CSCL 2011

Past, present and future of research on educational technology in the West

Gerry Stahl

3 Parts of Talk

- **Past: The Roots of CSCL**
  (expanding vision)

- **Present: Alternative approaches within CSCL**
  (multiple analytic voices)

- **Future: Lessons from CSCL Research and Theory**
  (global collaboration)

Past: The Roots of CSCL

- **Schematic histories of educational technology**
- **The role of support for intersubjective meaning making in CSCL**
- **The role of individual student learners in CSCL**
- **The role of technology in CSCL**
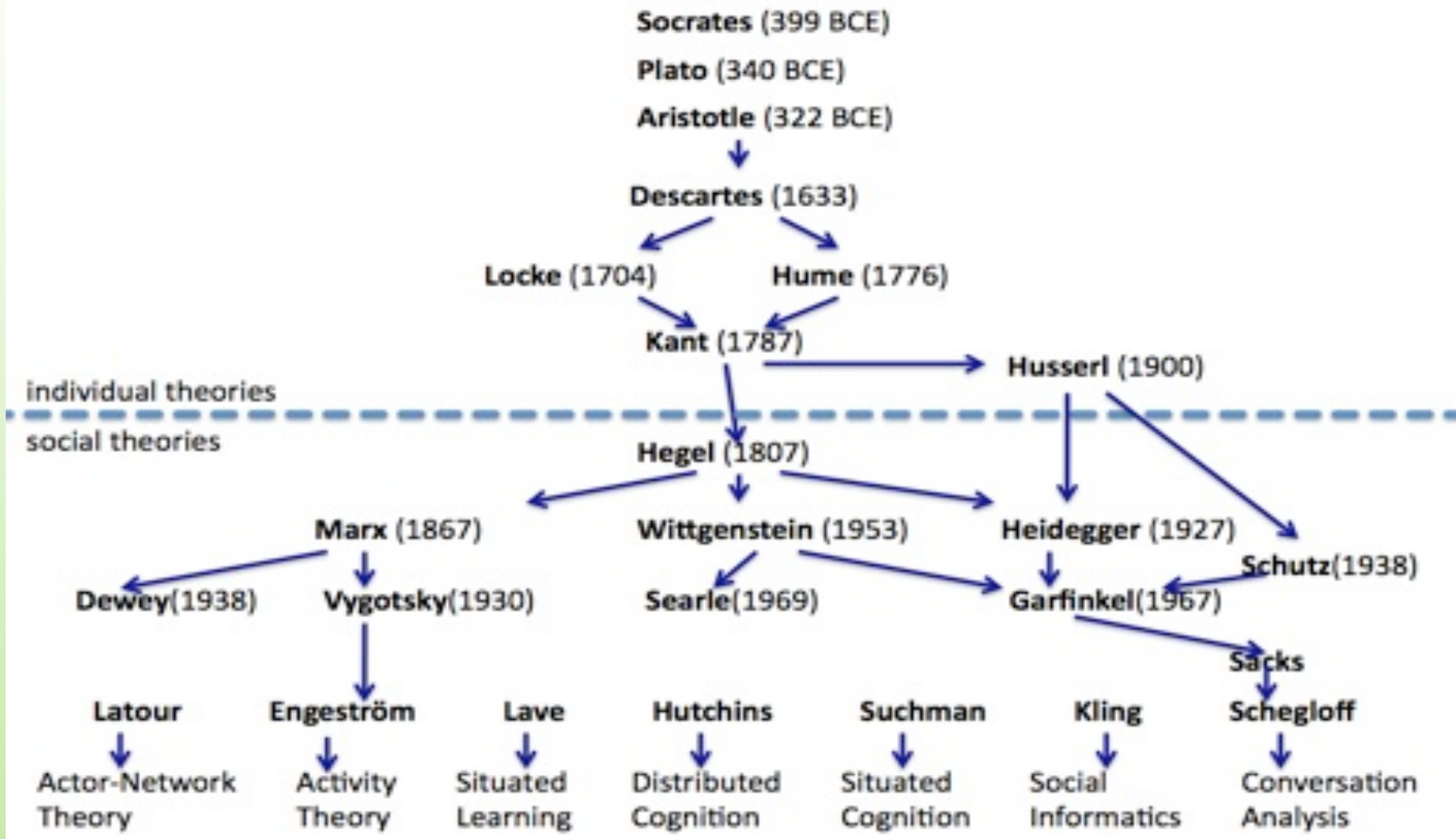- **The role of testing and assessment in CSCL**

Schematic histories of educational technology

- **The history of education**
- **The history of theory**
- **The history of computer technology**
- **The history of software design**
- **The history of educational applications**

The history of education

- **The disciplines of the sciences and liberal arts**
- **Universal public education**
- **Progressive education**
- **Emphasis on creative exploration**
- **Small-group cooperative learning**
- **Project-based learning**
- **Problem-based learning**
- **Collaborative learning and CSCL**

- *transfer of facts → ability to construct knowledge & communicate understanding*

The history of theory

Socrates (399 BCE)
Plato (340 BCE)
Aristotle (322 BCE)
→
Descartes (1633)
Locke (1704)   Hume (1776)
Kant (1787)   → Husserl (1900)

individual theories
- -
social theories

Hegel (1807)

Marx (1867)   Wittgenstein (1953)   Heidegger (1927)
Schutz(1938)
Dewey(1938)   Vygotsky(1930)   Searle(1969)   Garfinkel(1967)
Sacks

Latour   Engeström   Lave   Hutchins   Suchman   Kling   Schegloff

Actor-Network   Activity   Situated   Distributed   Situated   Social   Conversation
Theory   Theory   Learning   Cognition   Cognition   Informatics   Analysis

- *The unit of analysis of cognition expanded from the individual mind*

The history of computer technology

- **Mainframe system software**
- **Custom applications for corporations**
- **Generic desktop applications**
- **Computer networking and groupware**
- **Small apps for devices**
- **Social networking media, cloud and ubiquitous computing**

- *Technology expanded from isolated machines to social infrastructures*

The history of software design

- **Techno-centric design**

- **Ergonomics and human factors**

- **Human-centered design**

- **Design-based research**

- **Social informatics**

- **Socio-technical design.**

- *Design expanded to stress how technology would be enacted, adopted, disseminated and used in practice*

The history of educational applications

- **1950s: Cooperative learning in groups**

- **1960s: Computer-assisted instruction (e.g., arithmetic drill)**

- **1970s: Intelligent tutoring systems (user modeling algebra misconceptions)**

- **1980s: Logo as Latin**

- **1990s: CSCL (e.g., CSILE)**

- *Support for learning expanded from focus on individuals acquiring facts to communities building knowledge*

Let there be meaning

The role of supporting intersubjective meaning making in CSCL

- **As Vygotsky points out in his analysis of an infant gesturing, the establishment of shared meaning provides the basis for our individual understanding of that meaning.**

- **Intersubjectivity is the ability of people to understand each other.**

- **In CSCL, goal is to support the group processes that foster intersubjective meaning making--not just provide factual knowledge and motivate individual effort.**

An infant & adult share a meaningful gesture at a shared object

The role of individual student learners in CSCL

- **The individual mind is itself a social product, the result of interpersonal interactions**

- **There are group knowledge-building processes not reducible to individual mental processes.**

- **A group can only build knowledge with the participation of individuals, to understand and communicate.**

- **The cognitive work of individuals, small groups and communities in collaborative learning are inseparable and complexly intertwined**

The role of testing and assessment in CSCL

- **The traditional conception of learning as an increase in explicit knowledge has lead to the prominence of testing of individual students.**

- **The ideology of individualism has had implications for both education and research.**

- **Vygotsky argues that individual learning is generally preceded by inter-personal learning.**

- **Because students must make the thinking visible to each other in collaborative work, group knowledge building can be assessed.**

The role of technology in CSCL

- **Technology to support group interaction**
- **People tried to design technologies in terms of technical issues; their solutions failed to be adopted and used because of social factors.**
- **Innovative software concepts are crucial for inspiring researchers, potential funding sources and future users**
- **But cannot be done techno-centrically. Innovation based on educational goals and communication through technology.**

Present: Alternative approaches within CSCL

- **The theoretical divide**

- **Dimensions of analysis**

- **Multi-vocal methods**

The theoretical divide

- Simplistically referred to as "quantitative" vs. "qualitative" approaches to research.

- "Objective paradigm" vs. "meaningful paradigm."

- "Purposive-rational action" (our primary way of interacting with nature, controlling it to meet our needs) vs. "communicative action" (interaction, understanding, negotiation and intersubjectivity).

- In CSCL settings, students blend strategic goal-oriented work on assigned tasks with peer social interaction.

- Traditional (objective) focus on individual mind vs. (meaningful) post-cognitive theories of distributed and situated cognition – incommensurate but both necessary.

Dimensions of analysis

- **Actions and processes of individuals, small groups, classrooms, communities of practice or whole cultures.**

- **Temporal dimension: brief exchanges or episodes of interaction to longitudinal studies.**

- **Different learning issues, learner characteristics, disciplines of learning, pedagogical approaches, different facilitating technologies.**

- **….**

Multi-vocal methods -- 1

- Growing recognition of the power and even necessity of incorporating multiple approaches in exploring the design of educational applications.

- Approach should be selected based upon the nature of ones research interests, questions, hypotheses and data.

- A sequence of phases with different approaches likely to be most productive in different phases.

- Complementarity of objective and meaningful analyses. Many researchers who started with one of these approaches realized as they articulated their findings that they needed evidence that could only come through the other approach.

Multi-vocal methods -- 2

- **Power of collaboration across research labs, including globally. By pooling researchers from different traditions, collaborative research efforts access more theoretical viewpoints, methodological approaches, educational technologies and rich data sources.**

- **The research questions that CSCL faces are complex and involve different aspects and components, which may be best analyzed by different methods.**

- **An investigation of meaning making in groups may benefit from an objective analysis of individual behaviors and vice versa—without denying the theoretical differences among the approaches.**

Future: Lessons from CSCL Research and Theory

- **Lesson 1: Learn collaboratively in multi-disciplinary labs**
- **Lesson 2: Study different approaches to CSCL issues**
- **Lesson 3: Conduct design-based research**
- **Lesson 4: Engage in socio-technical design**
- **Lesson 5: Leverage technological advances**
- **Lesson 6: It takes a global village**

Lesson 1: Learn collaboratively in multi-disciplinary labs

- **Significant contributions to CSCL are likely to continue to come from research collaborations, which span both disciplinary and theoretical boundaries.**

- **The idea of a lone programmer with a bright idea, working in an isolated garage is a myth.**

- **However, labs interested in educational technology desperately need skilled, creative software designers, developers and engineers.**

Lesson 2: Study different approaches to CSCL issues

- **Newcomers to CSCL should catch up on classics of the field:**

- **Vygotsky, L. (1930/1978).** *Mind in society.*

- **Lave, J., & Wenger, E. (1991).** *Situated learning.*

- **Koschmann, T. (Ed.). (1996).** *CSCL: Theory and practice of an emerging paradigm.*

    - **Koschmann, T. (1996a).** *Paradigm shifts and instructional technology.*

    - **Scardamalia, M., & Bereiter, C. (1996).** *Computer support for knowledge-building communities.*

    - **Roschelle, J. (1996).** *Learning by collaborating: Convergent conceptual change.*

Lesson 3: Conduct design-based research

- **An on-going cyclical process of trying something out, seeing how it is used, responding to problems through re-design, testing alternative versions, etc.**

- **Phases are tightly coupled and the design-implement-test-redesign cycle is repeated as frequently as possible.**

- **The software development and the educational research are interdependent.**

Lesson 4: Engage in socio-technical design

- **Research in CSCL combines exploration of technological media with investigation of its use or adoption by students, teachers and/or school systems.**

- **A research paper might just report on one aspect of a larger research effort, but these findings are likely to emerge from more inclusive research agendas and to be considered within broader contexts.**

Lesson 5: Leverage technological advances

- **As new techniques, devices, and media become available, they will continue to inspire new educational approaches.**

- **To leverage new technical opportunities will require a deep understanding of existing practices and a careful refining of applications if educational technologies are to enter the classroom effectively without being completely co-opted into traditional systems.**

Lesson 6: It takes a global village

- **While educational technology will have to be accepted into one classroom at a time, that acceptance will have to be part of a much larger, well-conceived effort.**

- **It will take a continuing effort by the global CSCL community working together on the technology, pedagogy, research, theory, policy, training and practice to move significantly forward.**

Conclusions

- Focus on a specific project, artifact, intervention or experimental manipulation—but be aware of the multiple dimensions of alternative possibilities and issues.

- Stay grounded in the specific focus and what you can find in your data, but consider how that data might look with other conceptualizations.

- Build your argument, but take seriously counter-arguments from other perspectives.

- Work respectfully with people from different intellectual traditions and invite them to collaborate and bring their approaches to your project.

- Advances in CSCL will increasingly come from multidisciplinary research labs and from global collaborations.

Full paper:

http://GerryStahl.net/pub/cscl2011beijing.pdf

These slides:

http://GerryStahl.net/pub/cscl2011beijing.ppt.pdf

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