By Veronica Diaz, Cindy Jennings, Kelvin Bentley, P. B. Garrett, Barron Koralesky, Christina Royal, and David Starrett

Deploying Research and development, especially in learning technologies, is seemingly cost-prohibitive during this time of fiscal constraint. Yet the ever-growing repertoire of “cloud-based” resources and tools has placed an increasing number of technology innovations within the reach of higher education institutions. These innovations hold the promise of attracting students’ attention, thereby supporting deeper student engagement with learning.1

Innovation Locally

Research and development, especially in learning technologies, is seemingly cost-prohibitive during this time of fiscal constraint. Yet the ever-growing repertoire of “cloud-based” resources and tools has placed an increasing number of technology innovations within the reach of higher education institutions. These innovations hold the promise of attracting students’ attention, thereby supporting deeper student engagement with learning.2
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Deploying Innovation Locally

For many campuses, the question is which of these innovations to support locally. The information in the Horizon Report, published annually by the EDUCAUSE Learning Initiative (ELI) and the New Media Consortium (NMC), can help. The report identifies and describes the key trends and critical challenges associated with those emerging technologies that are likely to have a significant impact on teaching, learning, creative inquiry, and student engagement in higher education over the next five years. It categorizes six areas of emerging technologies within three adoption horizons: a year or less, two to three years, and four to five years. A quick review of the report and its vast collection of examples and practices can serve as the preliminary research needed for an institution to proceed tactically.

This article will address three technologies from the 2010 Horizon Report: electronic books, mobile computing, and open content. Both mobile computing and open content are within the one-year-or-less time-to-adoption; electronic books are in the two-to-three-years adoption horizon. We’ve chosen these three because we believe they have reached a level of maturity and robustness that makes adoption both easier and more affordable. For each technology, we discuss the questions of why, how, and who’s doing it. In the “Why?” sections, we explain the relevance of the technologies to teaching and learning, and especially to student engagement. The “How?” sections provide some low-threshold “on-ramps” that will help those involved in faculty development and in teaching and learning innovation to get started, even if only in a small way, with the technologies. Finally, the “Who’s Doing It?” sections offer easily referenced, application-based examples of institutions that are deploying electronic books, mobile computing, and open content locally.

Electronic Books
Electronic books, or e-books, have the potential to give students and faculty members easier and lower-cost access to instructional content—access well beyond that offered by traditional textbooks.

Why?
E-books can deepen students’ engagement with content in and out of the physical classroom by offering a highly portable, sometimes interactive, access option. Many devices allow students not only to review material but also to annotate and share it, further increasing their ability to interact. Student-content
interactions will be enhanced as e-books include the use of multimedia to further a student’s understanding of key concepts. Students can also benefit from having the ability to revise and create their own e-books, increasing their information literacy.3

A few new technologies and their affordances make e-books an even more attractive alternative to traditional print books. For instance, the Blio eReader software (http://www.blioreader.com) will offer users the ability to add written, voice, and video notes to the Blio e-book content. Another example is Scroll-Motion (http://www.scrollmotion.com/), which will enable existing e-textbooks from four major publishers to be adapted so that they can be viewed on Apple’s iPad, iPod, and iTouch.4

E-book adoption may also provide significant cost savings for students. For-profit intermediaries sometimes offer discounts of up to 50 percent over traditional textbooks. Flat World Knowledge (http://www.flatworldknowledge.com/) contracts with instructors to create open e-book content that students can view online at no cost or can print themselves. But these savings may be tempered by the length of time the content is available and by the printing options associated with e-books. For example, CourseSmart e-book titles (http://www.coursesmart.org) can be downloaded or accessed online through subscriptions that generally last for six months, after which time the subscription can be renewed. The number of pages that can be printed is limited to 15% of the number of pages in the e-book. This is counter to students’ prior ability to own a book indefinitely or sell it back to the bookstore.

Students’ interest in e-books may likewise vary according to cost. A recent study on students’ perceptions of printed and digital textbooks revealed that 70 percent of students preferred to read printed textbooks instead of digital versions if cost were not a factor.5 In addition, 30 percent of respondents indicated they would pay more to have both print and digital versions of their textbooks.

Accessibility of e-book content is closely tied with the devices used to view the content. Several e-reader devices are now available, including Amazon’s Kindle DX, Sony’s Reader, and Apple’s iPad. The iPad, the most recent addition to the e-reader market, sold over 1 million units in the United States within a month of its release, along with over 1.5 million iBooks specifically designed for the iPad.6 Institutions hoping to integrate e-books into their curriculum should carefully consider the devices that are currently owned by, and are affordable for, students.
Deploying Innovation Locally

How?
The adoption and scalability of e-books on an institutional level depends on many factors. As a first step, institutions might survey their students to determine the level of interest in e-book options. In addition, assessing students’ use of and satisfaction with an institution’s initial e-book project can help gauge how to better educate students about availability and use.

Faculty members need to be encouraged to review and discuss the availability of new e-book options for their courses and of e-book options for print textbook titles they are currently using. Faculty members who are considering moving to a new textbook should review both proprietary and open textbook options so that a more informed decision can be made about whether an e-book option will align with course learning outcomes while offering students a flexible instructional resource.

In addition, institutions or departments can increase students’ and instructors’ awareness levels of the various e-book initiatives, many of which are no or low cost. One example is California’s Free Digital Textbook Initiative (http://www.clrn.org/fdti), which collects various e-books for use in K12 and some higher education courses. Connexions (http://cnx.org/) and the Community College Open Textbook Collaborative (http://collegeopentextbooks.org/) both provide links to open, online textbook resources. Faculty and students can access these sites to find open e-books across various subjects.

Faculty members can use different strategies for selecting and adopting e-books. Content, features, availability windows, and prices of e-book titles can be compared across textbook publishers and open e-book repositories. Faculty members can contact colleagues at other institutions to determine which e-books they are using and how students have received those books. Faculty members can also conduct their own pilot studies with a short list of e-books within their disciplines to determine which ones their students find most useful.

Institutions should work closely with faculty to assess students’ use of and satisfaction with assigned e-book content. This collaboration should be as transparent as possible to help an institution demonstrate an ongoing commitment to help its students, faculty, and staff adopt and use e-book content, which can benefit learning across courses and academic programs.

Who’s Doing It?
Northwest Missouri State University (NMSU) began using e-textbooks in 2008 in an effort to reduce its dependence...
on printed books and reduce the costs associated with its rental textbook program. The institution conducted a pilot with students who accessed textbook content with Sony Readers; today NMSU students access e-textbooks primarily using laptops and their learning management system. Reed College recently concluded a mobile learning pilot study using the Amazon Kindle. Although the students found that the platform was easy to read, had good battery life, and was durable, it did not yet meet their needs for annotation and reference during in-class discussion. In the fall of 2010, George Fox University and Seton Hill University will issue iPads to entering freshmen. Seton Hill freshmen will receive an iPad with a MacBook laptop; students entering George Fox will have a choice between an iPad or a MacBook. Some states have developed e-book consortia. For instance, in 2005 the State Library of Ohio created the Ohio e-Book Project (http://ohdbks.lib.overdrive.com/), which is made up of digital collections contributed by libraries across the state. The 11,000-plus e-books in the collection are available in various formats including Adobe EPUB, Adobe PDF, and Mobipocket Reader.

Increasing access to e-readers is helpful, but by itself, this is not enough. It will be important for institutions to document how e-readers and e-books are adapted for classroom use and to highlight how student learning and engagement benefit as a result.

Mobile Computing
Mobile computing has the potential to expand the classroom and further engage students in opportunities to learn through the ever-increasing array of mobile tools and applications available today.

Why?
The International Telecommunication Union expects to see five billion mobile phone subscriptions worldwide in 2010. This trend has significant implications for incoming students, who may be more likely to own cellphones or smartphones and have a high comfort level with their use. In addition to the growth in device adoption, mobile application development is on the rise. In conjunction with phone plan subscription growth, e-reader device sales jumped with the Apple iPad, Amazon Kindle, and others.

Learners’ expectations of the educational experience are rapidly changing, forcing institutions to incorporate more flexible learning and collaboration options into the learning environment—opportunities enabled through a mix of the digital tools that students are likely to find engaging (e.g., mobile devices). Rather than ignoring or even banning the mobile devices that students bring with them, institutions should encourage creative pedagogical uses that allow anytime-anywhere access to content, collaboration, and creation. In addition to providing interactive learning experiences, mobile devices can help students engage with their local environment through GPS, video, and data-gathering functionalities.
Deploying Innovation Locally

How?
Although challenges exist, so also do several low-threshold entry points. Macalester College, a small private liberal arts institution, offers mobile communication and collaboration tools using Google Apps for Education. This suite offers an easy-to-use mobile interface as part of the “software-as-a-service” model and allows the institutional community access from a broad range of devices. Since implementing the tool two years ago, the college has found that students use the various collaborative document tools, the shared calendaring functions, and text-based alerts to facilitate meetings with their professors and group work in their classes.

Learning management systems brought classrooms online, and now many of these systems are expanding to support teaching and learning via mobile platforms. For instance, Moodle has various mobile features under way, such as Moodle for Mobiles and several Smartphone apps (http://docs.moodle.org/en/Mobile_Moodle_FAQ). Blackboard has released Blackboard Mobile Central (http://www.blackboard.com/Mobile/Mobile-Central.aspx) to mobilize its system. These interfaces and applications will allow students and instructors to explore mobile functionality within a learning management system with which they are already familiar.

As noted in the section on e-books, some institutions are experimenting with mobile e-readers. These projects will serve as important laboratories for exploring the frontiers of mobile learning.

Who’s Doing It?
Since mobile computing is close to the adoption horizon, many successful examples at various complexity levels are available. Cuyahoga Community College (Tri-C), a large multi-campus public institution, initiated a mobile learning pilot in 2009 to improve student access, student success, and student engagement in Blackboard e-learning courses. The pilot created important announcements and advisories that students could receive via text message and/or e-mail; (2) build an infrastructure that would enable faculty to communicate important information to their students via text message and/or e-mail; and (3) give students more flexibility by allowing them to receive course information on the mobile learning platform of their choice. The initial pilot consisted of 13 faculty members teaching 60 sections using the Blackboard learning management system. Of the 1,293 total students in these course sections, 8.6 percent (111) participated in the mobile learning pilot. Of the 111 students participating in the pilot, 56 chose text messages only, 9 chose e-mails only, and 46 chose both the text messaging and the e-mail services. During the pilot, 3,453 text messages and 1,812 e-mails were sent to students from their Blackboard course sites. There was a high satisfaction rate (95%) with the service, and many students commented that this functionality assisted them with time management of their e-learning courses. They liked receiving notification to their mobile devices when grades were posted (although no actual grades were sent via text message or e-mail). Students felt more confident that they weren’t missing key announcements, such as assignment due dates or exam reminders. With the success of the pilot, Tri-C has continued offering this service to students enrolling in courses with a Blackboard course site. With the recent launch of Blackboard Mobile Learn, Tri-C faculty and students are now able to access their Blackboard courses on multiple mobile platforms.

George Washington University (GW), a large private urban university, offers another example of a mobile initiative. GW has found that mobile learning tools engage students by providing learning opportunities that equip students with the skills necessary to contribute to today’s technology marketplace. In partnership with GW’s Academic Technologies Department, students from the Computer Science Department developed an application that provides faculty and students with mobile access to academic course listings (including an interactive campus map with building locations), university news feeds, and campus advisories. In addition, faculty and students can upload interactive study guides and flashcards to their mobile devices and share these with others across the university. Involving students in mobile learning management systems brought classrooms online, and now many of these systems are expanding to support teaching and learning via mobile platforms.
application development provided a real-life internship for students while helping them to learn a programming language not taught in the traditional curriculum. Not without its challenges, this project resulted in some cost savings by developing an internal product, the customization of the application to GW’s academic and operational needs, and the utilization of the university’s student labor pool, all while providing students with marketable job skills.

Scalability is an important consideration as institutions move beyond initial pilots to broader deployment. Developing and offering mobile products and services has a cost to the institution and students, and application development for the mobile learning platform requires additional skills and resources. Mobile learning strategies will need to incorporate professional development and training for faculty members to help them understand the pedagogical similarities and differences between traditional classroom, e-learning, and mobile learning environments.

Open Content
Finding a simple and easy entry point onto the broad continuum represented by open content may present more of a challenge than adopting either of the two technologies discussed above. Essential to making informed decisions on how open content might be meaningfully utilized is understanding that rather than a technology per se, open content represents a philosophy, a culture shift, a “way of being” predicated on ideas like community, sharing, and collaboration. Yes, this philosophy is greatly enabled and enhanced by and through technology, but the potential and possibilities derived from expression of an open culture of education really should be first explored, then nurtured, and then practiced.¹²

Why?
John Seely Brown and Richard P. Adler describe a “perfect storm of opportunity” that promises to transform education by fostering “a new culture of sharing, one in which content is freely contributed and distributed with few restrictions or costs.”¹³ The culture of sharing and collaboration around open content supports and expands opportunity for learning and engagement. With this new culture comes a different relational equation between the instructor and the learner. Both participate equally in the educational encounter and have the opportunity to access from the community and share with the community. Through those connections, the experience is enriched and made all the more meaningful than when a course lives entirely in isolation. The open faculty member’s practice is broadened while the open student is afforded the opportunity to participate and contribute in real networked communities of practice.

In addition to offering authentic opportunities to engage students, open content and open resources provide the faculty with access to substantial innovative and just-in-time professional development in the form of personal learning networks around openness and open content/resources. Numerous resource repositories (e.g., OER Commons) allow direct access to some of the most brilliant minds and effective teachers—at no cost.

How?
Institutions can start by exploring open resources and networks and by following open thought leaders, projects, and institutions. An understanding of open content can be developed simply by observing how it works. Finding the shared works of open educators is easy precisely because they write and share their work “in the open.” The EDUCAUSE overview topic page on open educational resources (http://www.educause.edu/Resources/Browse/OpenEducationalResources27863)¹⁴ and the “Open Content” section of the 2010 Horizon Report provide good starting points. The resources available from seminal projects such as MIT OpenCourseWare (http://ocw.mit.edu/), MERLOT (http://www.merlot.org), Open Culture (http://www.openculture.com), and UMWB Blogs (http://umwblogs.org/) are the expression of the open learning culture.

Next, institutions should determine their readiness for openness. The extent to which ideas of openness can or should be embraced is context-dependent and can be explored via the following questions:
Does open content/sharing (and the collaborative spirit that goes with it) fit here?

- How/where does open content/sharing fit?
- How might open content/sharing enrich or inform teaching by faculty and learning by students?
- Which open content resources are students most likely to find engaging?
- What level of technical skill is needed to begin?

The decision to move toward adopting open teaching and learning should be based on a recognition of the challenges involved in creating, sharing, and using open content:

- How should the material be vetted—by the creator and the consumer?
- What about copyright and intellectual property concerns? The Code of Best Practices in Fair Use for OpenCourseWare (http://centerforsocialmedia.org/ocw) from the Center for Social Media at American University provides guidance in the area of fair use and copyright law.
- How should student privacy be protected in open environments?
- What practices of good digital citizenship are important when teaching and learning “in the open”?
- How can the sheer volume of material be dealt with?

Participating in open education and/or using open content does not have to be done on a grand scale. Benefits accrue even with small steps. Institutions can start small with a test drive. In fact, sharing, collaborating, reusing and remixing might be easiest to approach in a departmental-level group of like-minded peers who are willing to support each other in the process. The partnership of one or two colleagues who share similar teaching and research interests may be all that is needed to create a self-supporting open community. Based on this experience, institutions can then consider what use, creation, and sharing of open content means for faculty members, students, and the institution on a larger scale and how learning outcomes will be determined.15

Who’s Doing It?

Examples of successful open content and open educational resources are rich and varied. Some initiatives are more formalized in nature. For example, SmartHistory (http://smarthistory.org/), founded by Beth Harris and Steven Zucker, is a free multimedia art history “web-book.” The University of Michigan’s Open.Michigan (https://open.umich.edu/) and Yale University’s Open Yale Courses (http://oyc.yale.edu/) are examples of institutional initiatives similar to MIT OpenCourseWare and Carnegie Mellon University’s Open Learning Initiative (http://oli.web.cmu.edu/openlearning/). A different approach to rich open collaboration and sharing is Looking for Whitman (http://lookingforwhitman.org/), an online space used by four institutions across courses to explore the poet Walt Whitman’s work in the context of the specific places in which he lived and worked. Other examples of openness and open content are more informal in nature and occur almost continuously as social web tools facilitate sharing and collaboration within professional communities. For instance, communities of colleagues regularly share with and support each other on Twitter in a lively exchange of ideas, content, and resources.

In short, today’s dynamic Web 2.0 environments provide open, immediate, and ongoing access to innovative thinking—whether through formalized institutional repositories or through informal networks and communities facilitated via social media participation.

Conclusion

This article has sought to bring electronic books, mobile computing, and open content to the fore as mature, robust, and in fact quite approachable pedagogical tools with much promise for supporting deeper student engagement. The incremental adoption and local deployment of any of these three technology innovations will allow institutions to expand the instructional environment beyond the classroom. Now, more than ever, students and faculty have options that need not be initiated by their institution’s central IT organization. They can store documents, work collaboratively with peers, publish web pages, and view or share content on their mobile devices—at no cost and completely independent of institutional support. This is not to say that there are no barriers or costs to technology adoption—quite the contrary is true. But multiple points of entry at various cost levels are now pervasive, allowing teaching and learning innovation to persist despite current budgetary conditions. Furthermore, the careful inclusion of thoughtfully selected digital tools as a natural part of the teaching and learning environment has tremendous power to attract students who are accustomed to ubiquitous technology in other areas of their lives, enticing them to focus on and engage with learning activities more fully.
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