

# **Measurement challenges for collaborative learning research: Discussion**

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# Big Picture

- CSCL measurement – why measure?
- Paradigms of CSCL – how to measure?
- Unit of analysis – what to measure?
- The dream of scientific measurement – is reliable measurement possible?

# CSCL measurement – why measure?

- At about the time of the first CSCL conference in 1995, Dillenbourg, P., Baker, M., Blaye, A., & O'Malley, C. (1996) analyzed the state of evolution of research on collaborative learning as follows
- As we read their analysis, we can think about how far CSCL methodology has come today

➤ “For many years, theories of collaborative learning tended to focus on how individuals function in a group. This reflected a position that was dominant both in cognitive psychology and in artificial intelligence in the 1970s and early 1980s, where cognition was seen as a product of individual information processors, and where the context of social interaction was seen more as a background for individual activity than as a focus of research. More recently, the group itself has become the unit of analysis and the focus has shifted to more emergent, socially constructed, properties of the interaction.

➤ “In terms of empirical research, the initial goal was to establish whether and under what circumstances collaborative learning was more effective than learning alone. Researchers controlled several independent variables (size of the group, composition of the group, nature of the task, communication media, and so on). However, these variables interacted with one another in a way that made it almost impossible to establish causal links between the conditions and the effects of collaboration.

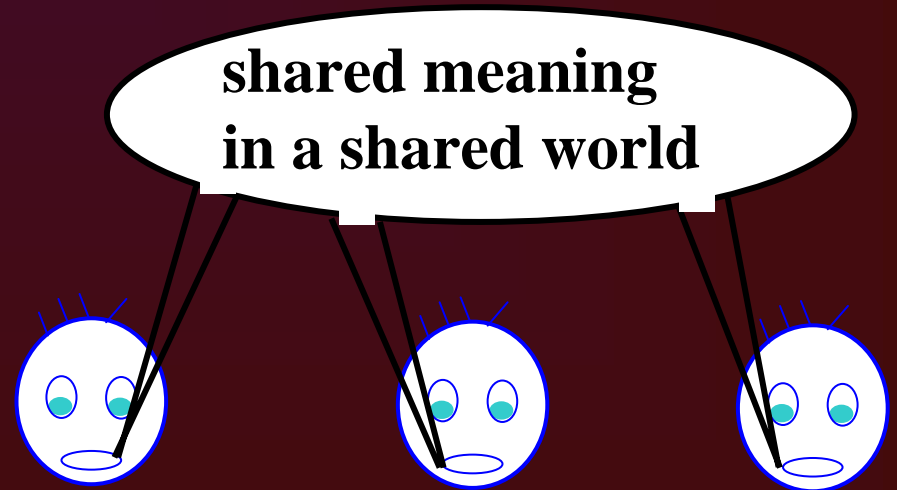
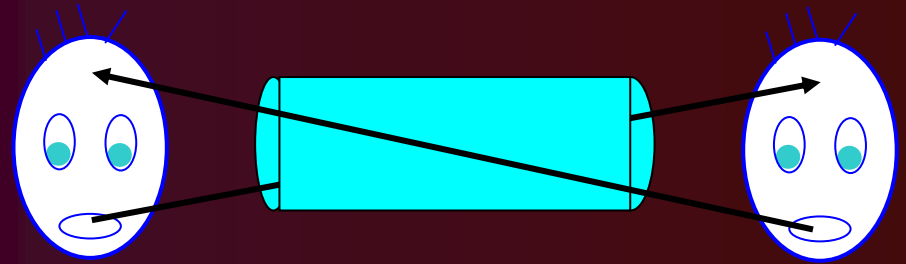
➤ “Hence, empirical studies have more recently started to focus less on *establishing parameters for effective collaboration* and more on trying to *understand the role that such variables play in mediating interaction*. This shift to a more process-oriented account requires *new tools for analyzing and modeling interactions*.” (p. 189, emphasis added)

# Paradigms of CSCL – how to measure?

- Cognitive (cognitive psychology)
  - Exchange messages thru communication channel
- Social practice (Lave)
  - Legitimate peripheral participation in community
- Socio-cultural (Vygotsky)
  - Internalization of social interaction
- Activity theory (Engeström)
  - Transformation of socio-cultural context
- Ethnomethodology (Garfinkel)
  - Interactive achievement of social structure
- Dialog (Bakhtin)
  - Reflection and internalization of other voices
- Knowledge building (Bereiter)
  - Further development of theory objects

# Paradigms of CSCL research

- Sending messages across a chasm thru a channel. How does knowledge in heads change?
- =====
- Co-constructing a shared world. How is shared knowledge constructed?





# Unit of analysis – what to measure?

- Individual
  - Small group
  - Community
- 
- Word, message, meaning unit, phase of interaction, activity, ....

# Unit of analysis

- Face-to-face (video and/or transcript)
- Videoconferencing (transcript)
- Virtual reality
- Telephone (Jeffersonian transcript)
- Threaded discussion (log)
- Chat room (log)
- Instant messaging (log)
- Email (log)

# The dream of scientific measurement: Is reliable measurement possible?

- Can one hope to compare math interactions (or the effects of factors on math learning) in small groups face-to-face with those in chat rooms, using a script, analyzed in 2 research labs (say at Tübingen and Drexel)?
- (a) the medium totally changes the task – e.g., from talking about math to posting text notes about math.
- (b) participants construct knowledge differently in different media.

# The dream of scientific measurement

- (c) The analysis involves many tricky steps: defining the object, audio-video recording, transcription, segmentation, threading, conversation coding, problem-solving threading, problem-solving coding, math coding, selection of statistics, conclusions.
- (d) Each step may have excellent inter-rater reliability, but only when every step before was agreed upon. Cannot agree across labs or even train together. 6 ratings of .8 -> .25 rating.

**Slides & paper:**

[www.cis.drexel.edu/faculty/gerry/publications/conferences/2005/earli](http://www.cis.drexel.edu/faculty/gerry/publications/conferences/2005/earli)

**“Group Cognition” (the book) from MIT Press in the Spring – prepublication version available now:**

[www.cis.drexel.edu/faculty/gerry/mit](http://www.cis.drexel.edu/faculty/gerry/mit)

**Journal of CSCL:**

[ijCSCL.org](http://ijCSCL.org)

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