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Call #: printed

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Borrowing Notes:

Journal Title: TechTrends: Linking Research & Practice to Improve Learning

Walden Ariel

Charge

Maxcost: Walden

Volume: 51 **Issue:** 5

Month/Year: September 2007 **Pages:** p55-61

Shipping Address:

Union, Craig

512 Leaflet Ives Trail

Lawrenceville, GA, 30045

Article Author:

Article Title: Leveraging Web 2.0 in the Redesign of a Graduate-Level Technology Integration Course

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Leveraging Web 2.0 in the Redesign of a Graduate-Level Technology Integration Course

By Kevin Oliver

This article discusses the redesign of a distance education graduate-level technology integration course taken by in-service teachers, highlighting the integration of new web 2.0 tools for learner content interactions and assignments. The course is directed at teachers working on a master's degree and a supplement to their existing teaching license that enables them to serve as a school Instructional Technology Specialist.

Course content is divided into four units designed to give teachers an overview of technology integration and the multiple types of technology that can be integrated.

Unit one covers definitions, standards, and models of technology integration. Integration is demonstrated through lesson plan examples, and tangential topics such as preparing school technology plans and evaluating technology initiatives are discussed.

Unit two shares research findings related to different hardware systems schools may integrate, including handheld tools (GPS, PDAs, probeware), laptops and tablets including 1:1 computing programs, and classroom response systems such as clickers and whiteboards.

Unit three presents research findings related to different software systems schools may integrate, including commercially produced multimedia, tool software such as spreadsheets and databases, multimedia/hypermedia production software, and audio/video production software.

Finally, unit four covers Internet resources and activities schools can integrate, including digital library resources, web 2.0 applications, and collaborative Internet projects.

The Emergence of Web 2.0 and Rationale for Course Inclusion

In the emerging era of the “read-write” web, students can not only research and collect information from existing web resources, but also collaborate and create new information on the web in a surprising number of ways (Richardson, 2005-2006). Web 2.0 is an umbrella term for many individual tools that have been created with web collaboration, sharing, and/or new information creation in mind. Blogging tools are perhaps the most familiar example in the web 2.0 realm with purported education benefits, allowing students to post reflections, book reports, and stories online, and then receive written comments from teachers, other students, or parents within their blog space. Wikis, another commonly cited web 2.0 tool in education, allow students to collaborate on the creation of a web page about some topic under study. *GO2WEB20* is one of several online directories summarizing hundreds of relatively new web 2.0 tools, many of which are free for educators to use (Yakuel & Shahar, 2007).

The decision to redesign this technology integration course and leverage new web 2.0 tools was based on numerous factors. First, web 2.0 includes many emerging applications that fit into units three and four of the course – software tools of all types (tool software, multimedia/hypermedia production tools, and audio/video production tools), and tools that enable teachers to harness Internet resources and foster collaborations. Thus, integrating web 2.0 applications gives teachers practice with the types of tools touted by the course that they can put to use in their own classrooms.

Another reason for integrating web 2.0 tools in the course is tied to their low cost or no cost in most cases. In the past, teachers in this technology integration course had voiced concern over school budgets and not having access to the tools introduced in the course. One student expressed many teachers' discouragement over an inability to apply what they had learned in their own classrooms:

I have learned about so many options for using technology, it makes me want to run back to school and start changing things, but it also makes me feel a little panicked. I have also found a lot of things I would love to try but know that right now it won't happen due to time and budget constraints. [I need to] focus on the positive things I have discovered this semester and keep those impossible ideas in my mind because someday I might be able to get there.

Each of the web 2.0 tools used in the redesigned course were free; they provided every teacher with a set of tools that can be used across multiple school settings from well-resourced to poor, assuming the teacher can occasionally access an Internet-enabled classroom or lab. The free tools also allowed teachers to gain technology experience without the expense of purchasing multiple copies of software programs.

Finally, this distance education technology integration course leveraged the collaborative aspects of new web 2.0 tools, allowing teachers from different parts of the state to work on projects in small groups, contribute to group-built resources, and build a sense of community beyond the usual discussion boards employed in online courses. A few discussion boards were used for introductions and course closure activities, but the class emphasized use of non-traditional web 2.0 tools found outside of typical university course management systems (CMSs). The CMS employed for this course provided a platform for delivering course content and engaging teachers in some limited text-based discussions. The more meaningful interactions and teacher assignments were supported almost entirely by free web 2.0 tools. This may be a transition worth watching as traditional CMSs decline in stature among some instructors, particularly distance instructors who seek better tools for engaging their students in active content processing and peer collaborations.

Course goals and related web 2.0 assignments

Since the fall of 2005, this technology integration course has been taught four times to

approximately 60 in-service teachers. In the first semester, only two web 2.0 tools were included in *Cmap* and wikis, with considerably more emphasis placed on discussion boards in the CMS and teacher use of fee-based software applications such as Hyperstudio, Microsoft Word, and Excel. Over three additional semesters, in response to general teacher disapproval, use of discussion boards has been cut back and assignments requiring fee-based software have been replaced with assignments using free web 2.0 tools such as blogs, *Google Docs* and *Spreadsheets*, *del.icio.us*, and *Trailfire*. Five web 2.0 assignments were included in the most recent section of the course.

Blogging Assignment

One goal for teachers in the technology integration course is to reflect on the integration practice of other teachers and emulate best practices in their own teaching. Blogging is suggested to promote reflective thinking about one's practice (Ray & Hocutt, 2006; West, Wright, Gabbitas, & Graham, 2006). From the multiple hardware, software, and Internet-based technologies introduced in the course, individual teachers select six technologies they are interested in integrating in their own classroom and use the university's *WolfBlogs* tool to post six reflective entries. Each entry must include a short description of the technology, a summary of research findings or shared best practices related to the technology, and a reflection outlining how they would apply the technology to their own classroom. Some teacher blog entries from the course are archived and can be viewed online (Oliver, 2007).

The blog tool allows class members to review each other's entries and to make comments or critiques, but to date, this particular feature has not been introduced into this course. The peer review of blog entries might increase the number of reflections entered, however, as recommended by one teacher who suggested the course should require fewer individual blog entries overall in lieu of more reading and reflecting on classmates' blog entries

Instead of doing six individual blogs, ask students to read their classmates' blogs and post commentaries, which would lead to further discussions and the sharing of possible applications of the course material.

On course evaluations, teacher reactions to blogs were mixed. While 79% of teachers who created blogs (n=29) agreed or strongly agreed that it was a useful assignment, a small group of teachers provided written comments suggesting blogging was the assignment they liked least in

the course. The strategy may not appeal to all learners:

- I didn't enjoy the blogs as much as some other aspects of the class, however I did understand their purpose and appreciated being able to apply the material to my classroom. Plus, it was advantageous to know how to do blogs now, since it was my first time doing them.
- I liked doing the blogs because they gave me six new technology-related ideas to try with my class.
- I hated the blogs, because in my opinion I did not learn anything from them.
- If I have to pick one thing [I enjoyed least about the course], it would be the blog.

Google Docs & Spreadsheets Assignment

Another goal of most technology integration courses is for teachers to learn about "tool" software (Jonassen, 1995). Entire technology integration books have been written on learning with tool software such as word processors, spreadsheets, and databases (Forcier & Descy, 2008). Data sharing projects are popular activities related to spreadsheets and databases in which students from multiple schools collect data on a similar inquiry and then upload their data to share with other schools and even scientists. TERC's Testbed for Telecollaboration established some of the earliest data sharing projects in the 1990s, with students collecting data on ground-level ozone, bird species migrations, and weather patterns (Berenfeld, 1994). Many curricular activities can be designed to make use of extended data sets, including scientific inquiry and mathematical analyses.

A social spreadsheet activity is included in the technology integration course to help teachers understand the value of tool software for analyzing information and of new Internet tools that support data sharing projects across sites. *Google Docs and Spreadsheets* (Google, 2007) are web 2.0 tools that allow multiple users to collaborate and co-edit either word-processed documents or spreadsheets. For the class, links to two social spreadsheets are shared. Over two days, teachers were asked to track either the foods they ate or the television programs they watched, and to enter this information online (see Figure 1). The class then engaged in a conversation about classroom activities that can be fostered by the shared data. Xcelley (Collaboral, 2007) is an additional web 2.0 spreadsheet tool that supports collaborative activities.

Students	Biscuit	Patty	Eggs	Toast	Bagel	Cup	Apple	Salad
3 Bever								
4 Combs	2		2	4				2
5 Denning						2		1
6 Doberstein								
7 Finch								
8 Jessee							2	2
9 Johnson							1	1
10 Kowitz						1		2
11 McConnell								
12 McKay								
13 Oliver								
14 Pollard, A.						2		3
15 Pollard, E.								
16 Thomas			2	4	2			
17 Walton						2		2

Figure 1. Excerpt from group-edited Google Spreadsheet on food consumed over a designated period.

Multimedia Presentation Assignment

For several decades, researchers have investigated the educational value of students using software to produce their own games, multimedia, and hypermedia (Carver, Lehrer, Connell, & Erickson, 1992; Willett, 2007). Another goal of this technology integration course is for teachers to understand this practice known as constructionism, whereby students acquire technology skills, thinking skills, and content knowledge in the process of designing an educational product to teach others. Instead of relying on commercially produced multimedia to teach their students about a concept such as continental drift, teachers can employ tool software and task their students with creating their own related presentation.

In this course, teachers create a multimedia presentation to teach their fellow classmates about some technology integration practice (e.g., ten ways to use concept mapping in business education, basic steps in setting up geocaching or keypal projects, effective uses of classroom response systems, etc.). This assignment is relevant for future Instructional Technology Specialists who will likely be asked to provide training for teachers in a school setting. To complete the assignment, teachers assemble relevant data, images, and media, then plan a presentation that would take a user 10-15 minutes to complete. Finally, teachers are asked to familiarize themselves with one of many web 2.0 tools that will

