

Connected Learning Project Report

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Overview & Objectives.

This project explored whether a large freshman course (50 students) could be reconfigured to utilize connected learning tools and techniques during virtually every class session, as well as between class meetings. The project was conducted in one section of MGMT 120, the initial course taken by all business majors at ACU.

Major Findings

Instructor Observations. The project was designed to assess how well connected learning tools would integrate into an existing, traditionally designed course (as opposed to redesigning a course around the new tools). The functions to be assessed fell into five major categories:

- *Teaching:* actual delivery of course content
- *Reinforcement:* helping students process and store previously presented material
- *Feedback:* giving students information on their performance
- *Interaction:* facilitating communication between student and teacher
- *Administration:* smoothing routine course processes such as attendance checking

In reviewing the course experience it appears that the connected learning tools offered *the least benefit in the administrative area*. This failure was due largely to technical problems. As an example, the process of checking attendance was attempted with a wide variety of device-based solutions; between connection problems, device problems, software problems, and user problems, this seemingly simple process never worked reliably enough to replace traditional methods.

The study also suggests that *the greatest benefits could probably be realized in the teaching area*. Probably the highlight of the experience was the class session on business history, in which small groups of students used their devices during class to explore, and then explain to the class, pivotal events in business history. While less flashy than the history lesson, the integration of *Responseware* also offered enormous benefits in tailoring and targeting the course delivery.

The other three areas appear to offer mixed potential; however given the numerous overlaps between and among the five areas, there are clearly tools which might prove useful in each, depending on a particular teacher's teaching style and the class under consideration.

Student Feedback. Student impressions were measured at multiple points during the semester, and this survey data offers important insights into how the learners perceive the connected learning experience. In summarizing the results, several findings appear noteworthy:

- Students are generally very comfortable with the new technology, and actually express a preference for it in several specific instances (e.g. online syllabus and electronically administered quizzes). However some students are initially quite apprehensive about the devices.
- A typical respondent had experienced technical problems, but still rated the technology highly usable.
- Students strongly agreed that the use of a student response system (e.g. *Responseware*) helped them remain focused during the course period.
- Students felt that the “Bootcamp” class held during week 1 was a major benefit and helped them become familiar with the technology.
- Students are extremely enthusiastic about the feedback benefits of the technology and expressed strong support for the immediate feedback available from online quizzing.

Measurable Outcomes

The project produced several specific outcomes

- Analysis of in-class survey data (briefly summarized above)
- Adams Center faculty presentation (October 2009)
- ConnectedProf website chronicling the experience (www.connectedprof.org)
- Peer-reviewed presentation (slides in Appendix A)
- Peer-reviewed article (included in Appendix B)

Assessment

This project was largely successful, in that it accomplished its objectives of integrating connected learning tools into an existing course. As the researcher and the instructor I found it simultaneously exciting and terrifying, primarily because I never knew from day to day which tools would work and which would not. I invest a great deal of time in planning my class sessions, so this uncertainty was frustrating for me.

As the semester continued, it became apparent to me that there is some conflict between the connected learning tools and the traditional classroom; specifically the traditional class structure is built on an assumption of largely one-way communication, while the connected learning tools provide not only student-teacher interaction, but also a connection to resources outside the classroom. For this reason I concluded that there was something of a misfit between my traditional teaching style and these tools.

Of all the tools I used, I enjoyed the *Responseware* app the most. On multiple occasions I was able to grab students' attention or push them to think in new ways by asking for class responses. On the downside, the software's integration with PowerPoint is somewhat unstable, and there are noticeable lags and delays as the signals travel back and forth between the classroom and the company's servers. Compared to dedicated clickers, this solution still feels a bit unwieldy.

During the spring semester I attempted to implement parts of what I learned in the fall. In particular I launched the course with a detailed “boot camp” experience so that my students would be able to engage fully with their devices and the course delivery. But once again I was struck with the difficulty of adding these new tools to a traditional course structure.


Summary

Going forward I anticipate using some of these connected learning tools and discarding others. It seems clear that a course would need to be extensively redesigned in order to fully take advantage of these tools (as opposed to the experiment described here in which the new tools were ‘bolted on” to a traditional course). For this reason it appears logical to introduce connected learning tools to our faculty in the context of broader training in classroom teaching, rather than as a stand-alone tool.

In addition the tools remain somewhat tech-intensive for the average faculty member, suggesting that we may struggle to broaden our base of connected teachers beyond a core of tech-savvy users. The students, in contrast, appear quite willing to experiment with us, as they seemed far less phased by the technical glitches we encountered than I was. The overall results of this project suggest that these tools hold great potential for improving our students’ learning experiences.


Appendix A
Presentation at Southwest Academy of Management Meeting
Dallas, Texas, 2009

A Brief History



- 2005-2006: LINK team studies technology in ed.
- April 2007: First discussions of mobile learning
- August 2007: Faculty invited to submit proposals (more than half do)
- Feb 2008: ACU announces iPhone/iPod initiative
- August 2008, 2009: Devices given to all freshmen
- Fall 2009: Mark Phillips reassigned from MGMT 436 to MGMT 120

Pillar 2: Reinforcement




- Examples:
 - Creation & evaluation of test items
 - Reading quizzes (auto-graded)

- Exam review with "flash cards"
- Exam recap with commonly missed items
- "Word of the day"



5 Major Ways to Use the Tools


Pillar 3: Feedback



- Examples:
 - Reading quizzes auto-graded (instant feedback)

- Exam recap with commonly missed items
- Review packet with commonly missed items


Pillar 1: Instruction



- Examples:
 - Students choose class topics from list (agile teaching)
 - Comprehension check
 - Attention-grabber

- Asynchronous class sessions
- Supplemental material
- "Word of the day" and other non-classroom activities

Pillar 4: Interaction



- Examples:
 - Students choose class topic from list
 - Students submit questions prior to class (or during)
 - Comprehension check

- Electronic office hours
- Electronically mediated group project

Pillar 5: Administration



- Examples:
 - Reading quizzes auto-graded (immediate feedback)
 - Attendance checking

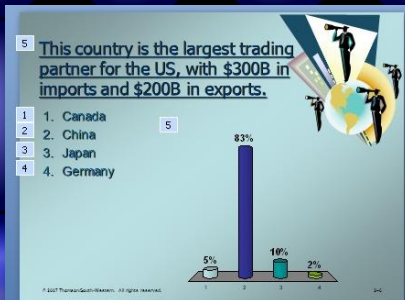
- Electronic office hours

General Perceptions

September 9 survey

	1	2	3	4	5
Usability (mean of 3 items)					3.97
Had technical problems		2.77			
Prefer paper quiz		2.02			
Boot camp helped					3.73
Prefer paper syllabus					3.23
Responsewre helps focus					4.16
VERY comfortable with tech					4.3

Example:



General Perceptions

October 15 survey

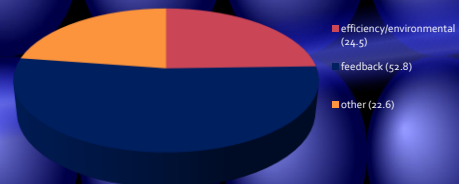
	1	2	3	4	5
Usability (mean of 3 items)					3.7
Had technical problems		2.77			
Prefer paper quiz		2.02			
Boot camp helped					3.73
Prefer paper syllabus					3.23
Responsewre helps focus					4.6
VERY comfortable with tech (iPhone)					4.3



Research in the Connected Classroom (very early findings)

Testing: Preference for Electronic (why?)

- Reading Quizzes on Blackboard
- Reading Quizzes on other systems





**Appendix B
Journal Article**

**Questioning the Answers:
What Mobile Learning Tools Can and Cannot
Do (and Why it Matters)**

Abstract:

Mobile and connected learning tools offer numerous opportunities to improve current higher education models; but as faculty members consider adopting these new tools, many are asking, “Is it worth it?” This article addresses that question, grouping various mobile learning tools into five broad categories based on potential benefits. It also offers specific guidance to early adopters, encouraging them to focus on realistic expectations without overselling the technology’s potential.

Mark Phillips

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Hype-notized

There has been no shortage of hype in the mobile learning sphere, as true believers and evangelists woo, nudge, and sometimes cajole their less tech-savvy colleagues into jumping on the bandwagon. In some cases this encouragement is invaluable, but in others the enthusiasm drifts into the realm of unsubstantiated and unrealistic expectations, setting up these already skeptical adopters for disappointment. With this risk in mind, it appears timely to move beyond general claims and vague promises, and to more clearly define what educators hope to achieve with each of the tools in the connected learning arsenal.³

At one recent academic conference, a group of presenters described their work with personal response systems (PRS or ‘clickers’). The presenters had clearly defined their objectives (increased learning), their measurement standards (the end of course exam), and their threshold for statistical significance. During the discussion of their results, another session attendee confided that he taught an unpopular course, and since he had not yet received tenure, he was using clickers solely because they created a distinct bump in his course evaluations.

Despite their divergent objectives, both the presenters and the third participant succeeded in one respect: *they clearly defined what they hoped to achieve* by implementing the technology tools in their classrooms. Ironically, in this case the two presenters were not able to demonstrate measurable improvements (their analysis produced non-significant results), while the third individual was. These researchers and their very different objectives are just two of the perspectives currently driving the push toward adoption of connected learning tools. Perhaps the greatest danger faced in these early days of mobile learning is that proponents will over-promise and under-deliver. Even more insidious is the temptation to promise much and vaguely imply even more, creating a no-win situation in which even positive results fall short of unrealistically high expectations.

Defining Benefits

As our campus rolls into its second year of equipping every incoming freshman with a connected learning device, we continue to expand our use of mobile learning technologies, both with the addition of new tools and with improved use of existing apps. Approximately half our

students now use connected learning devices, either iPhones or iPod Touches. Our university began this experiment in the hope that we would be able to more clearly define both the costs and benefits of connected learning tools in modern higher education.

At this very early phase of the game, it appears that connected learning techniques fall into five basic categories, identified here by their primary objectives: *instruction, reinforcement, feedback, interaction, and administration*. These are described in detail below and summarized in Table 1.

Instruction

While teachers hope that all of our activities contribute in some way to the learning process, some connected learning tools tie directly to the teaching function. The use of podcasts to provide supplemental material⁴ is a well-studied example of this function. Another example is the use of in-class response systems (PRS) to check student comprehension of a given topic,⁵ enabling professors to adjust their delivery based on progress during a particular class period.⁶

Reinforcement

Repetition, despite its somewhat tarnished reputation, remains an important component of the learning process. Mobile learning tools offer several ways to lead students back to information they have previously covered. Vocabulary packs, downloaded as a review stack, offer a simple way to interactively guide students back through key concepts.⁷ “Word of the day” messages, pushed through RSS or Twitter, provide students with memory keys for difficult concepts, while keeping the material fresh in their minds between class meetings.

Feedback

One of the major shortcomings of large classrooms is a dearth of meaningful feedback. Given the time pressures experienced by professors, feedback tends to be either timely or thorough, but rarely both (and sometimes, neither). Connected learning offers the potential for

feedback to become an integral step in the learning experience, rather than simply a reminiscence of some long-forgotten exercise. Using mobile devices to administer a reading quiz (and provide immediate feedback on the items missed) is one example of enhanced functionality in a traditional practice; with this method the student immediately learns how well she grasped the material, while also receiving reinforcement on the items missed.

Interaction

Particularly in large course sections, students frequently complete an entire semester without actually speaking to the instructor. Connected learning tools offer enhanced opportunities to build community, both between faculty member and student,⁸ and among students. Virtual office hours allow a faculty member to be available without being physically tied to the office; in some cases a student who might never personally visit the office may be willing to text message with a professor. Group PRS exercises also allow student-student and student-teacher interaction, as the teacher monitors each group's responses and 'wanders by' groups which are struggling.⁶ Simple applications are already available to help teachers learn student names and faces before the semester begins, and group collaboration on class projects can be simplified (and accountability improved) with connected tools.

Administration

A surprising amount of teacher effort is still invested in daily administrative tasks. Grading, checking attendance, and sending reminders and updates have all been streamlined by the arrival of inexpensive computing power, but still consume an inordinate number of hours. In many cases, electronically administered exams can be scored automatically, sometimes with detailed feedback.⁹ Attendance in the connected classroom does not have to be manually checked; rather the data is collected from student use of PRSs during the class meeting, and students receive an immediate email when they are absent. Changes to an assignment or the course schedule can be easily communicated when students are already receiving course updates on a regular basis; and while efficiency is not the ultimate aim of a university, the connected campus's potential savings in printing costs alone are enormous.

Not surprisingly, most mobile learning tools offer multiple benefits. In some cases they may offer differing benefits depending on the context in which they are used; one recent example is the Japanese school which issued iPhones to all students primarily to monitor truancy.¹⁰ Several of the uses described above, along with others, are included in Table 1.

Experimentation

During the Fall 2009 term, the author taught one course section of 69 freshmen, each equipped with a connected learning device; this was the author's first connected learning class, as well as the first such experience for most of the students. Participants were required to bring their devices to class. During the term the class explored a variety of ways the devices can be used. Simple administrative tasks such as taking attendance were automated. Reading quizzes were taken online using the phones. Two class sessions were taught via podcast, and numerous class sessions used student response systems for interactive teaching.

As with any new technology, several shortcomings became almost immediately evident. Connectivity issues, both in the wireless access points in the classroom and on some application servers, led to slow connections and frustration for the students; in one extreme example a reading quiz was cancelled due to these problems. In some cases, students were relatively unskilled at using their devices, leading to confusion and interfering with engagement.

Given that these problems were occurring, the instructor repeatedly surveyed the students in order to gauge their perspective on the technology, with their responses provided on a scale anchored at 1 (strongly disagree) and 5 (strongly agree). While acknowledging the various technical problems encountered, the students were overwhelmingly positive about the general connected learning experience. For example, on an item stating that they found the connected learning tools usable, they responded positively (mean of 3.97), while their agreement with a statement that the response system helped them stay focused was even higher (4.16). Also, when given the statement, "I prefer a paper quiz" the responses were largely negative (2.02) despite the technical problems experienced in early electronic quizzes. Qualitative follow-up clarified that students preferred the electronic option primarily due to its ability to provide instant performance feedback.

Connected learning techniques and tools appear to offer several benefits in traditional teaching functions. However their greatest impact is likely to be found as teachers re-orient their teaching style to take advantage of new tools. For example, the use of feedback systems to enable “agile teaching,” in which the students steer the class to their topics of interest, becomes quite feasible with the tools now available. A variety of other techniques also make it possible for teachers of large sections to interact with a much broader segment of the class.

Moving Forward

Connected learning techniques are being slowly adopted in numerous universities and a handful of high schools. What steps can early adopters take to accelerate acceptance of mobile learning tools in their schools? Three recommendations appear useful.

- a. **Be specific about potential gains and avoid overhyped claims.** When user expectations are set too high or too broadly, even a successful implementation feels like a failure. Even worse, disillusioned users become far harder to reach in the future.² Technology adopters must make certain to acknowledge potential problems in advance;¹¹ rather than repelling potential users, this candor may encourage them.
- b. **Meet adopters where they are.** Later adopters are usually less tech-savvy, less enthusiastic for the technology itself, and more pragmatic about the adoption process.¹² Technologists must remember that potential new users are risking embarrassment when adopting unfamiliar technology, and offer the support necessary to reassure new users and protect their self-esteem. What appears to be stubbornness may actually be a fear of public failure¹³ or simply a healthy pragmatism.
- c. **Don’t confuse great tools with great teaching.** Despite their ‘sexiness’ and their amazing capabilities, iPhones and similar devices remain simply tools which must rest on a solid foundation of teaching excellence. Draper and Brown¹⁴ are only two of the many writers cautioning that strong pedagogy is the real engine driving technology-based

classroom improvements. Armstrong and Georgas¹⁵ echo this warning, noting that the increased interaction provided by PRS is beneficial only in the context of good teaching, with technology serving only as a facilitator. Instruction must drive technology, not the reverse.¹⁶

A decade from now, historians will undoubtedly conclude that today's mobile learning tools were, in various ways, both more and less effective than anticipated. By making realistic claims for each of these tools, and clearly noting what each can and cannot do, early adopters are more likely to help, rather than hurt, those who will follow in their footsteps.

Table 1: Sample Activities and Primary Functions

Activity	Primary Function				Admini- stration	Tool
	Instruction	Reinforce- ment	Feedback	Interaction		
Students choose class topic from list	◆			◆		PRS
Exam review with "flash words" for study	◆	◆				Flashcard stack
Exam recap with commonly missed items, grade distribution, etc.		◆	◆		◆	RSS
Students submit questions prior to class	◆			◆		Email
Reading quizzes auto-graded (with immediate feedback)		◆	◆		◆	Blackboard
Attendance checking (and message when absent)			◆	◆	◆	
Comprehension check during class	◆		◆	◆		PRS
"Word of the day" with key terms, etc.	◆	◆				RSS
Electronic office hours				◆	◆	Chat
Electronically mediated group project				◆		Groupware
Asynchronous class days	◆					Podcast
Supplemental class material	◆					Podcast
Creation and evaluation of exam questions	◆	◆		◆		PRS

End Notes

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