

Moving To Their Own Beat: Exploring How Students Use Web 2.0 Technologies To Support Group Work Outside Of Class Time

Norman Vaughan
Todd Nickle
Jim Silovs
Jim Zimmer
Mount Royal University

Abstract

Over the years, researchers have consistently reported that, regardless of the subject matter, students working in small groups tend to learn more of what is taught and retain it longer than when the same content is presented in other instructional formats (Beckman, 1990; Chickering & Gamson, 1991). The majority of these research studies have focused on cooperative learning techniques in the classroom, but there are few studies that have investigated the impact of group work and peer instruction on student learning outside of the classroom. A similar trend appears to exist with regards to student use of technology. There are a number of studies that have explored student use of technology in the classroom (Barnett, 2006; Graham, Tripp, Seawright & Joeckel, 2007; Hoekstra, 2008), but not many document how students are using technology to support learning beyond the classroom. The purpose of this research study was to address these gaps in the literature: How do students use Web 2.0 technologies to support group work outside of class time?

Over the years, researchers have consistently reported that, regardless of the subject matter, students working in small groups tend to learn more of what is taught and retain it longer than when the same content is presented in other instructional formats (Beckman, 1990; Chickering & Gamson, 1991; Collier, 1980; Cooper & Associates, 1990; Goodsell, Maher, Tinto & Associates, 1988; Johnson, Johnson & Smith, 1991; Kohn, 1986; McKeachie, Pintrich, Lin & Smith, 1986; Miles, Polovina-Vukovic, Litteljohn, & Marini, 2010; Slavin, 1980, 1983; Smith et al., 2009; Whitman, 1988). A landmark study conducted by Slavin (1983) determined that student achievement (e.g., final course grades) could be enhanced by the use of cooperative learning methods that use group rewards and individual accountability. In the natural sciences, Crouch and Mazur (2001) studied the impact of peer instruction in undergraduate physics courses over a 10-year period. They concluded that a peer-instruction approach dramatically improved students' performance on baseline tests and problem-solving activities and that these results were not dependent on a particular instructor. Following up on this work, Preszler (2009) demonstrated that replacing lectures with peer-led workshops in an introductory biology course improved student performance and retention as well as the quality of student learning.

Yamarik (2007) conducted research on the use of cooperative learning in business and economic education. His studies focused on comparing the use of cooperative learning techniques and traditional lecture approaches in different sections of economic courses. Through the use of multivariate regression analysis, he demonstrated that students in the cooperative learning sections achieve greater academic performance in the form of higher final exam scores than those students in the lecture sections of the same course.

The majority of these research studies have focused on cooperative learning techniques in the classroom, but there appears to be very few studies that have investigated the impact of group work and peer instruction on student learning outside of the classroom. A similar trend appears to exist with regards to student use of technology. There are a number of studies that have explored student use of technology in the classroom (Barnett, 2006; Graham, Tripp, Seawright & Joeckel, 2007; Hoekstra, 2008) but not many that document how students are using various technologies to support learning beyond the classroom. The *EDUCAUSE Center for Applied Research* (ECAR) has sponsored a large-scale study of undergraduate student use of technology in American higher education institutions over the past five years. Smith, Salaway and Caruso (2009) report that there is an increasing trend to laptop (88.3%) and cell phone (89.8%) ownership, but they have not investigated how students are using these tools to collaborate outside of the classroom.

With the advent of the World Wide Web in the early 1990s, discussion began about how web-based applications could support a distributed approach to learning. Saltzberg and Polyson (1995) described distributed learning as:

. . . not just a new term to replace the other 'DL,' distance learning. Rather, it comes from the concept of distributed resources. Distributed learning is an instructional model that allows instructor, students, and content to be located in different, noncentralized locations so that instruction and learning occur independent of time and place. The distributed learning model can be used in combination with traditional classroom-based courses, with traditional distance-learning courses, or it can be used to create wholly virtual classrooms. (p. 10)

Building upon this approach to learning, Hollan, Hutchins, and Kirsh (2000) developed the concept of distributed cognition to describe how cognitive processes can be distributed across members of a social group either co-present or over a distance, between internal process and external (material or environmental) tools, and across time with products of earlier events transforming the nature of later events. The first generation of web-applications was somewhat limited in its ability to support this distributed approach to learning, but in the mid 2000s O'Reilly (2005) coined the term Web 2.0 to describe the trend in the use of World Wide Web technology to enhance creativity, information sharing, and, most notably, collaboration among users.

Wikipedia (2001) defines Web 2.0 as web-based applications that facilitate participatory information sharing, interoperability, user-centered design, and collaboration on the World Wide Web. Web 2.0 tools can potentially be used to support group work, outside of the classroom, in a variety of formats. For example, social bookmarking applications such as *Diigo* can be used to share personal collections of web-based resources to complete group projects. Blogs can facilitate student self-reflection and peer review of course assignments. Students can use *wikis* to collaboratively summarize course discussions, refine research papers or even co-create online books. Social networking systems (SNS) such as *FaceBook* and *MySpace* can be used to extend the boundaries of the classroom to create online communities and discussions/debates that

include past students, potential employers, and subject matter experts. Audio, graphic, and video files can now be created and shared through social media applications such as *Podomatic*, *Flickr*, and *YouTube*. These files and other data sources can then be recombined to create new meaning and interpretations by using mashup applications such as *Intel's Mash Maker* and *Yahoo Pipes*. Synchronous communication technologies such as *Skype* and *lluminate Live!* allow students to communicate and collaborate outside of the classroom in real time. Moreover, virtual world applications such as *Second Life* provide opportunities for rich synchronous interaction in 3-D immersive worlds to support collaborative and creative project-based work.

The focus of this research study was to examine if and how these types of Web 2.0 applications could be used to support a distributed approach to learning through group work outside of the classroom. Questions that were examined included:

1. What kind of informal and formal group work do undergraduate students engage in outside of class time?
2. How are students using Web 2.0 technologies to support informal and formal group work outside of class time?
3. What advice, recommendations, and strategies do students have for faculty members and other students in higher education about using Web 2.0 technologies effectively and efficiently to support informal and formal group work outside of class time?

This study specifically examined the use Web 2.0 applications to support group work, outside of the classroom, in second year Genetics, Business, and Education courses at Mount Royal University, which is located in the city of Calgary, Alberta, Canada with a population of 1.2 million people. Mount Royal University is a four-year undergraduate institution with a full time student enrollment of 10,000. Approximately 62% of the student population is female and 80% of the students are originally from the Calgary area.

Methods

This research project utilized a case-based action research framework (Creswell, 1997; Stringer, 1999). Gilmore, Krantz and Ramirez (1986) define such a framework as:

Action research . . . aims to contribute both to the practical concerns of people in an immediate problematic situation and to further the goals of social science simultaneously. Thus, there is a dual commitment in action research to study a system and concurrently to collaborate with members of the system in changing it in what is together regarded as a desirable direction. Accomplishing this twin goal requires the active collaboration of researcher and client, and thus it stresses the importance of co-learning as a primary aspect of the research process. (p.161)

This approach consisted of a mixture of quantitative (i.e., survey) and qualitative (i.e., focus group) research methods.

Data Collection

During the fall 2009 semester, a 28-item survey instrument was developed to collect demographic data, information concerning student use of Web 2.0 technologies, and perceptions about how these technologies could support group work outside of the classroom. Items used in the survey were derived from the *EDUCAUSE Centre for Applied Research Study of Undergraduate Students and Information Technology* (Smith, Salaway & Caruso, 2009), the *Pew Internet & American Life Project* (Lenhart, Purcell, Smith, & Zickuhr, 2010), and the *Canadian*

Internet Project (Zamaria & Fletcher, 2008). The *Flashlight Assessment Tool* (Ehrmann & Zuniga, 1997) was used to construct the survey, which consisted of a series of Likert (4 and 5 point scale) and open-ended questions. This survey instrument was piloted in a combination of online and paper-based format with second year Biology, Business, and Education students during the tenth week of the fall 2009 semester. The response rate was 36% (n=83).

Based on feedback from students who completed the fall 2009 pilot survey, the instrument was revised to include 43 items and was administered in only paper-based format to a different group of second year Biology, Business, and Education students during the tenth week of the winter 2010 semester. The response rate was 62% (n=166). The tenth week was selected so that students would have had sufficient exposure to group work and Web 2.0 technologies to provide the researchers with meaningful feedback and so that there would be time for a student focus group meeting before the end of the semester.

All students who completed the winter 2010 version of the survey were also invited to participate in a sixty-minute, post-course focus group lunch in an email message. Fifteen students responded to the email invitation indicating that they would be willing to be part of the focus group and 12 students actually attended the lunch. This focus group lunch was facilitated by an undergraduate research assistant (URA) who was trained by the principal author of this study. The session was digitally recorded and the URA used a series of open-ended questions, generated from the survey results, to guide the focus group.

Data Analysis

A constant comparative approach was used to identify patterns, themes, and categories of analysis that “emerge out of the data rather than being imposed on them prior to data collection and analysis” (Patton, 1990, p. 390). Descriptive statistics (e.g., frequencies, means, and standard deviations) were calculated for the individual survey items using *MS Excel*. The focus group session was transcribed in *MS Word* by the URA. The resulting transcript was reviewed and compared with the open-ended survey questions in order to triangulate the themes and patterns.

Results

This section begins with a demographic profile of the study participants followed by a summary of the results for each of the three research questions:

1. What kind of informal and formal group work do undergraduate students engage in outside of class time?
2. How are students using Web 2.0 technologies to support informal and formal group work outside of class time?
3. What advice, recommendations, and strategies do students have for faculty members and other students in higher education about using Web 2.0 technologies effectively and efficiently to support informal and formal group work, outside of class time?

Demographic Profile of Study Participants

In order to establish a context for the study findings, the winter 2010 survey asked a series of demographic questions. The survey response was 62% (n=166). The demographic profile of the students is summarized in Table 1.

Table 1.

Survey respondent demographics

Item	Percentage/Number
Off-campus accommodation within driving distance (61% lived with their parents)	95%
24 years of age or less	89%
Employed (part-time 65%; full-time 12%)	77%
Female	55%
Second year of studies	51%
Average number of courses enrolled in/semester	4

The majority of respondents were second-year students who were employed, commuted to campus, and lived at home with their parents. Respondents were primarily under the age of twenty-five and just over fifty percent were female. The demographic profile of student participants reflected that of the university as a whole with respect to age, employment status, residence, and level of course enrollment with the exception of gender (Prairie Research Associates, 2008). Approximately two-thirds of the Mount Royal University student population is female and the higher percentage of males in this study may be due to a higher concentration of male students in the second-year Biology and Business courses.

The Types of Informal and Formal Group Work that Undergraduate Students engage in Outside of Class Time

The survey instrument asked the students to identify how often they participated in a series of informal and formal group work activities, outside of class time, during the winter 2010 semester. With regards to informal group work (e.g., not assigned by instructors), approximately 20% of the students indicated that they often/very often engage in these type of activities (Table 2).

Table 2.

Informal group work outside of class time (not assigned by instructors)

Activity	Often/ Very often
Study outside of class time with your peers/friends for quizzes, tests, midterm, and final exams	26%
Work on written assignments with your peers/friends outside of class time	19%
Review and discuss course readings with your peers/friends outside of class time	18%
Work on problem sets with your peers/friends outside of class time	18%

The students indicated the principal informal group work activity that they participated in, outside of class time, was studying for summative assessments such as midterm and final examinations. There was a more frequent rate of student participation for formal group work activities that were assigned by instructors (Table 3).

Table 3.

Formal group work outside of class time (assigned by instructors)

Activity	Often/ Very often
Prepare for class presentations with your peers/friends outside of class time	39%
Work on assigned group projects with your peers/friends outside of class time	38%
Work on research assignments with your peers/friends outside of class time	35%

Student use of Web 2.0 Technologies to Support Informal and Formal Group Work Outside of Class Time

There were a number of survey questions that asked students to identify their access to various technology applications and whether they used collaborative technologies for academic or personal purposes. The vast majority of students reported that they had access to a high-speed home Internet connection and that they owned both a mobile communication device and laptop computer (Table 4).

Table 4.

Technology access

Technology application	Percentage of students reporting access
Home access to the Internet	99.8%
Access to high-speed home Internet connection	98%
Have your own a mobile communication device (e.g., cell phone)	90%
Have your own laptop computer	89%
Have your own a digital music player (e.g., iPod)	82%
Have your own a mobile communication device with Internet access (e.g., Smart Phone)	51%

A list of 16 collaborative technologies was identified from a review of existing undergraduate technology surveys (e.g., *EDUCAUSE Centre for Applied Research Study of Undergraduate Students and Information Technology*, *Pew Internet & American Life Project*, *Canadian Internet Project*). Survey questions were then designed to ask students how they used these technologies. The results were ranked based on the percentage of combined academic and personal use responses (Table 5).

Table 5.
Student use of collaborative technologies

Collaborative Technologies	Use for both academic studies & personal purposes	Use only for academic studies	Use only for personal purposes	Do not use	Do not know what this
<i>High-Use Technologies</i>					
Email	82%	16%	1%	1%	0%
Blackboard Learning Management System	7%	81%	11%	1%	0%
Text messaging on your mobile communication device (e.g., cell phone, Blackberry)	66%	6%	25%	2%	0%
Social networking systems (e.g., Facebook)	36%	11%	47%	7%	0%
Instant Messaging on your computer (IM – e.g., MSN Messenger)	38%	9%	43%	10%	0%
<i>Medium-Use Technologies</i>					
Google Docs (e.g., word processing, spreadsheets, presentation tools)	33%	31%	13%	21%	1%
Online discussion boards	11%	23%	16%	49%	0%
Calibrated Peer Review Tool (i.e., CPR)	2%	41%	7%	35%	15%
Learnnet (i.e., Mahara)	3%	38%	3%	31%	25%
Synchronous communication tools (e.g., Skype, Google Chat, Elluminate Live!)	12%	4%	25%	59%	0%
Wikis (e.g., collaborative writing tools)	19%	8%	11%	54%	8%
<i>Low-Use Technologies</i>					
Blogs (e.g., WordPress, Blogger)	7%	7%	19%	65%	2%
Photosharing applications (e.g., Flickr)	7%	2%	20%	63%	9%
Mashup applications (e.g., Google Mashup Editor, Yahoo Pipes, MS Photostory)	8%	3%	11%	54%	23%
Social booking marking applications (e.g., Del.icio.us, CiteUlike)	3%	2%	2%	54%	39%
Virtual world applications (e.g., Second Life, Moove, Palace)	2%	1%	1%	72%	23%

The top five collaborative technologies were used by over 90% of the students surveyed for either academic or personal purposes. In the focus group, students indicated that the primary academic use of these technologies was for asynchronous and synchronous communication with the instructor and fellow students.

Six collaborative technologies were identified as medium-use, based on 40% to 80% of the students using these applications. Students were required to use each of these tools in order to complete at least one course assignment that required formal group work outside of class time. It appears that the *Calibrated Peer Review Tool* (<http://cpr.molsci.ucla.edu/>) and the *Mahara ePortfolio Tool* (<http://mahara.org/>) were used by students primarily for academic purposes while *Google Docs*, online discussion boards, synchronous communication tools, and wikis were also used for personal purposes.

Collaborative technologies were designated as low-use if less than one-third of the students used these applications for either academic or personal purposes. None of these tools were required to complete course assignments. Approximately one-fifth of the students used blogs and photo sharing applications for personal purposes, whereas very few students used or knew about mashup, social bookmarking, or virtual work applications.

Student Advice and Recommendations for Using Web 2.0 Applications to Support Group Work Outside of Class Time

From the open-ended survey questions and the focus group session, the students identified a series of strategies, advantages, disadvantages, and recommendations for using Web 2.0 applications to support group work outside of class time. With regards to strategies, the students indicated they preferred to use hand-held devices (e.g., cell phones) for communication and laptop computers for actual project work. Social networking applications such as *Facebook*, in combination with texting and instant messaging, were used for communication tasks such as arranging meetings, updates, and discussion of project-related issues. Email and the *Blackboard* Learning Management System were used primarily for file sharing of project work. The students also emphasized that there is a trend to use mobile devices for asynchronous rather than synchronous communication (e.g., text messaging rather than actual phone calls). In addition, the students commended instructors in the focus group session for using *Blackboard* as a “base camp” with links to the required Web 2.0 applications (e.g., blogs, wikis, and specialized tools such as the *Calibrated Peer Review* system).

The students stated that the three main advantages of using Web 2.0 applications to support group work were convenience, increased productivity, and the ability to learn and get peer feedback from fellow students. In terms of convenience, one student commented that using these tools provides for “easy communication and information gathering for both informal/formal group work” (Focus Group Participant 4). The students also indicated that “collaborative technologies are already a major part of my life, and to be able to integrate group work is very effective” (Focus Group Participant 10) and that these applications “create a more efficient way to work in groups without having to leave your home or work or school and improve social communication skills with all peers and students” (Survey Participant 151). Another student emphasized in her survey response about how “I can ask questions I don't understand, get clarity, go over stuff I don't know, can help others” and that through this process of peer collaboration, outside of the classroom, “It allows you to get to know people that you are working with and make friends that you can study with” (Survey Participant 89).

Trust issues with group members and technology were identified as the major disadvantages of using Web 2.0 tools to support group work. For example, one student indicated that, “A lot of trust in other people is being tested when using collaborative technologies” (Focus Group Participant 6). Another student suggested that the “elimination of face to face communication takes trust away” through the “inability to see face to face and use hand signals and body language” (Focus Group Participant 11). Numerous students also commented about reliability issues with the institutional learning management system, which was the major conduit to the collaborative technologies, “Many times it’s been a frantic rush trying to get things done because *Blackboard* was down all weekend” (Survey Participant 24) and, “At times we become too reliant on them and they have been known to break or not work at times eg. *Blackboard*” (Survey Participant 74).

The students provided a number of recommendations for effectively and efficiently using Web 2.0 applications to support group work outside of class time. The key suggestion was that higher education institutions should provide training, resources, and support for student use of these tools. For example, one student commented that she believed “more students should learn how to use *Google Docs* for I have found this tool to be great for everyone in the group to work on one document that can be accessed from any computer with internet” (Survey Participant 17) but that there was a lack of institutional support for this application. In addition, students in the focus group strongly advocated that “collaborative technologies should be encouraged more by instructors because it makes group work less stressful!” (Focus Group Participant 12). They also suggested that instructors should provide a “hands on” introduction and tutorial for collaborative technologies required to complete course assignments. Finally, one student stated that, “As more Web 2.0 technologies emerge there must become standards of use. These need to have proper uses to make them effective as there are too many to master them all for all uses” (Focus Group Participant 1).

Discussion

The purpose of this research study was to investigate what types of group work undergraduate students engage in outside of class time, how they use Web 2.0 technologies to support these types of group work, and what recommendations students have for faculty members regarding the use of collaborative technologies to support group work outside of class time. Each of these topics is discussed below.

The Types of Informal and Formal Group Work that Undergraduate Students engage in Outside of Class Time

The results from this study indicate that less than one-quarter of the students participated in informal group work activities while more than a third engaged in formal activities that had been assigned by the instructor. All of these formal group activities had an assessment component related to the performance of the group. A number of educational researchers have suggested that assessment practices drive student approaches to learning in higher education and that the design of the assessment activity and the associated feedback can influence the type of learning that takes place in a course or program (Marton & Saljo, 1984; Biggs, 1998; Entwistle, 2000; Ramsden, 2003; Thistlethwaite, 2006). This statement appears to apply to student approaches to group work outside of class time. If there is an assessment component tied to the group work activity, the students are more likely to participate.

Student use of Web 2.0 Technologies to Support Informal and Formal Group Work Outside of Class Time

The results of the winter 2010 semester survey demonstrated that the majority of the student participants had access to a high-speed home Internet connection and own both a mobile communication device and laptop computer. These findings are consistent with the recent *ECAR Study of Undergraduate Students and Information Technology* (Smith, Salaway & Caruso, 2009) where 90% of the students had access to a mobile communication device and 88% of the students owned a laptop computer. This study also noted that student laptop ownership is increasing with a corresponding decrease in desktop computer ownership (44% in 2009).

The survey findings also indicate that students are primarily using Web 2.0 technologies to communicate and share files with their group members outside of class time. Again, these results mirror the recent *ECAR Study* (Smith, Salaway & Caruso, 2009), which reports that 87% of American undergraduate students are using social networking systems such as *Facebook* and 85% are using text messaging to communicate with their peers. It is interesting to note that this study also demonstrates that the use of computer-based instant messaging by undergraduates is in decline from a high of 73% in 2006 to only 56% in 2009.

Over the past five years, the use of learning management systems (LMS), such as *Blackboard*, have become ubiquitous in higher education (Allen & Seaman, 2010). Both this study and the *ECAR* research (Smith, Salaway & Caruso, 2009) report that over 90% of the students surveyed are using a LMS in their undergraduate studies. Students who participated in the focus group of this research study indicated that for group work, outside of class time, they use a LMS principally for file sharing.

The authors of this study were surprised at the relatively low student use of blogs, wikis, and other Web 2.0 applications to support group work outside of class time. Many of these Web 2.0 tools receive frequent media attention (e.g., *Second Life Virtual World*), but recent studies (Lenhart, Purcell, Smith, & Zickuhr, 2010) suggest that student use of applications such as blogs have been declining in recent years (e.g., in 2007, 24% of young adults aged 18 to 29 maintained a blog compared to 15% in 2009). Some researchers speculate that young adults are now focusing on text messaging as their primary form of personal and academic communication (Smith, Salaway & Caruso, 2009).

Student Advice and Recommendations for Using Web 2.0 Applications to Support Group Work Outside of Class Time

In the surveys and focus group, students provided a series of recommendations for using Web 2.0 applications to support group work outside of class time. At the top of their list was training and support. The assumption of many instructors in higher education is that Web 2.0 tools are already part of students' everyday life, and, thus, no additional support is required (Lenhart et al., 2010). The comments provided by students in this study indicate that this is not always the case. They suggest that instructors provide "hands-on" tutorials and online resources to demonstrate how Web 2.0 technologies can be used to effectively and efficiently complete group work assignments. In addition, they recommend that post-secondary institutions provide "drop-in" centers where students can go for one-to-one help and assistance with technology tools. The *Student Technicians and Resource Tutors* (START) program at Mount Royal University was pointed to as an example (<http://www.mtroyal.ca/START/>).

The students also indicated that there is a potential to become overwhelmed with the number of Web 2.0 technologies available to support group work (e.g., currently over 8,000 Web 2.0 applications listed at <http://www.go2web20.net/>). Their concern is that they will spend more time learning how to use these tools than on completing their group work tasks and assignments. Several students recommended that institutions or departments develop a standard set of Web 2.0 applications and that these tools should be used throughout a program, not just in one individual course.

Conclusion

Misanchuk and Anderson (2001) indicate that there is a distinction between cooperation and collaboration when it comes to group work in higher education. They suggest that cooperation entails students dividing up group work tasks. “A machine metaphor can illustrate cooperation in the classroom: different parts of the machine perform different functions and goals, but work together towards a similar end” (Misanchuk & Anderson, 2001, p.6). For example, students may divide up sections of a report to write individually and then collate the finished work. Whereas, Misanchuk and Anderson advocate that collaboration is the most integrated form of group work and is therefore potentially the most difficult and the most rewarding. “In the case of collaboration, the group members work toward a common goal, one that carries a mutual investment” (Misanchuk & Anderson, 2001, p.6). For example, students work on every section of the report together, consulting each other and re-reading each other’s edits. This description of collaboration is congruent with Hollan, Hutchins, and Kirsch’s (2000) concept of distributed cognition. Misanchuk and Anderson (2001) have created the following table to further illustrate the differences between cooperation and collaboration in-group work (Table 6).

Table 6.

Characteristics of cooperation and collaboration in-group work (Misanchuk & Anderson, 2001)

Characteristic	Cooperation	Collaboration
<i>Learning</i>	Knowledge transmission	Knowledge generation
<i>Inquiry</i>	Delegation of tasks	Common inquiry
<i>Decision-making</i>	Vote (majority rules)	Social negotiation to consensus
<i>Goals/agendas</i>	One goal/ multiple agendas	One goal/ one agenda
<i>Accountability</i>	Individual accountability	Group accountability
<i>Learning relationship</i>	Partial interdependence	Complete interdependence

The findings from this research study suggest that students enrolled in the second year Biology, Business, and Education courses at Mount Royal University are primarily using collaborative technologies to support group communication and file sharing outside of the classroom. At this point in time, it appears that the technology tools are being used for cooperative tasks (e.g., sharing and compiling project work that was accomplished by individual effort) rather than for collaborative activities (e.g., using the tools to support collaborative project building, writing, and discussion outside of the classroom).

In order for Hollan, Hutchins, and Kirsh’s (2000) concept of distributed cognition to be achieved through group work, outside of class time, we recommend that faculty use Web 2.0

technologies to intentionally design, facilitate, and direct group assignments for collaboration. In terms of design, instructors should create and scaffold tasks that promote open communication and trust in order to support critical reflection and discourse in the groups. For example, designing authentic problem-based learning activities, which require groups to use Web 2.0 technologies to generate their own solutions and ideas. With regards to facilitation, it is important for instructors to model collaborative behavior and appropriate use of the technology tools. This implies “walking the talk” by demonstrating the use of Web 2.0 technologies to support collaboration and critical discourse with the students throughout the course. Finally, instructors also need to direct and sustain the collaborative process by helping to manage potential conflicts and ensuring that the work produced by the groups is aligned with the intended course learning outcomes.

References

- Allen, I.E. & Seaman, J. (2010). *Learning on demand: Online education in the United States, 2009*. Babson Park, MA: Babson Survey Research Group.
- Barnett, J. (2006). Implementation of personal response units in very large lecture classes: Student perceptions. *Australasian Journal of Educational Technology*, 22(4), 474-494. Retrieved from <http://www.ascilite.org.au/ajet/ajet22/barnett.html>
- Beckman, M. (1990). Collaborative learning: Preparation for the workplace and democracy. *College Teaching*, 38(4), 128-133.
- Biggs, J. (1998). Assumptions underlying new approaches to assessment. In P. Stimson & P. Morris (Eds.). *Curriculum and assessment in Hong Kong: Two components, one system* (pp. 351-384). Hong Kong: Open University of Hong Kong Press.
- Prairie Research Associates. (2008). *Canadian University Survey Consortium: Undergraduate student survey – 2008*. Retrieved from http://www.cusccreu.ca/publications/2008_cusc_masterreport.pdf
- Chickering, A. W., & Gamson, Z. F (Eds.). (1991). Applying the seven principles for good practice in undergraduate education. *New Directions for Teaching and Learning* (Vol.47). San Francisco: JosseyBass.
- Collier, K. G. (1980). Peer-group learning in higher education: The development of higher-order skills. *Studies in Higher Education*, 5(1), 55-62.
- Cooper, J., and Associates. (1990). *Cooperative learning and college instruction*. Long Beach, CA: Institute for Teaching and Learning, California State University.
- Creswell, J.W. (1997). *Qualitative inquiry and research design: Choosing among five traditions*. Thousand Oaks, CA: Sage.
- Crouch, C. H., & Mazur, E. (2001). Peer instruction: Ten years of experience and results. *American Journal of Physics*, 69(9), 970-977.
- Ehrmann, S.C. & Zuniga, R.E. (1997). *The flashlight evaluation handbook*. Washington: Corporation for Public Broadcasting.
- Entwistle, N. J. (2000). Approaches to studying and levels of understanding: The influences of teaching and assessment. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research*, XV (pp. 156–218). New York, NY Agathon Press.
- Gilmore, T., Krantz, J. & Ramirez, R. (1986). Action based modes of inquiry and the host-researcher relationship. *Consultation*, 5.3(Fall), 161.
- Goodsell, A., Maher, M., Tinto, V, & Associates (Eds.). (1988). *Collaborative learning: A sourcebook for higher education*. University Park: National Center on Postsecondary Teaching, Learning, and Assessment, Pennsylvania State University.
- Graham, C. R., Tripp, T. R., Seawright, L., & Joeckel, G. L. (2007). Empowering or compelling reluctant participators using audience response systems. *Active Learning in Higher Education*, 8(3), 233-258.
- Hoekstra, A. (2008). Vibrant student voices: Exploring effects of the use of clickers in large college courses. *Learning, Media, & Technology*, 33(4), 329-341.
- Hollan, J., Hutchins, E., & Kirsh, D. (2000). Distributed cognition: Toward a new foundation for human-computer interaction research. *ACM Transactions on Computer-Human Interaction*, 7(2), 174 – 196.
- Johnson, D. W., Johnson, R. T., & Smith, K. A. (1991). *Cooperative learning: Increasing*

- college faculty instructional productivity*. ASHE-FRIC Higher Education Report No.4. Washington, D.C.: School of Education and Human Development, George Washington University.
- Kohn, A. (1986). *No contest: The case against competition*. Boston: Houghton Mifflin.
- Lenhart, A., Purcell, K., Smith, A. & Zickuhr, K. (2010). *Social media & mobile Internet use among teens and young adults*. Washington, D.C.: Pew Internet & American Life Project.
- Marton, F. & Saljo, R. (1984) Approaches to learning. In F. Marton, D. Hounsell & N. Entwistle (Eds.), *The experience of learning*. Edinburgh: Scottish Academic Press.
- McKeachie, W. J., Pintrich, P. R., Lin, Y. G., & Smith, D. A. F. (1986). *Teaching and learning in the college classroom: A review of the research literature*. Ann Arbor: National Center for Research to Improve Postsecondary Teaching and Learning, University of Michigan.
- Miles, C. A., Polovina-Vukovic, D., Littljohn, D., & Marini, A. (2010). *The effectiveness of peer-assisted study sessions (PASS) program in enhancing student academic success at Carleton University*. Toronto: Higher Education Quality Council of Ontario.
- Misanchuk, M. & Anderson, T. (2001). Building community in an online learning environment: Communication, cooperation and collaboration. Proceedings of the *Sixth Annual Mid-South Instructional Technology Conference*, Murfreesboro, Middle Tennessee State University. Retrieved from <http://www.mtsu.edu/~itconf/proceed01/19.html>
- O'Reilly, T. (2005). What is web 2.0. *O'Reilly Network*. Retrieved from <http://oreilly.com/web2/archive/what-is-web-20.html>
- Patton, M. Q. (1990). *Qualitative evaluation and research methods* (2nd ed.). Newbury Park, CA: Sage Publications.
- Ramsden, P. (2003). *Learning to teach in higher education* (2nd ed.). London: Routledge.
- Preszler, R.W. (2009). Replacing lecture with peer-led workshops improves student learning. *Life Sciences Education*, 8(Fall), 182–192.
- Saltzberg, S., & Polyson, S. (1995). Distributed learning on the World Wide Web. *Syllabus*, 9(September), 10.
- Slavin, R. F. (1980). Cooperative learning. *Review of Educational Research*, 50(2), 315-342.
- Slavin, R. E. (1983). When does cooperative learning increase student achievement? *Psychological Bulletin*, 94(3), 429-445.
- Smith, M. K., Wood, W. B., Adams, W. K., Wieman, C, Knight, J. K., Guild, N., & Su, T. T. (2009). Why peer discussion improves student performance on in-class concept questions. *Science*, 323(5910), 122-4.
- Smith, S., Salaway, G., & Caruso, J. (2009). *The ECAR study of undergraduate students and information technology, 2009—key findings*. Boulder, CO: EDUCAUSE Center for Applied Research.
- Stringer, E.T. (1999). *Action research* (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Thistlethwaite, J. (2006). More thoughts on 'assessment drives learning'. *Medical Education*, 40(11), 1149-1150.
- Whitman, N. A. (1988). *Peer teaching: To teach is to learn twice*. Washington, D.C.: ASHE-ERIC Higher Education Report No.4. Washington, D.C.: Association for the Study of Higher Education.
- Wikipedia. (2011). *Web 2.0*. Retrieved from http://en.wikipedia.org/wiki/Web_2.0
- Yamarik, S. (2007). Does cooperative learning improve student learning outcomes? *Journal of Economic Education*, Summer, 259-277.

Zamaria, C. & Fletcher, F. (2008). *Canada online! The internet, media and emerging technologies: Uses, attitudes, trends and international comparisons 2007*. Toronto, ON: Ryerson University.