

# STUDENT ENGAGEMENT AND WEB 2.0:

## WHAT'S THE CONNECTION?

OVER THE PAST DECADE, rising tuition costs and concerns about student success and retention rates have led to an increased focus on levels of student engagement in higher education.<sup>1</sup> Some have advocated for a curriculum redesign that stresses relevance, rigour, and relationships (3R's of engagement) as a way of enabling students to meaningfully engage in sustained learning experiences.<sup>2</sup> In 1998, the National Survey of Student Engagement (NSSE) was developed as a "lens to probe the quality of the student learning experience at American colleges and universities."<sup>3</sup> The NSSE defines student engagement as 1) the amount of time and effort that students put into their classroom studies that lead to successful experiences and outcomes, and 2) the ways the institution allocates resources and organizes learning opportunities and services to induce students to participate in and benefit from such activities.

The survey's analysis of the literature related to student engagement in higher education has identified five clusters of effective educational practice:

1. Active and collaborative learning
2. Student interactions with faculty members
3. Level of academic challenge
4. Enriching educational experiences
5. Supportive campus environment

**The growing use of Web 2.0 technologies in higher education courses seems to offer some support for the revival of the traditional view of education as a community of learners.**

The current interest in student engagement may be helping to revive the traditional view of education as a community of learners. John Dewey, the American educational philosopher, suggested in his book, *Democracy in Education*, that the development of such a community is essential to any successful educational experience.<sup>4</sup> The growing use of Web 2.0 technologies such as social networking sites, blogs, and wikis in higher education courses seems to offer some support for this revival, but there has been little research about how these tools are actually impacting student learning and engagement.<sup>5</sup> At the University of Calgary, we recently began to explore whether these tools could be used to increase the level of student engagement with course concepts, peers, faculty, and external experts – potentially leading to increased student success, retention, and satisfaction.

### WEB 2.0 TECHNOLOGIES AND APPLICATIONS

Tim O'Reilly is credited with coining the term Web 2.0 to describe a trend in the use of web-based technology and design to enhance creativity, information sharing, and – most notably – collaboration among users.<sup>6</sup> These technologies can be used to support collaborative learning in a variety of formats. For example, social bookmarking applications 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 applications 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 Elluminate Live! allow students to communicate, collaborate, and create knowledge outside of the classroom. Moreover, virtual world applications such as Teen Second Life and Habbo provide opportunities for rich synchronous interaction in 3-D immersive worlds to support collaborative and creative project-based work.

An overview to each of these categories of Web 2.0 technologies, including examples of software applications and ideas for collaborative learning activities, is provided in Table 1 and on a corresponding wiki site ([http://shex.org/wiki/Collaborative\\_learning\\_technologies](http://shex.org/wiki/Collaborative_learning_technologies)).



**TABLE 1: Categories of Web 2.0 Technologies**

Category	Description	Software Application Examples	Collaborative Learning Activities
Social bookmarking	<ul style="list-style-type: none"> <li>• Sharing personal collections of URLs on a web-based server</li> <li>• Ability to re-use and re-purpose existing collections of links</li> <li>• Tagging of resources helps develop relationships between concepts and people</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Del.icio.us</b> <a href="http://del.icio.us/">http://del.icio.us/</a></li> <li>• <b>CiteUlike</b> <a href="http://www.citeulike.org/">www.citeulike.org/</a></li> <li>• <b>Edtags</b> <a href="http://edtags.org/">http://edtags.org/</a></li> <li>• <b>Diigo</b> <a href="http://www.diigo.com/">www.diigo.com/</a></li> </ul>	<ul style="list-style-type: none"> <li>• Student generated course reading list</li> <li>• Article critique assignments</li> <li>• Group project resources</li> </ul>
Blogs	<ul style="list-style-type: none"> <li>• A web-based public diary with dated entries, usually by a single author, often accompanied by links to other blogs that the author of the site visits on a regular basis.<sup>7</sup></li> <li>• Reflective writing and reading activity</li> <li>• Opportunity for students to receive external feedback and to make contributions to the dialogue in their field of study</li> <li>• RSS subscription to other blogs to receive automated content updates</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Google's Blogger</b> <a href="http://blogger.com/">http://blogger.com/</a></li> <li>• <b>Edublogs</b> <a href="http://edublogs.org/">http://edublogs.org/</a></li> <li>• <b>Twitter</b> <a href="http://twitter.com/">http://twitter.com/</a></li> </ul>	<ul style="list-style-type: none"> <li>• Article critiques</li> <li>• Peer review</li> <li>• Assignment self-reflections</li> <li>• Field journal</li> <li>• Practicum/clinical journal</li> <li>• Citizen journalism</li> <li>• Historical blog – diary of historical events</li> <li>• Blogging portfolios</li> <li>• Micro-blogging (e.g., Twitter) to respond to in class questions</li> </ul>
Wikis	<ul style="list-style-type: none"> <li>• A wiki is a collection of web pages that can be edited by anyone, at any time, from anywhere. The possibilities for using wikis as a platform for collaborative projects are limited only by one's imagination and time.<sup>8</sup></li> <li>• Support collaboration and creative project-based work</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Wikispaces</b> <a href="http://www.wikispaces.com/">www.wikispaces.com/</a></li> <li>• <b>Google Docs</b> <a href="http://documents.google.com/">http://documents.google.com/</a></li> <li>• <b>Etherpad</b> <a href="http://etherpad.com/">http://etherpad.com/</a></li> </ul>	<ul style="list-style-type: none"> <li>• Class books</li> <li>• Online discussion summaries</li> <li>• Group essays</li> <li>• Peer review of student work</li> <li>• Personal and course home pages</li> </ul>
Social networking	<ul style="list-style-type: none"> <li>• Focuses on building and verifying of online social networks for communities of people who share interests and activities</li> <li>• Additional "communication channel" to reach students (e.g., RSS feeds from institutional learning management systems)</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Facebook</b> <a href="http://www.facebook.com">www.facebook.com</a></li> <li>• <b>LinkedIn</b> <a href="http://www.linkedin.com/">www.linkedin.com/</a></li> <li>• <b>MySpace</b> <a href="http://www.myspace.com/">www.myspace.com/</a></li> <li>• <b>Ning</b> <a href="http://www.ning.com/">www.ning.com/</a></li> </ul>	<ul style="list-style-type: none"> <li>• Online discussion board</li> <li>• Study groups</li> <li>• Course communication</li> <li>• Connections between institutions in other countries</li> <li>• Useful for linking students and employers</li> </ul>
Social media sharing	<ul style="list-style-type: none"> <li>• Simplifies the process of posting and sharing content on the web (e.g., text, audio, images and video)</li> <li>• Provides a wealth of re-usable media resources for learners and educators</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Podomatic</b> <a href="http://www.podomatic.com/">www.podomatic.com/</a></li> <li>• <b>Flickr</b> <a href="http://flickr.com/">http://flickr.com/</a></li> <li>• <b>YouTube</b> <a href="http://youtube.com/">http://youtube.com/</a></li> <li>• <b>Slideshare</b> <a href="http://www.slideshare.net/">www.slideshare.net/</a></li> </ul>	<ul style="list-style-type: none"> <li>• Interviews with external experts</li> <li>• Case studies</li> <li>• Storytelling</li> <li>• Project work</li> <li>• Development and sharing of instructional resources</li> <li>• Discussions and debates about these learning objects</li> </ul>
Mashups	<ul style="list-style-type: none"> <li>• Allows non-technical individuals to mix-up data, find new meaning and present it in interesting ways</li> <li>• Allows users to put together different types of data</li> <li>• Mapping mashups – maps are overlaid with different types of information</li> <li>• Music mashups – mixing tracks from two or more different source songs</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Intel's Mash Maker</b> <a href="http://mashmaker.intel.com/web/">http://mashmaker.intel.com/web/</a></li> <li>• <b>Yahoo Pipes</b> <a href="http://pipes.yahoo.com/pipes/">http://pipes.yahoo.com/pipes/</a></li> <li>• <b>MIT's Piggy Bank</b> <a href="http://simile.mit.edu/wiki/Piggy_Bank">http://simile.mit.edu/wiki/Piggy_Bank</a></li> <li>• <b>Wordle</b> <a href="http://www.wordle.net/">www.wordle.net/</a></li> </ul>	<ul style="list-style-type: none"> <li>• Mapping activities</li> <li>• Data visualization</li> <li>• Presenting student project and research work</li> <li>• Knowledge maps</li> <li>• Analysis of online discussions using Wordle</li> <li>• Real-time analysis</li> <li>• Digital storytelling</li> </ul>
Synchronous Communication and Conferencing	<ul style="list-style-type: none"> <li>• Synchronous communication opportunities (i.e. text messaging, audio, video)</li> <li>• Support 'real-time' collaborative and creative project-based work</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Skype</b> <a href="http://skype.com/">http://skype.com/</a></li> <li>• <b>WiziQ</b> <a href="http://www.wiziq.com">www.wiziq.com</a></li> <li>• <b>Dimdim</b> <a href="http://www.dimdim.com/">www.dimdim.com/</a></li> <li>• <b>Illuminate Live!</b> <a href="http://www.illuminate.com/">www.illuminate.com/</a></li> </ul>	<ul style="list-style-type: none"> <li>• External guest presentations</li> <li>• Group project work</li> <li>• Brainstorming and action plans</li> <li>• Ability to create learning resources</li> <li>• Service learning</li> </ul>
Virtual worlds	<ul style="list-style-type: none"> <li>• Synchronous interaction in 3-D immersive worlds</li> <li>• Support collaborative and creative project-based work that goes beyond text-based and audio communication</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Teen Second Life</b> <a href="http://teen.secondlife.com/">http://teen.secondlife.com/</a></li> <li>• <b>The Palace</b> <a href="http://www.thepalace.com/">www.thepalace.com/</a></li> <li>• <b>Habbo</b> <a href="http://www.habbo.ca/">www.habbo.ca/</a></li> </ul>	<ul style="list-style-type: none"> <li>• Experimentation</li> <li>• Simulations</li> <li>• Group project work</li> <li>• Learning different languages and cultures</li> <li>• Mentors</li> <li>• Role plays</li> </ul>

**The focus of this program was to help faculty members meaningfully integrate Web 2.0 technologies into their courses to significantly shift teaching and learning from a passive lecture approach to an engaged and collaborative approach.**

### REDESIGNING FOR ENGAGEMENT: A CASE STUDY

To help determine how effective Web 2.0 technologies could be at increasing student engagement and improving academic outcomes, faculty members at the University of Calgary redesigned a series of undergraduate courses using the Inquiry through Blended Learning (ITBL) program. The focus of this program was to help faculty members meaningfully integrate Web 2.0 technologies into their courses to significantly shift teaching and learning from a passive lecture approach to an engaged and collaborative approach.

To evaluate these redesigned courses, we constructed a student survey using three of the five benchmarks identified by the NSSE framework: active and collaborative learning; student interactions with faculty members; and level of academic challenge. The rationale for using this framework was to align the ITBL program with a university-wide campaign to improve student engagement and success on campus.

The third year Experimental Psycholinguistics course that is the subject of this case study originally consisted of three 50-minute lecture periods per week. For the Fall 2006 semester, the course had been redesigned for a “laboratorial” format in which students met once a week for a 120-minute time block that combined a lecture and lab component. Student survey results suggested that this focus on a structural rather than a pedagogical redesign resulted in a low level of active and collaborative learning.

After reviewing the student surveys and consulting with other members of the ITBL program, the Psycholinguistics instructor decided to become more intentional with the course’s learning design. In order to achieve this goal, the redesign team (faculty member, graduate student, and instructional designer) attempted to constructively align the learning outcomes, the assessment activities, and the use of technology. Using her original learning outcomes, the instructor decided to redesign the two major assessment activities to provide students with greater opportunities to collaboratively construct their own knowledge frameworks about key course concepts. She selected a variety of Web 2.0 technologies to support these activities. Table 2 demonstrates the new alignment between the learning outcomes, assessment activities, and use of technology for the Experimental Psycholinguistics course.

These new assessment activities were implemented during the Winter 2007 semester, and at the end of the term, students in this new iteration of the course completed the same survey that had been used in the Fall 2006 semester. There were approximately 35 students in both sections of the course.

On two of the criteria measured by the survey – student to faculty interaction and academic challenge – there were no observable differences between the two sections. In both sections students reported that they usually received prompt feedback and communicated via email with the course instructors, and they perceived a fairly high level of academic challenge in both sections.

However, in the area of active and collaborative learning, the surveys did reveal significant differences between the sections, corresponding with the redesigned assessment activities (see Figure 1). For example, students in the Winter 2007 perceived they were more frequently working with peers both during and outside of class time – very likely because this was a requirement for both the article critique and research assignments. These assignments also required students to make class presentations and to facilitate in-class discussions. The slight decrease in the contribution level to online discussions could be due to the fact that students received weekly participation marks for their online postings in the Fall 2006 but not in the Winter 2007 semester.

**TABLE 2: Experimental Linguistics course: Constructive alignment of course learning outcomes, assessment activities, and use of technology**

Learning Outcomes	Assessment Activities	Web 2.0 Technologies
Lecture component	Article critique assignment	Social bookmarking
Understanding of the cognitive, neuro-psychological, and social processes that underlie language abilities	<ul style="list-style-type: none"> <li>• Student groups selected an article to critique each week</li> <li>• Weekly online discussions about the articles – moderated by these student groups</li> <li>• Groups then make a class presentation based on an analysis and synthesis of the online discussion</li> <li>• Summary of the online and face-to-face discussions posted to a collaborative web space</li> </ul>	<ul style="list-style-type: none"> <li>• The Del.icio.us application used by students to post annotated links to peer reviewed journal articles</li> <li>• Wiki</li> <li>• The WikiSpaces tool used by students to collaboratively create and post their discussion summaries</li> </ul>
Lab component	Research assignment	Mashups
First-hand experience with methodologies used to study language behaviour	<ul style="list-style-type: none"> <li>• Individual experiments redesigned to become team based</li> <li>• Data collection required outside of class time</li> <li>• Teaching team (faculty member and graduate teaching assistant) demonstrated and discussed their current research in the lab component</li> </ul>	<ul style="list-style-type: none"> <li>• Google Maps and Stats-Canada Mapping tools used by students to analyze and present research findings</li> </ul>

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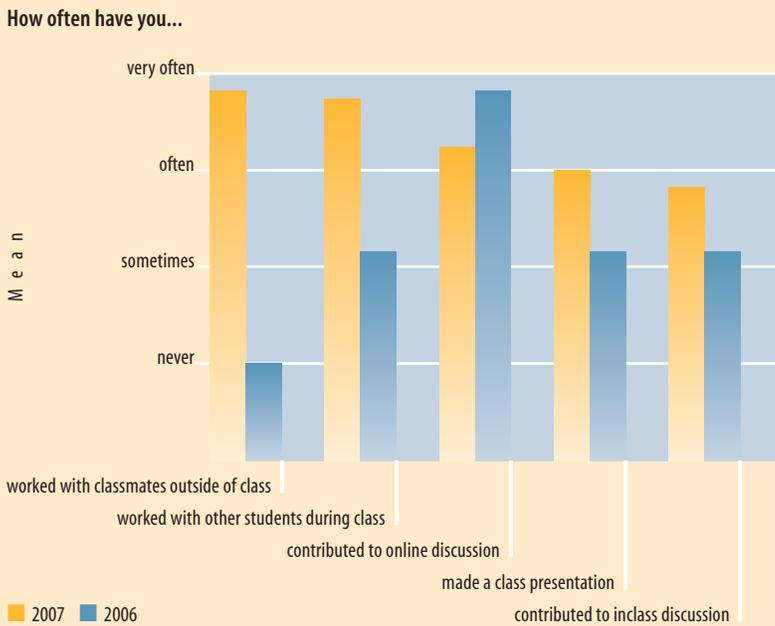
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**EN BREF** Historiquement, l'idéal des études supérieures était d'apprendre dans une communauté de recherche collaborative. Une recherche de l'Université de Calgary démontre le potentiel de recourir aux technologies Web 2.0 et à des stratégies de conception d'éducation pour revenir à cette vision, même dans de vastes cours d'introduction du premier cycle universitaire. Un cours de psycholinguistique intégrant des technologies Web 2.0 a rehaussé la réussite et le taux de rétention des étudiants. La clé consiste à revoir le contenu du cours de façon à favoriser des expériences d'apprentissage actif et collaboratif permettant aux étudiants de prendre en charge leur apprentissage et de valider leur compréhension par des discussions et des débats avec leurs pairs. Le défi, pour les personnes qui élaborent ces cours, consiste à harmoniser les résultats d'apprentissage préétablis et les activités d'évaluation avec les nombreux outils interactifs Web 2.0.

**FIGURE 1:** Student perceptions of the level of active and collaborative learning in the Fall 2006 and Winter 2007 sections of the Experimental Psycholinguistics course.



Robert Perry suggests that student satisfaction is a poor measure of course effectiveness as students can initially be frustrated with course experiences that challenge their existing cognitive frameworks.<sup>9</sup> That said, students were much more satisfied with the Winter 2007 version of the course. Over 75 percent, for example, agreed strongly with the statement "I am satisfied with this course," compared with 50 percent in the Fall version. In the open-ended survey questions, students indicated that the most effective aspect of the course was the sense of community that was developed through the redesigned assessment activities. One student stated that this was the first course in which she had not only learned the names of her fellow students but had actually made real friends.

Most importantly, from an academic perspective, students in the Winter version of the Experimental Psycholinguistics course were much more successful than students in the Fall class. While the number of students in the two sections of the course is too small to make any significant statistical claims, it is interesting to compare the grade distributions and retention rates in the Fall and Winter semesters.

**TABLE 3:** Experimental Psycholinguistics course – student success and retention

Final Course Grades	Fall 2006	Winter 2007
A	57%	82%
B	28%	12%
C	0%	6%
Withdrawal/failure	15%	0%

As Table 3 demonstrates, a greater percentage of students in the second iteration of this blended learning course received an A grade, and none of the students in Winter 2007 section withdrew from or failed the course. This increased student success and retention encourages us to consider further studies into the relationship between the use of Web 2.0 technologies and higher levels of active and collaborative learning.

## CONCLUSION

The historical ideal of higher education has been to learn in collaborative communities of inquiry. Our research at the University of Calgary has demonstrated the potential of using Web 2.0 technologies and educational design strategies to recapture this vision, even in large, introductory undergraduate courses. The key is to redesign courses for active and collaborative learning experiences that enable students to take responsibility for their learning and to validate their understanding through discourse and debate with their peers. |

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## Notes

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