Blending Synchronous Face-to-face and Computer-Supported Cooperative Learning in a Hybrid Doctoral Seminar

By Cary Roseth, Mete Akcaoglu and Andrea Zellner, Michigan State University

Abstract

Online education is often assumed to be synonymous with asynchronous instruction, existing apart from or supplementary to face-to-face instruction in traditional bricks-and-mortar classrooms. However, expanding access to computer-mediated communication technologies now make new models possible, including distance learners synchronous online attendance of face-to-face courses. Going beyond traditional uses of videoconferencing (e.g., real-time remote viewing with limited student interaction), this article describes the use of freely available technologies to support synchronous cooperative learning activities involving both face-to-face and hybrid doctoral students. Specifically, we describe the rationale behind pedagogical choices and specify how various technologies were re-purposed to create a virtual classroom space in which all possible combinations of face-to-face and hybrid students worked together in multiple small-groups across single class sessions. Implications for course development, the implementation of cooperative learning activities in online settings, and the use of both synchronous and asynchronous methods of online instruction are discussed.

Keywords: blended learning, distance education, online learning, computer supported collaborative learning, cooperative learning

Rooted in historical models of distance education (e.g., correspondence, broadcast radio and television; Moore & Kearsley, 2012), online education is often assumed to be synonymous with asynchronous teaching and learning, with learning management systems (LMSs) used to administer course content (e.g., course materials, recordings of instructor presentations) and to facilitate student-instructor and student-student interaction (e.g., email, discussion forums, etc.). More recently, however, expanding access to high-bandwidth computer-mediated communication technologies (e.g., Skype) have stimulated new ways of thinking about the use of online technologies, including blended/hybrid approaches in which instructors may combine different forms of media (e.g., text, audio, video) and different timescales (e.g., asynchronous, synchronous) within the same course.

Under ideal circumstances, blended/hybrid approaches allow practitioners to match technology, pedagogy, and content to the specific needs of different learners and to the specific demands of different contexts (Mishra & Koehler, 2006). The problem, of course, is that practitioners rarely enjoy ideal circumstances and, as a result, must make difficult choices about instructional design so that a given course can be offered within a particular set of circumstances. In this hybrid doctoral seminar, for example, the

Figure 1. A new blended learning environment: FTF and online students working together.

instructor and instructional design team faced two challenges. The first was how to make the seminar, *Current Issues in Motivation and Learning,* available to both face-to-face (FTF) and hybrid doctoral students. The second was how to support the instructor's insistence on using cooperative learning pedagogy.

The instructional design team considered several ways to make the seminar available to both FTF and hybrid students. One was to offer separate sections of the course, with the FTF section meeting weekly in the traditional bricks-and-mortar classroom, and the hybrid section being taught online using a traditional asynchronous LMS. This possibility was immediately rejected as the instructor did not want to teach two different versions of the same course. The instructor also believed that separating the FTF and hybrid students prevented the two groups of students from working together and developing positive peer relationships. After all, the department's goal in developing the hybrid program was not to create two 'separate but equal' programs but, instead, to offer two ways of completing one program.

Another possible way to include both FTF and hybrid students in the same course was to enroll both groups in one online version of the course. This too was met with instructor resistence, however, as his own research suggested that synchronous forms of computer-mediated cooperative learning result in greater achievement, motivation, and more positive peer relationships compared to asynchronous forms (Roseth, Saltarelli, & Glass, 2011; Saltarelli & Roseth, under review; for an altenative view, see Dewiyanti, 2005). Thus, the design team's two challenges were inextricably linked, and the decision was made to offer a blended course in which all possible small group combinations of FTF and hybrid students participated in both synchronous and asynchronous cooperative learning activities. Here, we emphasize that the term "blended" refers to more than offering some learning experiences FTF and some online because, in this doctoral seminar, the term blended also referred to *simultaneous* and *synchronous* instruction of both FTF and hybrid students. Figure 1 illustrates this idea showing some small groups involving only FTF students, some involving only hybrid students, and some involving various combinations of both FTF and hybrid students.

Cooperative Learning in Computer-Mediated Contexts

The pedagogical decision to use cooperative learning was based on theory and research documenting the positive effects of this method on student achievement, motivation, and interpersonal relationships (O'Donnell, 2006). *Cooperative learning* is an umbrella term that includes collaborative learning, peer tutoring, and other methods in which students work together in small groups "to maximize their own and each other's learning" (Johnson, Johnson, & Holubec, 1998, p. 5; O'Donnell, 2006). Meta-analyses including over 650 primary studies across 9 decades and 27 countries makes cooperative learning one of the most robust, research-based instructional methods on record (Johnson & Johnson, 1989, 2005; Roseth, Johnson, & Johnson, 2008; Slavin, 1995).

Recent efforts to use computer (e.g., online) technology to support cooperative learning respond to a call from the literature (e.g., Abrami, Bernard, Bures, Borokhovski, & Tamim, 2011; Resta & Laferriere, 2007) and are guided by theory and research highlighting the importance of making students feel a sense of belonging (Baumeister & Leary, 1995), meeting their needs for autonomy, competence, and relatedness (Deci & Ryan, 2000), and maintaining mastery rather than performance goals (e.g., Ames & Ames, 1984). This article advances this literature by describing how freely available online technologies may be used to support multiple, synchronous

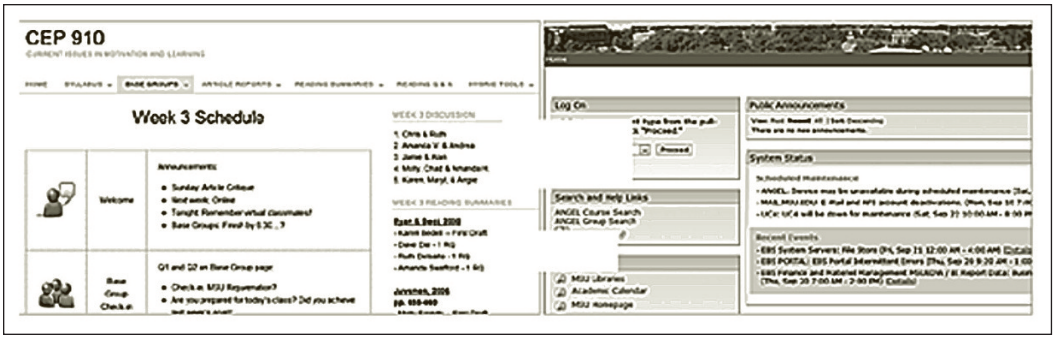

Figure 2. Comparison of custom WordPress (left) and institutionally owned LMS (right) course sites.

cooperative learning groups involving both FTF and hybrid students, and so doing offer an alternative to both asynchronous online education and to traditional uses of teleconferencing to support hybrid students' remote attendance of bricks-and-mortar class sessions. We begin by describing how we created a virtual classroom space by integrating multiple online tools into a single, course website. We then detail, in turn, the tools used to support synchronous online discussions, synchronous and asynchronous text-based collaboration, and synchronous and asynchronous peer and instructor feedback. We conclude by describing an online tool used to support research on the use of cooperative learning in online settings.

Using WordPress to Create a Virtual Classroom Space

An additional challenge with involving both FTF and hybrid students in synchronous cooperative learning activities was how to support their concurrent participation. Looking at the range of technologies at our disposal, we found that both the LMS and teleconferencing technologies owned by our institution lacked the flexibility to support multiple, simultaneous and synchronous small-group activities. Accordingly, we chose the WordPress platform, an open source website publishing application that was sufficiently adaptable to meet all our needs.

WordPress first emerged as a blogging platform but, over time, has become an ideal platform for creating websites with almost any purpose due to flexibility in its design, and ease of use (Smith & McCallister, 2012). Open-source technologies such as WordPress bring with them access to a comprehensive community of support, including free updates, up-to-date technology, and myriad tools for customization that is created and offered (mostly) freely by the community. In addition, sites created with WordPress appeal to users aesthetically, as they feel and look like the commercial websites that students regularly access in their daily lives. Thus, WordPress stands in direct contrast to the "mass-produced" course sites in institutionally-owned LMS's, as those sites inevitably look very similar and can lose the feeling of the larger "web" context (Figure 2). The flexibility of the WordPress platform also affords combining, mixing (i.e., mashing) different online tools and websites into a single platform, and thereby avoids sending students to and from the LMS in order to take advantage of other online tools.

Using WordPress, we were able to create a virtual classroom space that combined a collection of online tools into a unified course website. We did this by using a simple HTML code, called "iframes." The iframe code allows one to "fit" one webpage into another webpage, in a seamless manner, just as a picture might be embedded into a presentation slide. The online tools we embedded into our website included Etherpads for collaborative writing, Google Forms for student progress check, Google Hangouts for videoconferencing, Piazza for Q&A's and discussion forum, and a self-created Java-based survey to capture students' experiences within the learning environment *in-situ,* whether they be FTF or hybrid. We detail of each of these technologies below, highlighting technologies' affordances as well as the ways in which they were repurposed for the course. First, however, it is necessary to explain how Google Hangouts were used to supplement the course website during synchronous class sessions.

Using Google Hangouts for Multiple, Simultaneous, and Synchronous Small Groups

Google Hangouts are part of the Google suite of applications that support multi-party video chat as well as other Google applications including Sketch-Up, Docs, Spreadsheets, Presentations, and screen sharing. In short, Google Hangouts provided a synchronous, video, audio- and text-rich communication platform that simultaneously connected our students to the wider affordances of the internet (Teras & Teras, 2012). With Google Hangouts, one can freely host videoconferences involving up to ten people and, if needed, also record the conference, store it to YouTube and provide a link for later viewing. This recording feature allows students to revisit parts of the conversation and also affords distributing the discussion to people who missed the class session. Most important for the cooperative learning activities used in this doctoral seminar, Google Hangouts also allowed different groups of FTF and hybrid students to work together simultaneously, whatever their geographic distribution. Additionally, once a Google Hangout has been opened, students are free to come in and out of them when directed by the instructor. This affordance contrasts with other popular videoconferencing tools that require "placing" and "receiving a call" because, in effect, Google Hangouts allows hybrid students to "move around" the classroom, just as a FTF student might move from one small group to another in a bricks-

and-mortar classroom. The next section illustrates how this occurred in this hybrid doctoral seminar.

To use Google Hangouts, at the start of each FTF session we invited the hybrid students to five different Hangouts (e.g., Hangout #1, Hangout #2, etc.) corresponding to five different computers (e.g., Computer #1, Computer #2, etc.) in the FTF classroom. Before class, we also posted students' small group assignments for a given day on the course website (see Figure 3). During class, this ensured that all students—whether FTF or hybrid—knew "where" to be. To illustrate, consider the start of a typical FTF class session: Students began each synchronous class session in their Base Groups (e.g., Base Group #1), a semester-long permanent groups of students who are randomly selected at the beginning of the year. In Base Group #1, FTF students sit next to a classroom computer hosting a corresponding Hangout (e.g., Base Group #1 sat at Computer #1) and hybrid student(s) joined the corresponding Hangout (e.g., Hangout #1). When prompted by the instructor, students then left their Base Groups and joined a different small group to participate in other cooperative tasks. Thus, a hybrid student in Base Group #1 who was then assigned to small group #4 would "move" from Hangout #1 to Hangout #4. At the same time, a FTF student assigned to small group #4 would physically move to Computer #4 (i.e., Hangout #4). Ironically, it was our experience that it would often take FTF students more time to move computers than hybrid students to move Hangouts!

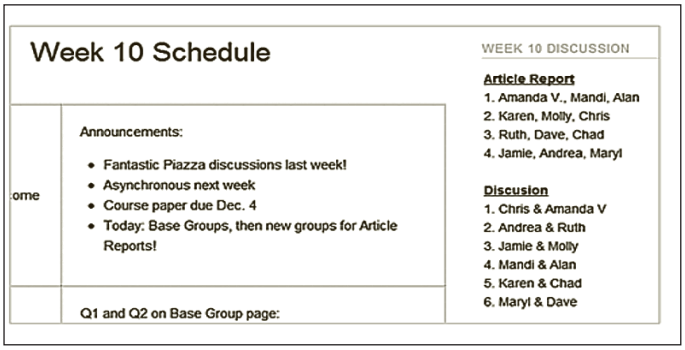

Figure 3. Students' assignments to small groups, as displayed on the course website.

With practice, Google Hangouts allowed FTF and hybrid students to participate in a variety of cooperative activities, ranging from the simple (e.g., Base Groups, 'turn-to-your neighbor' discussions) to more complex (e.g., jigsaw, constructive controversy). And, true to the instructor's intent, Google Hangouts also allowed every student in the class to work with every other student in the class, regardless of their FTF or hybrid status. Figures 4 and 5 display two examples of Google Hangouts being used during the course.

Using Google Docs, Etherpads, and Piazza for Written Collaboration

Many of the cooperative learning activities involved collaborative written assignments—for example, students were asked to write summaries and questions for assigned readings. Some of these assignments were completed during synchronous class sessions, and some were completed outside of class. This meant that we needed a free and embeddable platform to facilitate collaborative synchronous and asynchronous writing. The obvious initial choice was Google Docs as it allowed collaborative writing and was freely available. We soon learned, however, that it was not embeddable, meaning students could not access a given Google Doc from within the course website and would need to link to a different website to complete their assignments. Because we wanted to minimize students' movement in and out from the course site, we used Etherpads instead.

Etherpad is an open-source, web-based text editor which allows real-time collaborative writing (Etherpad, 2012). In addition, we were able to embed each Etherpad so that students never needed to leave the course website or create a separate account. Etherpads worked exceptionally well and also include additional affordances (e.g., author-color text, chat, export to pdf, etc.) that we do not detail here.

To support asynchronous collaboration, we also wanted to include a discussion forum for the four weeks (out of 15) that the course "met" asynchronously. We wanted the discussion forums to provide all students with equal access to all of the posted questions and to give each student an equal chance to respond. The WordPress platform offers various tools (i.e. plugins) that facilitate discussion forums (e.g., bbPress, BuddyPress), but these proved inadequate compared to external web-based tools that also gave us the ability to ask questions anonymously, post documents, tag questions, search discussion threads, and receive automatic email updates of new messages. We also wanted a tool that would complement our existing design, embedding seamlessly into the course website. Ultimately we chose Piazza, a dynamic web-based discussion platform (Piazza Q&A platform, 2012) due to its clear layout and modern interface.

Using Google Forms for Peer and Instructor Feedback

To support Base Group activities and peer feedback on different oral and written assignments, we used Google Forms. Unlike Google Docs, Google Forms may be easily embedded into the course website and allowed us to record and display students' responses over the semester. For example, at the beginning of each class (or asynchronous week), students used embedded Google Forms to report weekly preparation levels and to answer a "check-in" question designed to nurture positive interpersonal relationships. At the end of class (or asynchronous week), students also recorded important content points and set goals for subsequent weeks. Thus, Google Forms helped us to create a dynamic record

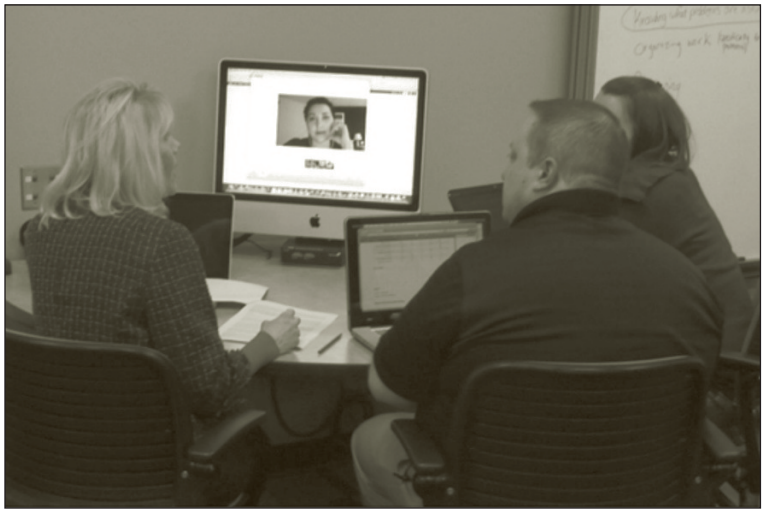

Figure 4. FTF and an online student working in a cooperative group using Google Hangouts.

Figure 5. Online students only working in a cooperative group using Google Hangouts.

of students' growth and development during the course, wherever in the world they may be located. Figures 6 and 7 display examples of the embedded Base Groups forms and various reports.

Google Forms also supported peer feedback on "Article Reports," a weekly assignment in which students provide an oral and written summary of an empirical research study. Specifically, students used Google Forms to submit a URL to their Google Doc written report, which peers and the course TA then used to view the written summary. Students also used embedded Google Forms to provide feedback to their peers on their oral and written reports.

A Java-based Survey Tool for Research on Computer-mediated Cooperative Learning

Finally, as this course was a doctoral seminar on motivation, the instructor felt it was important to involve students in actual data collection about motivational phenomena. To do this, we developed a Java-based survey tool in the spirit of Csikszentmihalyi's (1990) Experience Sampling Method (ESM) to record students' experience once per hour when logged into the course website. Our goal was to document FTF and hybrid students' experiences as they occurred "in-the-moment," and then link these experiences to context (FTF, synchronous online, asynchronous online), instructional activities (i.e., Base Group, lecture, small-group discussion), and time (i.e., week one, two, etc.). The final dataset was shared with all members of the class and we now are in the process of analyzing the data. Importantly, the survey tool was also one of the reasons we insisted on using embeddable tools to facilitate the other aspects of the course design: If students left the course website, the sampling method would fail to capture the data we needed to assess the impact of context, instructional activities, and time.

Summary

In summary, this article provides one example of how instructors and instructional designers can integrate technology, pedagogy and content in a way that supports synchronous cooperative learning activities involving both FTF and hybrid students learners. We plan to offer this course in the hybrid format again in the future, especially given the economic advantages of freely available, open-source technologies and the flexibility of the WordPress platform to incorporate whatever technological advances await the next iteration of the course. For practitioners interested in adopting some of these technologies, we recommend all of them enthusiastically and without hesitation, save the need to start course development well in advance (e.g., 2- to 3-months). We also recommend a collaborative team bringing diverse skill sets. For this hybrid doctoral seminar, matching the instructor's theoretical and practical knowledge with graduate assistants' technological knowledge proved to be the right combination.

Cary Roseth *is an assistant professor of Educational Psychology in the College of Education at Michigan State University. His research focuses on how the presence of others—and especially peers—affects educational outcomes such as achievement, motivation, and prosocial and aggressive behavior. He can be found at http://croseth.educ.msu.edu*

Mete Akcaoglu *is doctoral student of Educational Psychology and Educational Technology at the College of Education at Michigan State University. His scholarly interests include the design and evaluation of technology-rich and innovative learning environments for K-12 children. He can be found at http://meteakcaoglu.com.*

Andrea Zellner *is a doctoral student in the Educational Psychology and Educational Technology Program in the College of Education at Michigan State University. Her interests focus on the impact of technological tools on student learning and writing achievement. Her methodological interests include social network analysis and multi-level models. She can be found at http://www.andrea-zellner.com*

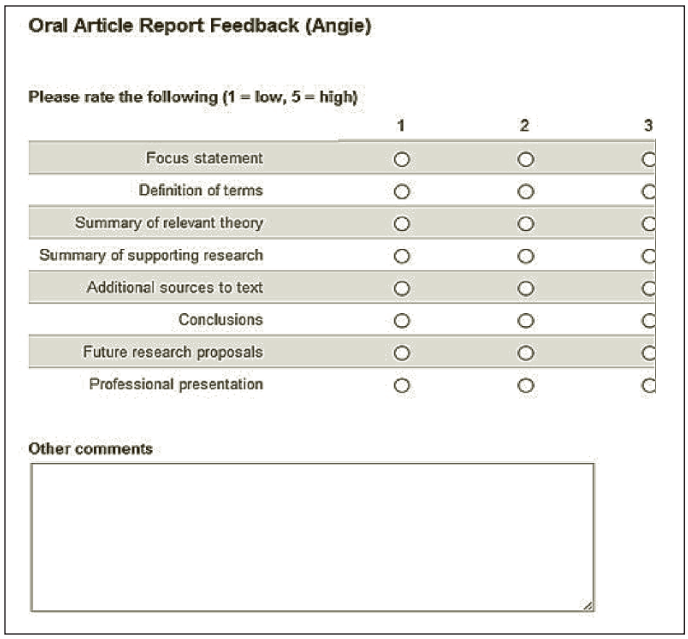

Figure 6. A Google Form used to collect peer feedback on a student's oral presentation

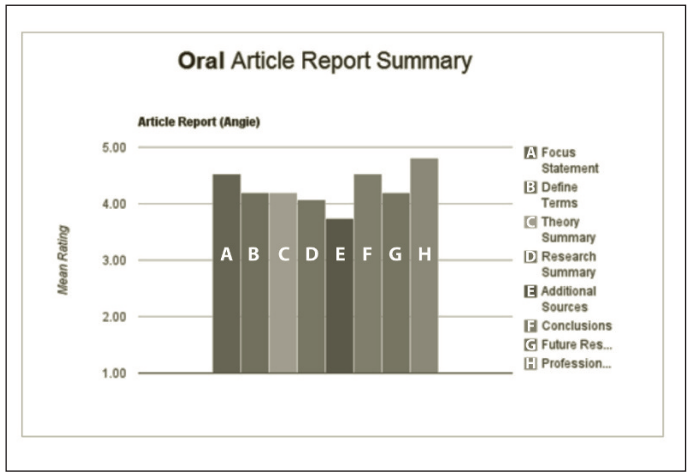

Figure 7. Results of peer feedback reported on Google Forms and integrated into course website using a Google spreadsheets.

References

Abrami, P. C., Bernard, R. M., Bures, E. M., Borokhovski, E., & Tamim, R. M. (2011). Interaction in distance education and online learning: using evidence and theory to improve practice. *Journal of Computing in Higher Education, 23,* 82-103.

Ames, C., & Ames, R. (1984). Systems of student and teacher motivation: Toward a qualitative definition. *Journal of Educational Psychology, 76,* 535-556.

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117,* 497-529.

Csikszentmihalyi, Mihaly (1990). *Flow: The psychology of optimal experience*. New York: Harper and Row.

Deci, E. L., & Ryan, R. (2000). The what and why of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11,* 227-268.

Dewiyanti, S. (2005). Learning together: A positive experience. The effect of reflection on group process in an asynchronous computer-supported collaborative learning environment. Unpublished doctoral dissertation. Open Universiteit, Maastricht, Nederland.

Etherpad. (2012, August 1). In Wikipedia, *The Free Encyclopedia*. Retrieved 00:32, September 14, 2012, from http://en.wikipedia.org/w/index.php?title=Etherpad&oldid=505283415

Johnson, D. W., & Johnson, R. (1989). *Cooperation and competition: Theory and research.* Edina, MN: Interaction Book Company.

Johnson, D. W., & Johnson, R. (2005). New developments in social interdependence theory. *Psychology Monographs, 131,* 285–358.

Johnson, D. W., & Johnson, R. T. (1996). Cooperation and the use of technology. In D. Jonassen (Ed.), *Handbook of research for educational communications and technology* (pp. 785–812). London: MacMillan.

Johnson, D. W., Johnson, R., & Holubec, E. (2008). *Cooperation in the classroom* (8th ed.) Edina, MN: Interaction Book Company.

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108,* 1017-1054.

Moore, M. G., & Kearsley, G. (2012). *Distance education: A systems view of online learning.* (3rd ed.). Belmont, CA: Wadsworth Cengage Learning.

O'Donnell, A. M. (2006). The role of peers and group learning. In P. A. Alexander & P. H. Winne (Eds.), *Handbook of educational psychology* (pp. 781–802). Mahwah, NJ: Erlbaum.

Piazza (Q&A platform). (2012, July 26). In Wikipedia, The Free Encyclopedia. Retrieved 00:49, September 14, 2012, from http://en.wikipedia.org/w/index.php?title=Piazza_(Q%26A_platform)&oldid=504211651

Reich, J., Murnane, R. & Willett, J. (2012). The state of wiki usage in US K–12 schools: Leveraging web 2.0 data warehouses to assess quality and equity in online learning environments. *Educational Researcher, 41*(1), 7-15.

Resta, P., & Laferriere, T. (2007). Technology in support of collaborative learning. *Educational Psychology Review, 19,* 65-83.

Roseth, C. J., Johnson, D. W., & Johnson, R. T. (2008). Promoting early adolescents' achievement and peer relationships: The effects of cooperative, competitive, and individualistic goal structures. *Psychological Bulletin, 134,* 223–246.

Roseth, C. J., Saltarelli, A. J., & Glass, C. R. (2011). Effects of face-to-face and computer-mediated constructive controversy on social interdependence, motivation, and achievement. *Journal of Educational Psychology, 103,* 804-820.

Saltarelli, A. J., & Roseth, C. J. (under review). Effects of belongingness and synchronicity on face-to-face and computer-mediated constructive controversy.

Slavin, R. E. (1995) *Cooperative learning.* Needham Heights, MA: Allyn & Bacon.

Smith, B., & McCallister, M. (2012). *Wordpress in depth.* Pearson Education.

Teräs, H. & Teräs, M. (2012). Using Google tools for authentic learning and progressive inquiry in 21st century faculty development. In P. Resta (Ed.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2012.* Chesapeake, VA: AACE. Retrieved from http://www.editlib.org/p/39754.