

Computer Supported Collaborative Learning

On-Line Learning and Communication Technologies

Course Number: 05-899 B

Day/Time: MonWed 10:30-11:50

Location: Wean Hall 5409

Units: 12

Books: None

Instructor:

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Prerequisites: None. Some familiarity with educational technology, linguistics, or machine learning would be beneficial, but not required.

Course Description

Collaborative technologies featured in the current day social web offer a snapshot vision of the next generation of learning opportunities. Environments such as Second Life, the Knowledge Forum, Wikipedia, and the Virtual Math Teams environment offer a wide range of formal and informal learning opportunities to individuals and groups worldwide. These social web technologies hold the potential to greatly increase opportunities for fostering advancement of underserved populations and leveraging the large amount of out-of-school time that school age kids have for their intellectual and social development. The field of Computer Supported Collaborative Learning has as one of its foundational goals to work towards understanding the pedagogical and technological features that make on-line education in general, and collaborative learning in particular, effective. The purpose of this seminar course is to expose students to the foundational theoretical, technological, and methodological issues underlying previous work in on-line learning, to introduce students to the wide range of current on-line environments for formal and informal interaction and learning on-line, and to explore current research in improving the quality of experiences these environments have to offer. The course is oriented around a hands-on project of the student's own choosing and design that will offer the opportunity to gain experience with available tool kits and work towards making their own contribution to what the modern day web has to offer for on-line learning.

Assignments

I. Each student will be responsible for leading the discussion for at least two class sessions. This involves both offering a concise presentation at the beginning of class that outlines the key points of the readings for the day (20-30 minutes) and moderating the class discussion.

II. Starting during the second week of class, write a response to posted discussion questions for each session by 10pm the night before class on the course Drupal account. You are encouraged also to print out what you have written and bring it to class for reference during the discussion.

III. Major Project: Work in groups of 2 or 3 to design and prototype a form of adaptive collaborative learning support. Alternative types of projects related to the theme of the course are negotiable with the instructor. Furthermore, you may pick any issue relevant to the course to focus on with your prototype, but the design challenge theme for the semester is to develop a collaborative activity to help students learn how to do an error analysis. Below are individual assignments that are meant to cumulatively result in the completion of the term project. The purpose of the project is to give students experience with each part of the process of designing and prototyping this type of intervention with the understanding that there is not sufficient time to perfect each step along the way.

- (a) Identify an issue of interest and review at least 5 related articles (Informal write up due at the end of week 5)
- (b) Optional: Practice assignments with TagHelper, SIDE, and TuTalk
- (c) Build a prototype using tools taught in class or others (first version done by end of week 10)
- (d) Collect preliminary data with your prototype – at minimum with friends.
- (e) Write a short report about your prototype, including a short literature review (primarily the review written up earlier in the semester).
- (f) Present your project in class during Week 15. Final paper due by May 8.

Grading

There will be no exams. The term project and its components are 70% of the grade. In-class presentations are 20% of the grade, and classroom participation (including online responses to other's postings) are 10% of the grade.

Syllabus

Week 1-2a Course Intro: Vision and History

Jan 12

Bork, A. (2001). Tutorial Learning for the New Century, *Journal of Science Education and Technology*, 10 (1), pp57-71.

Jan 14

Steinbock, D. (2008). Higher Education and Innovation and Competitive Advantages, in DeHaan, R. & Narayan, K. (Eds) *Education for Innovation: Implications for India, China, and America*, Sense Publishers

Jan 19

Perkins, K. & Wieman, C. (2008). Innovative Teaching to Promote Innovative Thinking: How Educational Technology Can Help, , in DeHaan, R. & Narayan, K. (Eds) *Education for Innovation: Implications for India, China, and America*, Sense Publishers

Stahl, G., Koschmann, T., Suthers, D. (2006). Computer-supported collaborative learning: An historical perspective. *Cambridge Handbook of the Learning Sciences*. Cambridge, UK: Cambridge University Press

Week 2b-Week 3 Group Facilitation and Instructional Strategies

Jan 20

Cooper, J., Robinson, P., & Ball, D. (2003). *Small Group Instruction in Higher Education: Lessons from the Past, Visions of the Future* (excerpts), New Forum Press.

Collison, G., Elbaum, B., Haavind, S., Tinker, R. (2000). *Facilitating Online Learning: Effective Strategies for Moderators* (Excerpts), Atwood Publishing

Jan 26

Hmelo-Silver, C. E. (2004). Problem-Based Learning: What and How Do Students Learn? *Educational Psychology Review*, 16(3), pp235-266.

Hmelo-Silver, C. E. & Barrows, H. S. (2006). Goals and Strategies of a Problem-based Learning Facilitator. *The Interdisciplinary Journal of Problem Based Learning*, 1(1), pp 21-39.

Jan 28

Ma, L. P. (1999). *Knowing and Teaching Elementary Mathematics: Teachers' Understanding of Fundamental Mathematics in China and the United States*, Lawrence Earlbaum

Week 4-Week 7a On-Line Learning Environments and Prototyping Tools

Learning in Virtual Math Teams

Feb 2 (Basilica Demo)

Stahl, G., Wee, J. D., & Looi, C.-K. (2007). Using chat, whiteboard and wiki to support knowledge building. Paper presented at the International Conference on Computers in Education (ICCE 07), Hiroshima, Japan. Retrieved from <http://GerryStahl.net/pub/icce07.pdf>.

Cui, Y., Chaudhuri, S., Kumar, R., Gweon, G., Rosé, C. P. (in press). Helping Agents in VMT, in G. Stahl (Ed.) *Studying Virtual Math Teams*, Springer CSCL Series, Springer.

Design Challenge Task Analysis

Feb 4 Introducing the Design Challenge: Supporting the Development of Error Analysis Skills

Learning in Wikis

Feb 9

Cress, U. & Kimmerle, J. (2008). A systematic and cognitive view on collaborative knowledge building with wikis, *International Journal of Computer Supported Collaborative Learning* 3:105-122.

Feb 11

Stahl, G. (2007e). The role of a wiki in supporting group cognition. Paper presented at the Open Learning Initiative, Pittsburgh, PA. Retrieved from <http://GerryStahl.net/pub/oli2007.pdf>.

Stahl, G. (2008d). Integrating a wiki into support for group cognition. Paper presented at the International Conference of the Learning Sciences (ICLS 2008), Utrecht, Netherlands. Retrieved from <http://GerryStahl.net/pub/icls2008wiki.pdf>.

Tools for Automatic Content Analysis

Feb 16

Rosé, C. P., Wang, Y.C., Cui, Y., Arguello, J., Stegmann, K., Weinberger, A., Fischer, F., (2008). Analyzing Collaborative Learning Processes Automatically: Exploiting the Advances of Computational Linguistics in Computer-Supported Collaborative Learning, submitted to the *International Journal of Computer Supported Collaborative Learning*

Kang, M., Chaudhuri, S., Kumar, R., Wang, Y., Rosé, E., Cui, Y., Rosé, C. P. (2008). Supporting the Guide on the SIDE, in *Proceedings of Intelligent Tutoring Systems (ITS '08)*

Learning in Second Life

Feb 18

Virtual Worlds: What are They and Why Do Educations Need to Pay Attention to Them?
<http://seanfitz.wikispaces.com/virtualworldsenetworks07>

Educational Uses of Second Life <http://sleducation.wikispaces.com/educationaluses>

Weusijana, B. A., Kumar, R., Rosé, C. P. (2008). MultiTalker: Building Conversational Agents in Second Life using Basilica, Second Life Education Community Convention, Purple Strand: Educational Tools and Products, 2008, Tampa, FL.

Tools for Building Interactive Support Agents

Feb 23

Cui, Y & Rosé, C. P. (2008). An Authoring Tool that Facilitates the Rapid Development of Dialogue Agents for Intelligent Tutoring Systems, in **Proceedings of Intelligent Tutoring Systems (ITS '08)**

Week 7b-8 Cognitive and Social Foundations of Collaborative Learning

Feb 25

Dewey, J (1910). *How We Think*, Chapter 13 “Language and the Training of Thought”, D.C.: Heath.

Resnick, L., O'Connor, C., and Michaels, S. (2007). *Classroom Discourse, Mathematical Rigor, and Student Reasoning: An Accountable Talk Literature Review*.

March 2

De Lisi, R. & Golbeck, S. L. (1999). Implications of Piagetian Theory for Peer Learning, in O'Donnell & King (Eds.) *Cognitive Perspectives on Peer Learning*, Lawrence Erlbaum Associates: New Jersey.

Hogan, D. M. & Tudge, R. H. (1999). Implications of Vygotsky's Theory for Peer Learning, in O'Donnell & King (Eds.) *Cognitive Perspectives on Peer Learning*, Lawrence Erlbaum Associates: New Jersey.

March 4

King, A. (1999). Discourse Patterns for Mediating Peer Learning, in O'Donnell & King (Eds.) *Cognitive Perspectives on Peer Learning*, Lawrence Erlbaum Associates: New Jersey.

March 9-March 13 Spring Break!!!!

Week 10-11 Issues and Problems

March 16 – Process Losses

Wang, H. C., Rosé, C.P., Cui, Y., Chang, C. Y, Huang, C. C., Li, T. Y. (2007). Thinking Hard Together: The Long and Short of Collaborative Idea Generation for Scientific Inquiry, Proceedings of CSCL 2007.

Brown, V. R., & Paulus, P. B. (2002). Making group brainstorming more effective: recommendations from an associative memory perspective. *Current Directions in Psychological Science*. 11(6), 208-212.

March 18 – Trouble with Explanation Depth

Webb, N., Nemer, K., & Zuniga, S. (2002). Short Circuits or Superconductors? Effects of Group Composition on High Achieving Students' Science Assessment Performance, *American Educational Research Journal* 39(4), pp943-989.

March 23 – Racial Stereotypes

Elbers, E., De Hann, M. (2004). Dialogic Learning in the Multi-Ethnic Classroom. *Dialogic Learning: Shifting Perspectives to learning, instruction and teaching*, Kluwer Academic Publishers.

March 25 – Gender Stereotypes

Ten Dam, G., Voman, M. & Wardekker, W. (2004). Making sense through participation: Social Differences in Learning and Identity Development. *Dialogic Learning: Shifting Perspectives to learning, instruction and teaching*, Kluwer Academic Publishers.

Gweon, G., Rosé, C. P., Albright, E., Cui, Y. (2007). Evaluating the Effect of Feedback from a CSCL Problem Solving Environment on Learning, Interaction, and Perceived Interdependence, Proceedings of CSCL 2007.

Week 12-13 Static Forms of Collaborative Learning Support

March 30 – Script Based Support

O'Donnell, A. M. (1999). Structuring dyadic interaction through scripted cooperation. In O'Donnell, A. M., and King, A. (Eds.), *Cognitive perspectives on peer learning*, Erlbaum, Mahwah, NJ, pp. 179-196.

Kollar, I., Fischer, F. & Hesse, F. (2003). Cooperation scripts for computer-supported collaborative learning. In B. Wasson, R. Baggetun, U. Hoppe, & S. Ludvigsen (Eds.), *Proceedings of the International Conference on Computer Support for Collaborative Learning - CSCL 2003, COMMUNITY EVENTS - Communication and Interaction* (pp. 59-61). Bergen, NO: InterMedia.

April 1- Structured Interfaces

Robertson, J., Good, J., Pain, H. (1998). BetterBlether: The design and evaluation of a discussion tool for education. *International Journal of Artificial Intelligence in Education*, 9.

Baker, M., & Lund, K. (1997). Promoting reflective interactions in a CSCL environment. *Journal of Computer Assisted Learning*, 13, 175-193.

April 6 – Learning to Collaborate

Webb, N. & Farivar, S. (1999). Developing Productive Group Interaction, in O'Donnell & King (Eds.) *Cognitive Perspectives on Peer Learning*, Lawrence Erlbaum Associates: New Jersey.

Rummel, N., Spada, H. & Hauser, S. (2006). Learning to collaborate in a computer-mediated setting: Observing a model beats learning from being scripted. In S. Barab, D. Hickey & K. Hay (Eds.) *Proceedings of the Seventh International Conference of the Learning Sciences*. Mahwah, NJ: Lawrence Erlbaum Associates.

April 8 – Roles and Prompts

Weinberger, A. & Fischer, F. (2006). A framework to analyze argumentative knowledge construction in computer-supported collaborative learning. *Computers & Education*.

Stegmann, K., Weinberger, A., Fischer, F., & Mandl, H. (2004). Scripting Argumentation in computer-supported learning environments. In P. Gerjets, P. A. Kirschner, J. Elen & R. Joiner (Eds.), *Instructional design for effective and enjoyable computer-supported learning*. Proceedings of the first joint meeting of the EARLI SIGs Instructional Design and Learning and Instruction with Computers (CD-ROM) (pp. 320-330). Tuebingen: Knowledge Media Research Center.

Week 13-14 The Future of CSCL: Towards Dynamic Collaboration Support

April 13

Soller, A., Mones, A. M., Jermann, P., & Muehlenbrock, M. (2005). From Mirroring to Guiding: A Review of State of the Art Technology for Supporting Collaborative Learning, *International Journal of Artificial Intelligence in Education*

April 15

Kreijns, K. (2004). Sociable CSCL Environments: Social Affordances, sociability, and social presence. Unpublished doctoral dissertation, Open Universiteit Nederland, Heerlen, The Netherlands (chapters 3-5)

April 20

Gweon, G., Rosé, C. P., Zaiss, Z., & Carey, R. (2006). Providing Support for Adaptive Scripting in an On-Line Collaborative Learning Environment, Proceedings of *CHI 06: ACM conference on human factors in computer systems*. New York: ACM Press.

April 22

Vizcaino, A. & du Boulay, B. (2002). Using a simulated student to repair difficulties in collaborative learning. In *Proceedings of ICCE'2002, New Zealand*. IEEE, 2002.

Kumar, R., Rosé, C. P., Wang, Y. C., Joshi, M., Robinson, A. (2007). Tutorial Dialogue as Adaptive Collaborative Learning Support, Proceedings of AIED 2007.

Week 15: Final Project Presentations