

Computer Supported Collaborative Learning

Units: 12

Books: None

Instructor:

Dr. Carolyn P. Rosé (LTI-HCII)

cprose@cs.cmu.edu

GHC 5415

Course Textbook: Hmelo-Silver, C., Chinn, C., Chan, C., & O'Donnell, A. (2013). *The International Handbook of Collaborative Learning*, Routledge.

You will be required to purchase your own copy of the text book, which you can order from Amazon.com. All other readings will be provided in pdf form in the course blackboard account.

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 class 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 one class session of the student's choosing. 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 the week by 10pm Monday evening in the Blackboard discussion thread for the week. The specific reading assignment and blog discussion prompt for each week will be posted by Wednesday night the week before. You are encouraged also to print out what you have written and bring it to class for reference during the discussion. There is also a discussion for week 1 in the blog space, but you can post your contribution any time during week 1.

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) In week 1, get an account at coursera.org and sign up for a course. Participate informally during the first week of class and then answer the discussion prompts in the blog discussion space on blackboard for week 1.
- (b) Identify an issue of interest and review at least 5 related articles (Informal write up due at the end of week 5)
- (c) Build a prototype using tools taught in class or others (first version prototyped by end of week 10)
- (d) Collect preliminary data with your prototype – possibly 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 Dec 17, 2013 at midnight.

Grading

There will be no exams. The term project and its components are 70% of the grade. In-class presentation and online discussion are 20% of the grade, and classroom participation is 10% of the grade.

Syllabus (Readings)

Week 1-2 Course Intro: History and Theoretical Foundations

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

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

Webb, N. (2013). Information Processing Approaches to Collaborative Learning, in Hmelo-Silver, C., Chinn, C., Chan, C., & O'Donnell, A. (Eds) *The International Handbook of Collaborative Learning*, Routledge.

Hakkarainen, K., Paavola, S., Kangas, K., & Seitamaa-Hakkarainen, P. (2013). Sociocultural Perspectives on Collaborative Learning: Toward Collaborative Knowledge Creation, in Hmelo-Silver, C., Chinn, C., Chan, C., & O'Donnell, A. (Eds) *The International Handbook of Collaborative Learning*, Routledge.

Week 3 Design and Development

Fischer, G. (2013). Meta-Design: Empowering all stakeholders as co-designers, in Luckin, R., Puntambekar, S., Goodyear, P., Grabowski, B., Underwood, J., & Winters, N. (Eds). *Handbook of Design in Educational Technology*, Routledge.

Prieto, L., Villagra-Sobrinio, S., Dimitriadis, Y., & Jorin-Abellan, I. (2013). Orchestrating Classroom CSCL: A multi-level pattern approach for design enactment, in Luckin, R., Puntambekar, S., Goodyear, P., Grabowski, B., Underwood, J., & Winters, N. (Eds). *Handbook of Design in Educational Technology*, Routledge.

Week 4-6 Instructional Issues and Approaches

Rogat, T., Linnenbrink-Garcia, L., & DiDonato, N. (2013). Motivation in Collaborative Groups, in Hmelo-Silver, C., Chinn, C., Chan, C., & O'Donnell, A. (Eds) *The International Handbook of Collaborative Learning*, Routledge.

Cornelius, L., Herrenkohl, L., Wolfstone, H. (2013). Organizing Collaborative Learning Experiences Around Subject Matter Domains: The Importance of Aligning Social and Intellectual Structures in Instruction, in Hmelo-Silver, C., Chinn, C., Chan, C., & O'Donnell, A. (Eds) *The International Handbook of Collaborative Learning*, Routledge.

Hmelo-Silver, C. & DeSimone, C (2013). Problem-Based Learning: An Instructional Model of Collaborative Learning, in Hmelo-Silver, C., Chinn, C., Chan, C., & O'Donnell, A. (Eds) *The International Handbook of Collaborative Learning*, Routledge.

Bielaczyc, K., Kapur, M., & Collins, A. (2013). Cultivating a Community of Learners in K-12 Classrooms, in Hmelo-Silver, C., Chinn, C., Chan, C., & O'Donnell, A. (Eds) *The International Handbook of Collaborative Learning*, Routledge.

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.

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.

Week 7-8 Traditional Support Technology and Environments

Dillenbourg, P. & Evans, M. (2011). Interactive tabletops in education, *International Journal of Computer-Supported Collaborative Learning*, Volume 6, pp491-514.

Fischer, F., Kollar, I., Stegmann, K., Wecker, C., Zottman, J., & Weinberger, A. (2013). Collaboration Scripts in Computer Supported Collaborative Learning, in Hmelo-Silver, C., Chinn, C., Chan, C., & O'Donnell, A. (Eds) *The International Handbook of Collaborative Learning*, Routledge.

Stegmann, K., Mu, J., Gehlen-Baum, V., Fischer, F. (2011). The Myth of Over-scripting: Can Novices be Supported Too Much? in *Proceedings of Computer Supported Collaborative Learning*, Hong Kong, July 2011.

Noroozi, O., Teasley, S., Biemans, H., Weinberger, A., & Mulder, M. (2013). Facilitating learning in multidisciplinary groups with transactive CSCL scripts, *International Journal of Computer-Supported Collaborative Learning*, Volume 8, pp189-223.

Chan, C. (2013). Collaborative Knowledge Building: Towards a Knowledge Creation Perspective, in Hmelo-Silver, C., Chinn, C., Chan, C., & O'Donnell, A. (Eds) *The International Handbook of Collaborative Learning*, Routledge.

Looi, C., Wong, L., & Song, Y. (2013). Mobile Computer-Supported Collaborative Learning, in Hmelo-Silver, C., Chinn, C., Chan, C., & O'Donnell, A. (Eds) *The International Handbook of Collaborative Learning*, Routledge.

Zhang, J. (2013). Collaboration, Technology, & Culture, in Hmelo-Silver, C., Chinn, C., Chan, C., & O'Donnell, A. (Eds) *The International Handbook of Collaborative Learning*, Routledge.

Week 9-10 Massive Scale Collaborative Learning

Smith, B. & Eng, M. (2013). MOOCs: A Learning Journey: Two continuing education practitioners investigate and compare cMOOC and xMOOC learning models and experience, in *Proceedings of the 6th International Conference on Hybrid Learning and Continuing Education*, pp244-255

MOOC Dataset: <http://change.mooc.ca/cgi-bin/archive.cgi?page=newsletter.htm>

Cress, U. (2013). Mass Collaboration and Learning, in Luckin, R., Puntambekar, S., Goodyear, P., Grabowski, B., Underwood, J., & Winters, N. (Eds). *Handbook of Design in Educational Technology*, Routledge.

Maddrell, J., & Morrison, G. (2013). Designing for Awareness: Purposeful Interactions in the Next Generation of Distance Education, in Luckin, R., Puntambekar, S., Goodyear, P., Grabowski, B., Underwood, J., & Winters, N. (Eds). *Handbook of Design in Educational Technology*, Routledge.

Kurz, G., Meishar-Tal, H., & Pieterse, E. (2013). Learning with Facebook Group – Interaction in Action, in Luckin, R., Puntambekar, S., Goodyear, P., Grabowski, B., Underwood, J., & Winters, N. (Eds). *Handbook of Design in Educational Technology*, Routledge.

Week 11-12 Prototyping Tools

Cui, Y., Chaudhuri, S., Kumar, R., Gweon, G., Rosé, C. P. (2008). Helping Agents in VMT, in G. Stahl (Ed.) *Studying Virtual Math Teams*, Springer CSCL Series, Springer.

Adamson, D. & Rosé, C. P. (2012). Coordinating Multi-Dimensional Support in Conversational Agents, *ITS 2012 Proceedings of the 11th International conference on Intelligent Tutoring Systems*, Lecture Notes in Computer Science Volume 7315, Springer-Verlag, pp 346-351.

Rosé, C. P. & Tovaes, A. (in press). What Sociolinguistics and Machine Learning Have to Say to One Another about Interaction Analysis, in Resnick, L., Asterhan, C., Clarke, S. (Eds.) *Socializing Intelligence Through Academic Talk and Dialogue*, Washington, DC: American Educational Research Association.

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*

Gweon, G., Jain, M., Mc Donough, J., Raj, B., Rosé, C. P. (in press). Measuring Prevalence of Other-Oriented Transactive Contributions Using an Automated Measure of Speech Style Accommodation, *International Journal of Computer Supported Collaborative Learning*

Week 13-15 The Future of CSCL: Towards Dynamic Collaboration Support

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*

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.

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

Wang, H. C., Rose, C. P., Chang, C. Y. (2011). Agent-based Dynamic Support for Learning from Collaborative Brainstorming in Scientific Inquiry, *International Journal of Computer Supported Collaborative Learning* 6(3), pp 371-396.

Wang, X., Kollar, I., Stegmann, K., & Fischer, F. (2011). Adaptable Scripting in Computer-Supported Collaborative Learning to Foster Knowledge and Skill Acquisition, in *Proceedings of CSCL 2011*, Hong Kong, July 2011.

Dyke, G., Adamson, A., Howley, I., & Rosé, C. P. (accepted). Enhancing Scientific Reasoning and Discussion with Conversational Agents, to appear in the *IEEE Transactions on Learning Technologies* special issue on Science Teaching