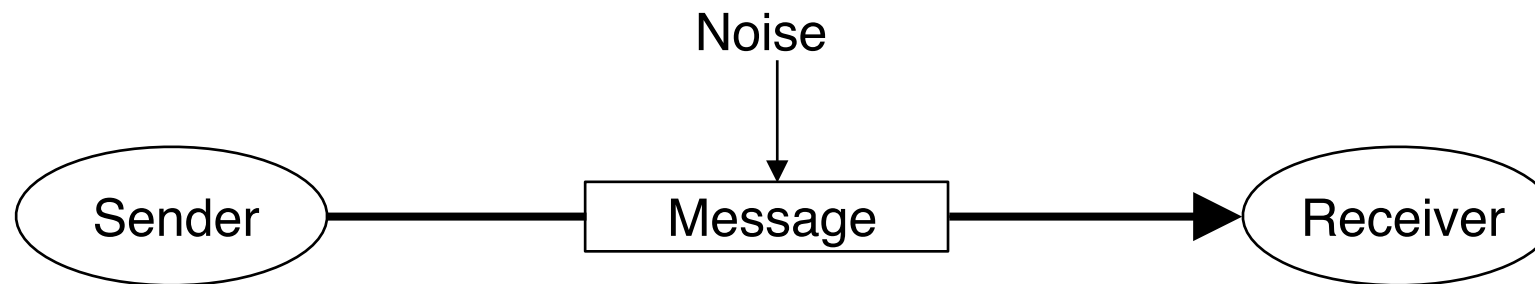
- *Forming* (orientation)
 - Socio-emotional level: Finding acceptable patterns of behavior
 - Task level: Approaching the group goal
- *Storming* (confrontation and conflict)
 - Socio-emotional level: Definition of positions and distribution of power
 - Task level: Organizational discussions
- *Norming* (consensus, co-operation and compromise)
 - Socio-emotional & task level: Development of standards
- *Performing* (Integration of task and socio-emotional requirements)
 - Socio-emotional: Standards in negotiation
 - Task level: Elaboration of solutions for group goals
- (Additional phase:) Transfer, closing und farewell
 - Dissolution of (learning) group
- **Consequence:**
 - **Accept conflict as part of co-operation** Tuckman (1965)
 - **Do not overly rely on computer-generated indicators for human behavior**

Leading a Group

- Determination of goals
- Orientation
 - Structure
 - Information flow
- Conflict resolution
 - Openness and tolerance
 - Working on upcoming conflicts
- (External) representation
- Styles of leadership
 - authoritative
 - democratic
 - laissez-faire
 - co-operative

Models of Human Communication (1)

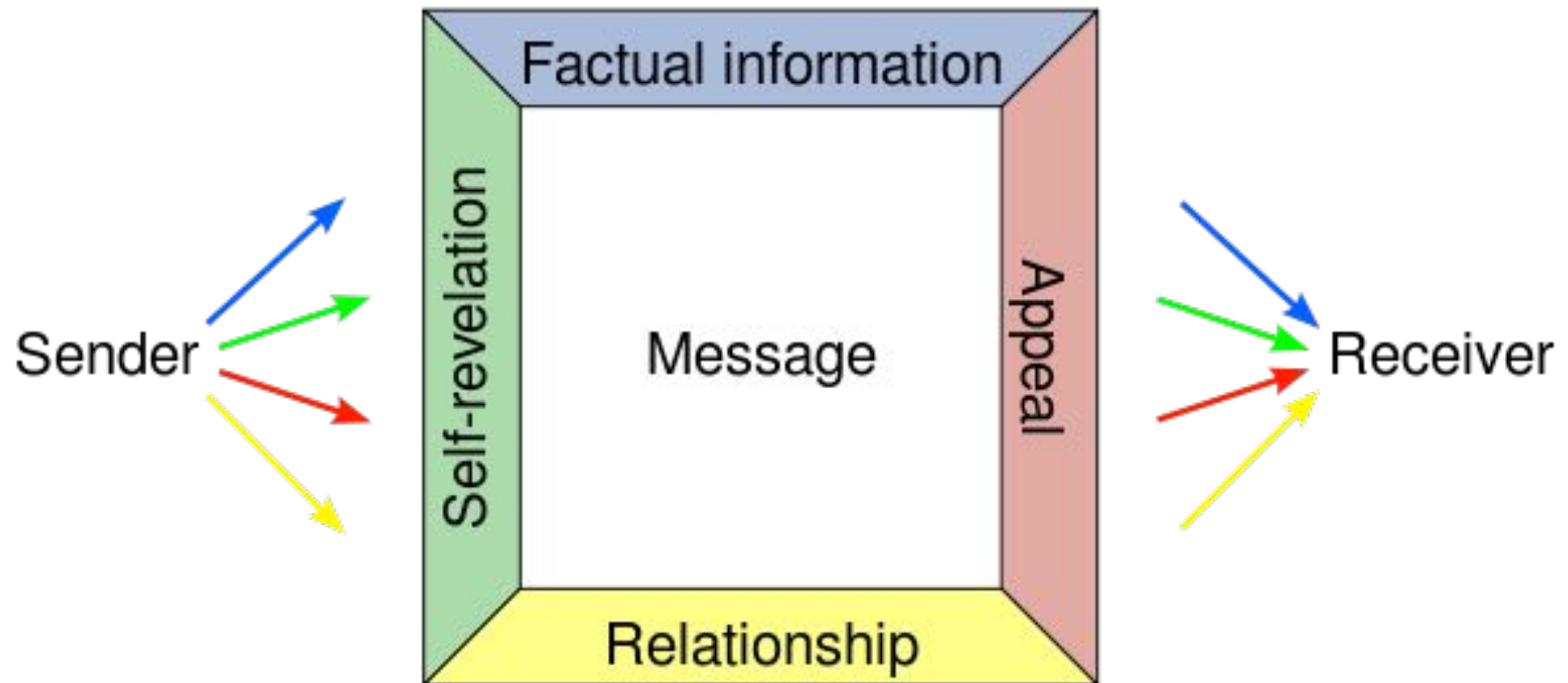
- Shannon/Weaver (1949)



How does this correspond to learning theories?

Models of Human Communication (2)

- Four-sides model of communication (Schulz von Thun, 2001)



Picture: Wikipedia

Human Communication in Group Learning

- ***Please evaluate the information on human communication regarding its impact on group learning, in particular computer-supported group learning!***


Co-Operative Learning: Opportunities and Hurdles

- Opportunities:
 - *to be filled in lecture*
- Hurdles:
 - *to be filled in lecture*

Suitable Learning Tasks for Group Learning

- *How can we characterize learning tasks/goals, which lend themselves to group learning?*

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Computer-Supported Cooperative Work (CSCW)

Ellis, Gibbs, Rein 1991, definition of *groupware*:

"computer-based systems that support groups of people engaged in a common task (or goal) and that provide an interface to a shared environment."

- Example functions:
 - Messaging systems
 - Multi-user editors
 - Virtual meeting rooms
 - Conferencing systems
 - Joint information spaces
 - Coordination systems
 - CSCW functions have become everyday experience in modern Web:
 - Open Source Development, Wikis, Chats, Skype, Dropbox, Google Docs, ...
- History of CSCW: Jonathan Grudin, "Computer-Supported Cooperative Work: History and Focus," *Computer*, vol. 27, no. 5, pp. 19-26, May 1994, doi:10.1109/2.291294

Traditional Groupware Systems

IBM Lotus Notes 8



Übersicht Modulare Anwendungen Office-Werkzeuge E-Mail
Kalender Kontakte

Warum IBM Lotus Notes für die elektronische Zusammenarbeit?
Mit IBM Lotus Notes und Domino 8 können Mitarbeiter Informationen leichter teilen und verwalten, Geschäftsentscheidungen schneller treffen und die Arbeitsabläufe optimieren.

The screenshot shows the BSCW (Business Support Collaboration Web) interface. The top navigation bar includes "Datei", "Bearbeiten", "Ansicht", "Optionen", "Anzeigen", and "Hilfe". Below the navigation bar, there is a search field with the text "Gemeinschaften von anonymous /public". The main content area displays a list of documents under the "public" group, with 14 entries. The list includes documents titled "Evaluation", "Konferenzen führen", and "QM Evaluation".

Name	Größe	Teilen	Aktion
Evaluation			
Konferenzen führen Evaluation der Tagung vom 16./17.Mai 2006 Bitte beantworten Sie die Fragen auf dem Hintergrund welche Elemente der Fortbildung für Sie von Bedeutung waren.			
Konferenzen führen Evaluation der Tagung vom 16./17.Mai 2006 Bitte beantworten Sie die Fragen auf dem Hintergrund welche Elemente der Fortbildung. Wie in der Schule ist 1 die beste, 6 die schlechteste Note.			
Neue Umfrage			
QM Evaluation 13./14.9.2006			

CACL

- **Computer-supported**
 - collaborative/ cooperative/ collective/ competitive/ conversational**Learning** (in analogy to “CSCW”)
- **Cooperative Learning:**
 - Learning in a group
 - Joint construction of knowledge
- **Example functions:**
 - Jointly used material collections
 - Collaboration functions for joint elaboration of solutions
 - Knowledge management
 - Participant and role management

Theoretical Background for CSCL

Do you remember theories which were discussed earlier in the lecture and which relate to CSCL?

Time Space Matrix

	same place	different place, predictable	different place, unpredictable
same time (synchronous)			
different time (asynchronous), predictable			
different time (asynchronous), unpredictable			

DeSanctis/Gallupe 1987, Grudin 1994

Fill in examples!

Time Space Matrix

	same place	different place, predictable	different place, unpredictable
same time (synchronous)	Computer- supported communication		
different time (asynchronous), predictable		Computer- mediated communication	
different time (asynchronous), unpredictable			

DeSanctis/Gallupe 1987, Grudin 1994

Further Dimensions of CSCL

- Symmetry
 - Knowledge transfer (asymmetric) or joint knowledge construction (symmetric)
- Control mechanism
 - Controlling person or implicit self-control
- Duration
 - Temporary learning group or community of learners (cf. chapter 3)
- Social form
 - Type and size of group
 - Interaction styles
- Knowledge goals
 - Individual goals or group goals

Tools for Work Coordination

Computer-Mediated Communication				
Channels	Asynchronous communication		Synchronous communication	
	2 partners	>2 partners	2 partners	>2 partners
Text	E-Mail	News Groups	Chat Instant Messaging	Chat Instant Messaging
Audio	(Attachments, Uploads)		(VoIP) telephony	Phone conferences
Video			Video conference	Multipoint video conference

Cooperation Tools for Small Groups (1)

- Min. 2, max. 10 participants
- **Awareness functions:**
 - Participants are able to observe what others are doing
 - State of participant
 - » e.g. current contribution is available, is allowed to speak
 - Context of participant
 - » Environment-specific activities and properties, e.g. role
 - State of jointly used objects
 - » e.g. updated version
 - Group activity
 - » e.g. transition into new phase
 - Individual activities
 - » e.g. moving a file

Cooperation Tools for Small Groups (2)

- Joint data repository
 - Shared objects, status, access rights
- Co-operative editing
 - Simultaneous modifications by several users
 - Fine-granular locking
 - Mechanisms to deal with conflicting activities
 - e.g. several cursors, "floor control"
- *Application Sharing:*
 - Embedding of standard applications into joint workflow
- ***Is it possible that such mechanisms create conflicts with self-determination principles?***

Example (2015): LMU F11 Teaming (1)

The screenshot displays the F11 Teaming web application interface. At the top, the header includes the 'F11 Teaming' logo, the text 'Fakultät für Psychologie und Pädagogik', and the user's name 'Heinrich Hußmann' with a 'Log Out' link and a settings icon. Below the header are navigation links: 'F11 IT Benutzerportal', 'F11 Teaming Home', 'Webseite der Fakultät', and 'Webseite der LMU'. The browser's address bar shows 'My Workspace' and other navigation options. The main content area is titled 'Heinrich Hußmann (heinrich.hussmann) Profile' and features a profile picture and a status field with the text 'What are you working on?'. Below the profile, there are tabs for 'What's New', 'Recent', 'Tasks and Calendars', 'Micro-Blogs and Shared Items', and 'Accessories'. The 'Accessories Panel' is expanded, showing four sections: 'Tasks' (with a table header: Task Name, Priority, Due Date, Status, Assigned to, % Done, Location), 'Guestbook' (with a 'Sign the guestbook' link), 'Blog' (with a 'Public Blog' link), and 'Photo Album' (with a 'Public Photo Album' link). The footer of the interface includes 'Permalinks | Server: F11-TEAMING-1'.

Example (2015): LMU F11 Teaming (2)

The screenshot displays the F11 Teaming web application interface. The top navigation bar includes the F11 Teaming logo, the text "Fakultät für Psychologie und Pädagogik", and user information "Heinrich Hußmann | Log Out | Settings". Below the navigation bar are links for "F11 IT Benutzerportal", "F11 Teaming Home", "Webseite der Fakultät", and "Webseite der LMU".

The main content area is divided into two panels. The left panel, titled "Projekte", shows a hierarchical tree structure of projects under "Projekte [F11]". The right panel displays a specific project entry titled "Fischer, Kollar, Ufer et al. 2014 - Scientific Reasoning and Argumentation- Adva...".

The project entry includes a title "Fischer, Kollar, Ufer et al. 2014 - Scientific Reasoning and Argumentation- Advancing an Interdisciplinary Research Agenda in Education.pdf", a version number "V1.0", and a status "No Status". It also shows the creator "Stefan Ufer" and the creation date "Jul 2, 2014 9:07 AM". The entry has "12 Visits" and "no comments".

Below the project entry, there are tabs for "Comments(0)", "Attachments(0)", "Entry History", "File Versions", and "Tags". A "Add Comment..." button is visible. At the bottom of the entry, there are links for "Permalink", "E-mail Contributors...", "Subscribe to This Entry", and "Server: F11-TEAMING-1".

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Virtual Cooperative Learning Space (VCL)

Computer-Mediated Communication

VCL

Coordination

Awareness,
Access Control,
Floor Control

Communication

Information and
Data Exchange

Cooperation

Resource Sharing

(Historic) Example: VITAL

- Virtual Teaching and Learning (GMD-IPSI 1999)
- Virtual learning world, hypermedia, audio communication
- Joint reading of learning materials
 - Awareness functions, e.g. *telepointer* (carrying a picture of owner)
- Chat & Audio
- Specific learning situations:
 - Private learning space
 - Group learning space
 - Auditorium

Message Board (Auditorium)

Questions:

- Why are there no traffic signs at some intersections?
- What is the meaning of blinking yellow lights?

Asked by: Jörg

Answer:

It would be expensive und unnecc... signs at all intersections. Especially, if there is only little tr...

Ask question

World "World2" at host 'pc-dolph'

You are Jörg.

About Pocket Rooms People

Jörg's home (nor...)

Martin's home (nor...)

Miao's home (nor...)

Ruediger's home (...)

Yongwu's home (...)

discussion room (none)

Auditorium (Ruediger, Martin, Yongwu, Jörg, Je...)

Auditorium

Whiteboard: Car driving 1 (this room)

Trainer: Martin

cooperative Learners: Jennifer, Jörg, Ruediger, Yongwu

III.3-A. Right-of-way

When traffic signs are absent, vehicles coming from the right have the right-of-way at intersections, junctions, and traffic circles. This general rule applies to motor vehicles, bicycles, and animal-drawn wagons.

Exceptions:



- Traffic signs
- Traffic lights
- Other exceptions

Who drives first?

→ The correct order is ...

More exercises ...

→ Exercises

iSocial: 3D Virtual Learning World

<http://isocial.missouri.edu/>



Science Learning in Second Life



www.youtube.com/watch?v=EfsSGBraUhc

Trends 2014 (According to NMC)

- NMC (New Media Consortium) Horizon project
 - Collecting trends in technology for higher education
 - Published every year, created by asking experts
- Main *fast trends* 2014:
 - Growing ubiquity of social media
 - Integration of online, hybrid and collaborative learning
- ***How is the topic of Social Media related to Collaborative Learning?***

Long-Term Trend: Learning Analytics

- NMC Report 2014, mid-range trend:
 - Rise of data-driven learning and assessment
 - Learners leaving a data trail
 - Learning analytics: analyze data on behavior of learners
- NMC Report 2015, mid-term trend:
 - Growing focus on measuring learning
- Concrete example:
 - Iowa Community College Online "Early Alert" system
 - Dashboard for instructors identifying at-risk students
 - See <http://nextgenlearning.org/grantee/iowa-community-college-online-consortium>
- ***Is this a positive development judging in terms of motivation theory?***

An instructor dashboard identifies at-risk students, defined as those who have not submitted an assignment in the last 10 days, have not logged into the course for 120 hours, or whose course grade falls below 72 percent.