Teaching Generation NeXt: Leveraging Technology with Today's Digital Learners

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Faculty struggle to effectively teach our traditionally aged students from Generation NeXt. In addition to issues with academic preparation, academic expectations, consumer orientation, and self-appraisal, esteem, and importance issues, their uses of technology are challenging traditional educational practices (Coates 2007; Hersch and Merrow 2005; Prensky 2001a, 2001b; Taylor 2005, 2006, 2007, 2010, 2011; Twenge 2006; Tapscott 2009).

This generation of digital natives has caught many educators flat-footed (Prensky 2001a, 2001b). Rather than complain about students' technology and online preferences, schools need to embrace technology and leverage it for academic and developmental means and ends. "Old school" and generally low-tech methods, especially the all-too-common lecture on content to passive learners, are proving less and less successful in bringing students to successful learning and developmental outcomes (Arum and Roska 2011; Bok 2006; Taylor 2007; U. S. Department of Education 2006). Hardwired youth have little patience for educational methods they see as outdated, like unidirectional lecturing to rows of passive listeners where they have no opportunity to personalize, offer input, or opine (Pletka 2007).

Bringing Technology to Teaching and Learning

Learner-centered teaching involving pedagogies of activity and engagement, especially those that use recently available Web and technology-based tools and resources, can be more effective than traditional methods but are often not gaining significant levels of use in most schools (Barr and Tagg 1995; Gardiner 1998; Tagg 2003; Weimer 2002). (A learner centered pedagogy is described in more detail by this author in "Teaching Generation NeXt: A Pedagogy for Today's Learners," 2010, and "Teaching Generation NeXt: Methods and Techniques for Today's Learners," 2011, available as downloads at www.taylorprograms.com). Few schools, beyond making online course management systems available, have truly leveraged students' digital preferences and the online-anytime resources available toward learning goals.

Instructional technology is a vast spectrum of equipment and software, each with associated educational and instructional methods and functions, from course management systems to projection devices. This paper focuses on technology to assist with two instructional factors critical to student success: improving students' out-of-class preparation by making content available online and improving in-class student engagement.

Using Technology to Move Content Learning Out of Class

Increasing activity during class time presumes improved student preparation for class, which obviates spending class time with the traditional delivery of content (lecture). Class time is too valuable to spend

delivering content, most of which is readily available and accessible by students out of class. (Barr and Tagg 1995; Gardiner 1998; O'Banion 1999; Pascarella and Terenzini 1991, 2005). Besides the traditional textbook (and newer less-traditional textbooks), online and Web based technologies make content available in forms our wired, digital, visual students from Generation NeXt may prefer. Besides being more attractive than the book and reducing the need to lecture, these new media can offer a level of credibility to our digital learners (Coates 2007; Prensky 2001a, 2001b; Tapscott 2009). Even beyond delivering the content, these resources can also be used effectively to introduce and demonstrate skills with video.

This presumes, of course, that instructors have made clear in their syllabi that preparation is required, how preparation will be assessed, and what the course benefits (points gained) or consequences (points lost) of preparing or not preparing will be. Preparation should be a necessary precondition for class success on a daily basis, with points awarded both for preparing for class and for the activity in class using that brought content.

Online Resources

Many online resources are available for making content available to students. These are generally free and mostly advertisement-free. This is not intended to be an exhaustive listing of online resources, but rather an overview of typical sites. Links are subject to change, and no endorsement is offered or implied for any school or site. As with any online activity, users are encouraged to surf with caution and to make sure that appropriate virus, span and phishing protections are in place.

University sites that make lecture content available, often through "open courses," include

Harvard University: http://www.extension.harvard.edu/open-learning-initiative

MIT: http://ocw.mit.edu/about/ocw-consortium/

New York University: http://www.nyu.edu/academics/open-education.html

Princeton University: http://www.virtualprofessors.com/directory/university/princeton

University of California–Berkley: http://webcast.berkeley.edu/

University of Notre Dame: http://www.notredameonline.com/online-learning/

Utah State University: http://ocw.usu.edu/

Yale University: http://oyc.yale.edu/

Organizational sites that contain aggregated content, often from multiple schools, include

Community College Consortium: http://oerconsortium.org/

The Internet Archive: http://www.archive.org/

Online Education Database: http://oedb.org/library/features/236-open-courseware-collections

Open Content: http://www.opencontent.org

Open Courseware Consortium: http://www.ocwconsortium.org/

Open Culture: http://www.openculture.com/freeonlinecourses

Open Learning Initiative: http://oli.web.cmu.edu/openlearning/

The Open University Learning Space (United Kingdom): http://openlearn.open.ac.uk/

Discipline-specific sites include content, often in interactive formats. Many, but not all, of these sites are advertising free.

Aggregation by Drexel University of Discipline-Specific Sites: http://www.ipl.org/div/subject/

Engineering: http://www.engineering.com/

Fine Arts: http://www.artcyclopedia.com/

Foreign Languages (from the BBC): http://www.bbc.co.uk/languages/

History: http://smarthistory.khanacademy.org/

Human Anatomy: http://www.innerbody.com/htm/body.html

Mathematics: http://amser.org/SPT--Home.php

Physics: http://www.fearofphysics.com/

Apple's iTunes site, which is accessible on other platforms, hosts content posted by schools on school "channels:.

iTunes University: http://www.apple.com/education/itunes-u/

Stanford University: http://itunes.stanford.edu/

Yale: http://itunes.yale.edu/

YouTube also hosts content provided by schools like Columbia, Harvard, MIT, and the University of California at Berkley. Though not organized around school channels like iTunes, content is searchable by topic: http://www.youtube.com/education?category=University.

The Kahn Academy, though primarily designed for K–12 students, deserves special mention for its library of "lecturettes" on topics including algebra, American civics, arithmetic, art history, banking and money, biology, calculus, chemistry, computer science, cosmology and astronomy, developmental math, differential equations, finance, geometry, history, linear algebra, organic chemistry, physics, pre-algebra, precalculus, probability, statistics, and trigonometry: http://www.khanacademy.org/.

Instructor-Created Resources

Some faculty may believe that their own explanations are superior or more appropriate for their students than the available online resources, especially in technical fields or with unique student populations. For these instructors, many resources exist to record, package, and post content to make it available to students in preparation for class. It should be stressed that capturing lectures during class for later viewing is not advocated. The goal is to make lecture content available before class, so that students can access it in preparation, to free class time for learning activities.

Posting Information

Most faculty will post content on their school-provided course management system like Blackboard (http://www.blackboard.com/) or Angel (http://www.angellearning.com/community/higher_ed.html). Instructors without access to these resources or to a dedicated iTunes channel through their school can post directly to YouTube (http://www.youtube.com/) or use an open course management system like Moodle (http://moodle.org/) or Sakai (http://sakaiproject.org/).

Lecture capture Mediasite is a hardware-based lecture capture and webcasting solution (http://www.sonicfoundry.com/default.aspx). Tegrity is a software lecture capture system (http://www.tegrity.com/). Camtasia is an instructional video production software package (http://www.techsmith.com/camtasia/).

Flash video recorders are inexpensive and easy to use. They are especially useful in demonstrating technical procedures, as well as for capturing the delivery of content in a lecture. (It should be noted that the popular Flip video camera is no longer in production and that support from Cisco for software and sharing will end on January 1, 2014.) Some possible flash video recorders are Samsung W200 (http://www.samsung.com/us/photography/camcorders/HMX-W200RN/XAA), Sony Bloggie (http://store.sony.com/webapp/wcs/stores/servlet/CategoryDisplay?catalogId=10551&storeId=10151&langId=-1&identifier=S_Bloggie), and Zoom Q3 and Q3HD (http://www.samsontech.com/zoom/products/handheld-video-recorders/).

An alternative to video is to voice-over a slide set in presentation software, which can then be posted to course management software: Microsoft PowerPoint for PC platforms (http://office.microsoft.com/en-us/powerpoint-help/about-recording-a-voice-narration-for-a-presentation-HP005195030.aspx) and Apple iWork Keynote for Macs (http://support.apple.com/kb/HT3699).

Increase Classroom Learning Activity and Engagement

Possibly the greatest truism in education is that student activity increases learning (Pascarella and Terenzini 1991, 2005). The primary reason class content is moved out of class is to free class time for active learning. Activity necessarily improves engagement, since the active student is an engaged student. A critical first step in student engagement and getting students active is their having some content to be active with.

While the earlier section focused on where content may be available to students in preparation before class, technology can assist in ensuring in real time that students have accesses to these resources and are prepared for class activity. This section describes two types of technology useful during classes to improve and monitor student engagement and improve and monitor student activity: backchannel communication channels and audience response systems.

A backchannel is a line of communication created by people in an audience to connect with others inside or outside of the room, with or without the knowledge of the teacher (Atkinson 2010). In current practice, the classroom backchannel is using networked computers to maintain a real-time online conversation alongside live spoken remarks, specifically inside the room, with teacher involvement. Applications to coordinate the backchannel were first used in conferences and meetings and have migrated to the college classroom. The backchannel can be a platform for students to ask questions, offer interpretations or clarifications, or share the results of group work. Backchannels represent a new leveraging of technology to improve students' opportunities to be actively engaged with the class content and personalize the content and applications, all while potentially reducing existing, often distracting, covert communications. These technologies can be especially engaging with today's digital learners and augment the active learning classroom with new tools for students to actively be engaged with class material. The following are four Web-based backchannel, microblogging, and chat platforms with classroom application. (As always, make sure to consult with campus IT before establishing a relationship with any external hosting platform.)

Chatzy is free and allows for hosting private, restricted chat areas: http://www.chatzy.com/advanced.htm

Edmodo is specifically for educational use: http://www.edmodo.com/

Presently can restrict to an e-mail domain (like a school): http://www.presently.com/

Today's Meet is free for hosting private chat areas and can be linked to Twitter: http://todaysmeet.com/; http://twitter.com/

Audience response systems, or clickers, are powerful tools for keeping students engaged, especially in large classes (Bruff 2009; Caldwell 2007; Duncan 2005). Usually handheld devices or Web-based mobile applications, these tools have evolved greatly in recent years. Modern clicker systems, like those available from Turning Technologies (http://www.turningtechnologies.com/), are reliable and easy to use, and connect each device with its student/user to provide a record of responses, so they are effective in monitoring attendance and for grading. This is especially important as a tool to assess student preparation for class in real time with beginning-of-class quizzes around homework and with transition into subsequent classroom activities contingent on quiz success. Clickers are also effective in increasing activity around peer instruction (Mazur 1997).

As instructors move from ineffective traditional lecture delivery methods to best practices pedagogies built around increasing student activity, engagement, and responsibility for their own learning, a variety of digital and online technologies and resources can maximize teaching effectiveness and student learning outcomes. These include resources to make content available outside class, either on the Web or created and posted to a course management system. Technologies to increase in-class activity and engagement include the use of Web-based backchannels and audience response system "clickers."

Meaningful faculty development using these tools must be provided on something more than a volunteer basis to interested faculty members. It is also critical for faculty to be trained in more effective pedagogies, including the technical, digital, and online resources that are available to facilitate teaching and learning, and are also critical in engaging and gaining credibility with the wired, tech-savvy cohort of students.

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