STUDENT ENGAGEMENT AND INTERACTIVE TECHNOLOGIES:

WHAT'S THE CONNECTION?

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Abstract

There is an increased use of interactive learning technologies such as social networking sites, blogs, and wikis in higher education but there is a lack of research about how these tools are impacting student learning and engagement (Leslie & Landon, 2008). This research investigated whether these tools could be used to design and support assessment activities that increase levels of student engagement with course concepts, their peers, faculty and external experts, potentially leading to increased student success and satisfaction.

Key Words: Student Engagement, Interactive Technologies, Assessment
Introduction

Over the past decade, there has been an increased focus on the topic of student engagement in higher education in light of rising tuition costs and concerns about student success and retention rates (Kuh, Kinzie, Schuh, Whitt & Associates, 2005). In order to address these issues, Littky and Grabelle (2004) advocate for a curriculum redesign that stresses relevance, rigor and relationships (3R’s of engagement). It has been suggested that such a redesign would enable students to meaningfully engage in sustained learning experiences that may lead to a state of optimal flow, which Csikszentmihályi (1990) defines as “the mental state of operation in which the person is fully immersed in what he or she is doing by a feeling of energized focus, full involvement, and success in the process of the activity” (p.9).

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” (NSSE 2007, p.3). The NSSE defines student engagement as the amount of time and effort that students put into their classroom studies that lead to experiences and outcomes that constitute student success, and the ways the institution allocates resources and organizes learning opportunities and services to induce students to participate in and benefit from such activities. Five clusters of effective educational practice have been identified based on a meta-analysis of the literature related to student engagement in higher education. These benchmarks are (NSSE, 2007):

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 literature also indicates that the use of interactive learning technologies such as social networking sites, blogs and wikis has been increasing in higher education courses but there has been a lack of corresponding research about how these tools are impacting student learning and engagement (Leslie & Landon, 2008). Can these tools be used to design and support assessment activities that increase the level of student engagement with course concepts, their peers, faculty and external experts, potentially leading to increased student success and satisfaction?

The purpose of this research study was to investigate the impact of interactive learning technologies (e.g., blogs, wikis, clickers, social media sharing and networking applications) on student learning and engagement in first year undergraduate courses designed for blended learning. The study addressed the following questions:

1. How are instructors designing course assessment activities to incorporate student use of interactive learning technologies?
2. How do students perceive the value of these tools?
3. Is there a correlation between the use of these tools, the level of perceived student engagement in these courses, and academic achievement?

The use of interactive learning technology applications was examined in seven, first-year courses from different disciplines at Mount Royal University (Biology, Business, Child & Youth Studies, Communication Studies, Economics and General Education – Controversies in Science and Creativity in the Workplace).
Methods of Investigation

The collaborative constructivism framework developed by Garrison and Archer (2000) and the theoretical foundations of the National Survey of Student Engagement (NSSE) underpin this research project. Garrison and Archer (2000) trace the origins of collaborative constructivism back to Dewey (1916) who argued that “meaningful and educationally worthwhile knowledge is a process of continuous and collaborative reconstruction of experience” (p.11). They indicate that meaningful and worthwhile learning outcomes are facilitated in a collaborative environment where individual students are recognized and supported, a variety of perspectives are presented and examined, and misconceptions are diagnosed.


An action research (Stringer, 1999) and case-based method (Creswell, 1997) were utilized for this study. This approach consisted of a mixture of quantitative (e.g., online surveys) and qualitative (e.g., interviews, focus groups) research methods.
Data collection

Data was collected from two iterations of the seven, first-year courses over a two-year period. A total of 273 students and 8 instructors participated in this study. This project received Mount Royal University Ethics Approval and both students and instructors signed informed consent forms. The consent forms offered the participants confidentiality and the ability to withdraw from the study at any time.

The data collection process began in the fall of 2008 with pre-course interviews with all the instructors involved in all seven courses. The purpose of these interviews was to identify how instructors were planning to use interactive technologies, in alignment with assessment activities, to help students achieve the intended course learning outcomes.

A 75 item online survey was designed to collect demographic data, information concerning student use of interactive technologies, and perceptions about student engagement. Items used in the survey were derived from the Classroom Assessment of Student Engagement (CLASSE - the classroom version of the National Survey of Student Engagement) (Ouimet & Smallwood, 2005) and the EDUCAUSE Centre for Applied Research Study of Undergraduate Students and Information Technology (Salaway, Caruso & Nelson, 2008). The Flashlight Online Survey Tool (Ehrmann & Zuniga, 1997) was used to administer the survey to both students and faculty in all seven courses. The survey was deployed during the tenth week of the semester, in two iterations of each course (e.g., fall 2008, winter 2009, and/or fall 2009 semesters). The tenth week was selected so that students would have had sufficient exposure to the interactive technologies in
their course 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.

Student focus groups were facilitated and digitally recorded using a standardized protocol by an undergraduate research assistant (URA) during the eleventh week of the semester for the first iteration of each course. The URA was an education student who received training from the principal author of this study and she used a series of open-ended questions, generated from the survey results, to guide the focus groups. These focus groups were limited to the first iteration of each course due to budget constraints. Approximately ten students attended each of the seven focus groups (e.g. one for each course), which provided an opportunity to discuss and verify the findings from the online surveys.

Students’ level of use of Blackboard, the institutional learning management system (LMS), was assessed using page hits per student per course. Academic achievement was defined as students’ final grade in the course under study.

Reports were prepared for each of the seven courses and post-course interviews were digitally recorded with each of the instructors at the end of the fall 2008, winter 2009, and fall 2009 semester depending on when the second iteration of the course took place. In addition, in early January 2009 a focus group lunch was held with all the instructors in order to review and discuss the preliminary data collected.
Data analysis

Quantitative Data

Descriptive statistics (frequencies, means, and standard deviations) were calculated for individual survey items. Scale scores were computed for the following engagement-related parameters using methods described elsewhere\(^1\): active and collaborative learning; student-faculty interaction; level of academic challenge; and engagement in effective educational practices. A scale score reflecting intensity of students’ course-related technology use was calculated based on responses to selected survey items. Cronbach alpha coefficients were utilized to assess the internal reliability of calculated scales. Descriptive statistics (range, mean, standard deviation) were used to depict level of use of the LMS. Pearson correlation coefficients and analysis of variance were used to assess the association between engagement measures, technology use, and academic achievement.

Qualitative Data

Interviews and focus group sessions were digitally recorded and transcribed by the URA. 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). These transcripts were reviewed and compared with the responses from the open-ended online survey questions in order to triangulate themes and patterns.

Findings

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

\(^1\) http://nsse.iub.edu/html/PsychometricPortfolio_SurveyDevelopment.cfm#construction_of_nsse_benchmarks
1. How are instructors designing course assessment activities to incorporate student use of interactive learning technologies?

2. How do students perceive the value of these tools?

3. Is there a correlation between the use of these tools, the level of perceived student engagement in these courses, and academic achievement?

Demographic Profile and Technology Ownership of the Study Participants

Student Demographics

In order to establish a context for the study findings, the student version of the online survey asked a series of demographic questions. The survey response rate was 53% for students (n=273) and 100% for faculty (n=8). The demographic profile of the students is summarized in Table 1.

Table 1. Survey Respondent Demographics

<table>
<thead>
<tr>
<th>Item</th>
<th>Percentage/Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>69%</td>
</tr>
<tr>
<td>24 years of age or less</td>
<td>82%</td>
</tr>
<tr>
<td>Employed (part-time 62%; full-time 13%)</td>
<td>75%</td>
</tr>
<tr>
<td>Average hours of work per week</td>
<td>16</td>
</tr>
<tr>
<td>Off-campus accommodation within driving distance</td>
<td>84%</td>
</tr>
<tr>
<td>First year of studies</td>
<td>75%</td>
</tr>
<tr>
<td>Average number of courses enrolled in/semester</td>
<td>4</td>
</tr>
<tr>
<td>Core course in program</td>
<td>78%</td>
</tr>
</tbody>
</table>

The vast majority of respondents were first year students who were employed and commuted to campus. Respondents were primarily under the age of twenty-five. Over two-thirds were female. The demographic profile of student participants reflected that of the university as a whole with respect to gender, age, employment status, residence, and level of course enrollment (Canadian University Survey Consortium, 2008).
Student Technology Access & Use in the Classroom

Questions from the *EDUCAUSE Applied Research Study of Undergraduate Students and Information Technology* (Smith, Salaway, and Nelson, 2008) survey were used in order to establish the types of technologies that students have access to outside the classroom and what kinds of technologies they were using in their courses. Student technology access is illustrated in Table 2.

Table 2. Student Technology Access & Proficiency

<table>
<thead>
<tr>
<th>Technology Access &amp; Proficiency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal rating of computer skills as intermediate / advanced</td>
<td>63/34</td>
</tr>
<tr>
<td>Access to high-speed home Internet connection</td>
<td>96</td>
</tr>
<tr>
<td>Have your own cell phone</td>
<td>95</td>
</tr>
<tr>
<td>Have your own MP3 digital music player</td>
<td>88</td>
</tr>
<tr>
<td>Have your own laptop computer</td>
<td>82</td>
</tr>
</tbody>
</table>

These results suggest that most survey respondents had access to high-speed Internet connections, cell phones, MP3 players, and laptops outside of the classroom. In the *EDUCAUSE Applied Research Study of Undergraduate Students and Information Technology* for 2009, eighty percent of the students surveyed also had access to a laptop computer. This EDUCAUSE study (Smith, Salaway & Caruso, 2009) and a recent *Pew Internet & American Life* report (Lenhart, Purcell, Smith & Zichkuhr, 2010) indicate that laptops have overtaken desktops as the computer of choice for adults under the age of 30.

Fourteen survey items measured frequency of students’ use of interactive learning technologies in courses under study using a four-point scale (very often, often, sometimes, never). Results are displayed in Table 3.
Table 3. Course Technology Use

<table>
<thead>
<tr>
<th>Technology</th>
<th>Often/Very Often</th>
<th>Never/Sometimes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessed <em>course materials online</em> (i.e. via Blackboard site, course wiki, etc.)</td>
<td>96%</td>
<td>4%</td>
</tr>
<tr>
<td>Used <em>email</em> or a <em>discussion forum</em> to communicate with the instructor(s) of this course</td>
<td>49%</td>
<td>51%</td>
</tr>
<tr>
<td>Worked in <em>teams or groups</em> using information and communication technology (i.e. clickers, Blackboard, wikis, blogs, Google Docs, etc.)</td>
<td>48%</td>
<td>52%</td>
</tr>
<tr>
<td>Used a <em>MRC Library online database</em> (i.e. EPSCO, ProQuest, etc.) to find material for a course assignment or project</td>
<td>38%</td>
<td>62%</td>
</tr>
<tr>
<td>Used real-time <em>communication tools</em> (i.e. Elluminate, cell phone, chat group, Internet, instant messaging, etc.) to discuss or complete an assignment with classmates in this course</td>
<td>38%</td>
<td>62%</td>
</tr>
<tr>
<td>Used a <em>social networking application</em> (i.e. Facebook, MySpace, Ning, etc.) for discussion of course material, assignments or project work</td>
<td>34%</td>
<td>66%</td>
</tr>
<tr>
<td>Used <em>clickers</em> (i.e. personal response systems) in class</td>
<td>32%</td>
<td>68%</td>
</tr>
<tr>
<td>Used a computer and/or a digital projector to make a <em>class presentation</em></td>
<td>32%</td>
<td>68%</td>
</tr>
<tr>
<td><em>Wiki</em> or other <em>collaborative writing tool</em> (e.g. Google Docs, etc.) for course assignments or projects</td>
<td>27%</td>
<td>73%</td>
</tr>
<tr>
<td><em>Media sharing application</em> (i.e. YouTube, Flikr, Podomatic, Slideshare) to create, share or access information for a course assignment or project</td>
<td>18%</td>
<td>82%</td>
</tr>
<tr>
<td><em>Blog</em> for course related work such as assignments or projects</td>
<td>13%</td>
<td>87%</td>
</tr>
<tr>
<td><em>Social bookmarking tool</em> (e.g. Delicious, Furl, Connotea, etc.) to manage/organize and share online resources in this course</td>
<td>5%</td>
<td>95%</td>
</tr>
<tr>
<td><em>Virtual world application</em> (i.e. Second Life, The Palace, Moove, etc.) for course assignments or project work</td>
<td>2%</td>
<td>98%</td>
</tr>
<tr>
<td><em>Mashup application</em> (i.e. Visuwords, Quintura, Intel’s Mash Maker, etc.) for course assignments or project work</td>
<td>1%</td>
<td>99%</td>
</tr>
</tbody>
</table>

This table clearly demonstrates that students used technology primarily to access online course materials and communicate with the instructor and other students. More advanced applications such as virtual worlds (e.g., Second Life) and mashups were rarely used by students in the courses that were studied. These findings mirror the results of the *EDUCAUSE Applied Research*
Assessment Practices and Interactive Learning Technologies

Instructors were asked in pre- and post-course interviews about how they were designing course assessment activities to incorporate student use of interactive learning technologies. All instructors indicated that they were using Blackboard, the institutional learning management system, as a ‘base camp’ with hyperlinks to interactive learning technologies, which provided opportunities for student self-reflection, peer review, and instructor assessment feedback. The institutional learning management system provided students with a common portal (e.g., URL) so that they did not have to remember and find a series of web-based addresses for the interactive learning technologies (Figure 1).

Figure 1. Blackboard as the Course “Base Camp”
A range of interactive learning technologies were used to support assessment practices in each of the seven courses. Technologies that were used in specific courses were identified from the interview and focus group transcripts. For example, students used blogs (e.g., Blogger and WordPress) for self-assessment feedback and reflection in the Child Studies and Creativity in the Workplace courses. At the beginning of the semester, students posted an initial journal entry about their personal learning goals for the course and what they thought they already knew about the course content. Then at the end of the semester, students created a final journal entry that reflected on what they had learned and how they had changed/grown/developed throughout the course. In the Child Studies course, the students were also required to post blog entries related to each major course project and assignment (Figure 2). The purpose of these entries was to have students intentionally reflect about what they learned through the process of completing the assessment activity and how they could apply this learning to their future course studies or careers.

Figure 2. Course Assignment Reflections
In addition, students in the Creativity in the Workplace course constructed course portfolios using the *Drupal Content Management System* in order to showcase their assignments and reflections.

Personal response systems (e.g., clickers) were used in the Biology and Controversies in Sciences courses for study group quizzes and discussion prompts. Crouch and Mazur (2001) describe how clickers can be used to support a form of peer instruction. The process begins with the teacher posing a question or problem. The students initially work individually toward a solution and ‘vote’ on what they believe is the correct answer by selecting the desired numbered or lettered response on their clicker. The results are then projected for the entire class to view. For a good question, there is usually a broad range of responses. Students are then required to compare and discuss their solutions with the person next to them in the classroom in order to come to a consensus. Another ‘vote’ is taken but this time only one response or clicker per group can be utilized. In most circumstances, the range of responses decreases and usually centers around the correct answer. An alternative to this process, in the Controversies to Science course, was to have groups of students generate the quiz questions in advance of the classroom session.

Students in the Biology course also made use of UCLA’s *Calibrated Peer Review* (CPR) tool to provide peer feedback on laboratory reports (Figure 3).
The social networking application *Facebook* and the group tools in the *Blackboard* learning management system were used by students in the Communication and Child Studies courses to facilitate communication, collaboration and construction of team-based projects. A wiki (e.g., *MediaWiki* server) was used by students as a collaborative writing space in the Business course to co-create a set of class notes, which were used to prepare for the midterm and final exams. And, in the Economics course, students used commercial problem solving software (e.g., *The Learning Manager* (TLM) and *Lyryx Learning*) for low and medium-stake self-assessment exercises throughout the semester. This type of rapid formative assessment provides students and instructors with weekly feedback on student performance (Birenbaum, Breuer, Cascallar, Dochy, Dori & Ridgway, 2006).
Student Perceptions of Assessment Practices and Interactive Learning Technologies

Survey responses suggest that students perceived high value in the above-noted assessment activities and associated use of interactive learning technologies. In terms of course satisfaction, 97% of the students who completed the online survey agreed or strongly agreed that the technologies used in the study courses were appropriate for performing the assessment tasks required (Figure 4). Further, 92% of the students agreed or strongly agreed that they would recommend these courses to other students.

![Figure 4. Appropriate Technologies for Performing the Required Course Assessment Tasks](image)

Students commented in each of the focus groups that the most effective aspects of the seven courses under study were the use of the interactive technologies, team-based project work, and empathetic instructors. Least effective aspects of these courses were the increased workload, lack of clear directions for out-of-class activities, and the emphasis on self-directed learning. In terms of improving the assessment practices in the courses, students recommended that interactive
learning technologies be used to provide more frequent assessment feedback, and that clearer explanation and examples of the required assignments be given. The students also suggested that there should be an increase in the number of low to medium stake assessments, more group work and a better distribution of assignment deadlines throughout the semester (e.g., avoid having all the major papers, projects and exam due in the final weeks).

**Associations between the Use of Interactive Learning Technologies, Engagement and Academic Achievement**

Cronbach alpha coefficients for computed scale scores are summarized in Table 4. All approach or exceed the acceptable level of 0.70 recommended by Nunally (1978).²

**Table 4. Alpha Coefficients for Computed Scales**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Cronbach Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engagement in effective educational practices</td>
<td>0.83</td>
</tr>
<tr>
<td>Active and collaborative learning</td>
<td>0.78</td>
</tr>
<tr>
<td>Student-faculty interaction</td>
<td>0.71</td>
</tr>
<tr>
<td>Level of academic challenge</td>
<td>0.68</td>
</tr>
<tr>
<td>Intensity of course-related technology use</td>
<td>0.69</td>
</tr>
</tbody>
</table>

Correlation coefficients for the association between student final course grades and engagement measures are shown in Table 5. Several small to moderate, statistically significant correlations were observed.

**Table 5. Correlations: Final Grades and Engagement Measures**

<table>
<thead>
<tr>
<th>Variables</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engagement in effective educational practices</td>
<td>0.303**</td>
</tr>
<tr>
<td>Active &amp; Collaborative Learning (ACL)</td>
<td>0.260**</td>
</tr>
<tr>
<td>Level of Academic Challenge (LAC)</td>
<td>0.181*</td>
</tr>
<tr>
<td>Student Interactions with Faculty Members (SFI)</td>
<td>0.148 *</td>
</tr>
</tbody>
</table>

* *p<0.05  ** *p<0.001

To further probe the association between grades and effective educational practices (EEP), and between grades and active and collaborative learning (ACL), one-way ANOVA was conducted to test for differences in final grade by scale score quartile. As shown in Figures 5 and 6, differences in final grade were statistically significant by ACL and EEP score quartile. In both cases, a 10% differential in mean final grade is noted between students in quartiles 1 and students in quartile 4. Effect size (Cohen’s d) was moderate in magnitude in both cases.

![Graph showing final course grades by ACL score quartile]

**ANOVA**
- F=5.27 (p=0.002)
- Effect size: d=0.46

*Figure 5. Final Course Grades by Active & Collaborative Learning (ACL) Score Quartile*
Figure 6. Final Course Grades by Effective Educational Practices Score Quartile

Pearson correlation coefficient for the association between levels of Blackboard use and final grade was 0.270 (p<0.001). One-way ANOVA was significant for differences in student grade by Blackboard usage quartile (F=7.97, p<0.001, Cohen’s d=0.43, see Figure 7).

Figure 7. Final Course Grades by Blackboard Use Quartile
The association between intensity of course-related technology use and final grade was non-significant \((r=0.095, p>0.05)\). Correlations between intensity of course-related technology use, Blackboard use, and engagement measures are shown in Table 6. Moderate to strong correlations were observed between intensity of technology use and each of the engagement parameters.

Table 6. Correlations between Engagement, Blackboard Use and Intensity of Technology Use

<table>
<thead>
<tr>
<th>Engagement Indicators</th>
<th>Blackboard Use</th>
<th>Intensity of Course-related Technology Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engagement in effective educational practices</td>
<td>(r=0.270^{**})</td>
<td>(r=0.643^{**})</td>
</tr>
<tr>
<td>Active and collaborative learning</td>
<td>(r=0.177^{**})</td>
<td>(r=0.482^{**})</td>
</tr>
<tr>
<td>Student-faculty interaction</td>
<td>(r=0.189^{**})</td>
<td>(r=0.413^{**})</td>
</tr>
<tr>
<td>Level of academic challenge</td>
<td>(r=0.187^{**})</td>
<td>(r=0.339^{**})</td>
</tr>
</tbody>
</table>

**\(p<0.01\)**

Discussion

The purpose of this study was to investigate the following three questions:

1. How are instructors designing course assessment activities to incorporate student use of interactive learning technologies?

2. How do students perceive the value of these tools?

3. Is there a correlation between the use of these tools, the level of perceived student engagement in these courses, and academic achievement?

Assessment Practices and Interactive Learning Technologies

With regards to the first question, a number of educational researchers (Thistlethwaite, 2006; Hedberg & Corrent-Agostinho, 1999) have stated that assessment drives learning in higher education. Entwistle (2000) indicates 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.
For example, standardized tests with minimal feedback can lead to memorization and a surface approach to learning while collaborative group projects can encourage dialogue, richer forms of feedback, and deeper modes of learning.

All seven instructors involved in this study commented, in the post-course interviews, about how they are using interactive technologies to design learning activities that provide students with more frequent opportunities for formative self, peer, and instructor assessment feedback. For example, technologies such as blogs, ePortfolios, and web-based problem solving software are being used by the students for self-assessment activities. And, tools such as the calibrated peer review tool, wikis, and clickers are enabling students to provide peer-assessment feedback to their classmates. Instructors, and in some courses external experts as well, are using all of these interactive technologies to observe student performance, diagnose student misconceptions, and provide additional formative assessment feedback. The use of interactive learning technologies to support a triad approach to assessment is illustrated in Figure 8.

Figure 8. Triad Approach to Assessment
An international call for a greater focus on assessment for learning, rather than on assessment for just measurement and accountability of student performance is well documented in the educational research literature (Yeh, 2009). The use of interactive learning technologies to support an increased focus on formative assessment practices may lead to Hattie’s (2009) vision of a visible teaching and learning framework where “teachers SEE learning through the eyes of their students and students SEE themselves as their own teachers” (p.238).

*Student Perceptions of Assessment Practices and Interactive Learning Technologies*

The findings from the online surveys and focus groups clearly demonstrate that students perceive a high value of using interactive learning technologies to complete assessment activities, if these tools help make the process more effective and efficient. Twigg (2003) warns of the dangers of using various forms of technology to create a “course and a half syndrome”. This is the common tendency to use interactive learning technologies to cover too much material and include too many assessment activities in an undergraduate course. Both the students and instructors involved in such a course quickly become overwhelmed with “content” and forget about the “key concepts and ideas”.

*Associations between the Use of Interactive Learning Technologies, Engagement and Academic Achievement*

Consistent with prior research (Carini et al., 2006; Kuh et al., 2007; Kuh, 2008), this study found small to moderate correlations between final course grades and engagement-related measures such as active and collaborative learning, level of academic challenge, student-faculty interaction, and engagement in effective educational practices. This finding suggests that engagement in empirically-supported educational practices is associated with gains in student
learning and development. It is a limitation of the present study, however, that controls for other correlates of achievement such as aptitude, prior achievement and motivation were not in place. It is conceivable that students with the highest aptitude or the greatest motivation were also the students with the highest levels of engagement, raising questions about the observed association between engagement and achievement. Future studies of this type should seek to examine and control for a fuller range of variables thought to influence students’ academic achievement (Pascarella and Terenzini, 2005).

Also consistent with prior research (National Survey of Student Engagement, 2009) was the observed association between intensity of student technology use and measures of engagement. Indeed, moderate to strong correlations were noted between technology use and engagement-related parameters including active/collaborative learning, student-faculty interaction, level of academic challenge, and engagement in effective educational practices. This finding appears to be in keeping with the manner in which interactive technologies were deployed in the courses under study, and suggests that when thoughtfully used, such technologies may have an important role to play in the engagement of today’s learner. Whether technology use is a form of engagement on its own for current students, or a vehicle for engagement in effective educational practices such as active and collaborative learning is unclear (Coates, 2006), but may be a subject of future study.

**Conclusion**

The historical ideal of higher education has been to learn in collaborative communities of inquiry (Lipman, 1991). This study has demonstrated the potential of using interactive learning technologies to design and implement assessment activities to recapture this vision in first year
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. Our hope is that others will be able to use and build upon the results of this project in order to help students at other institutions effectively engage in their academic studies.
References


