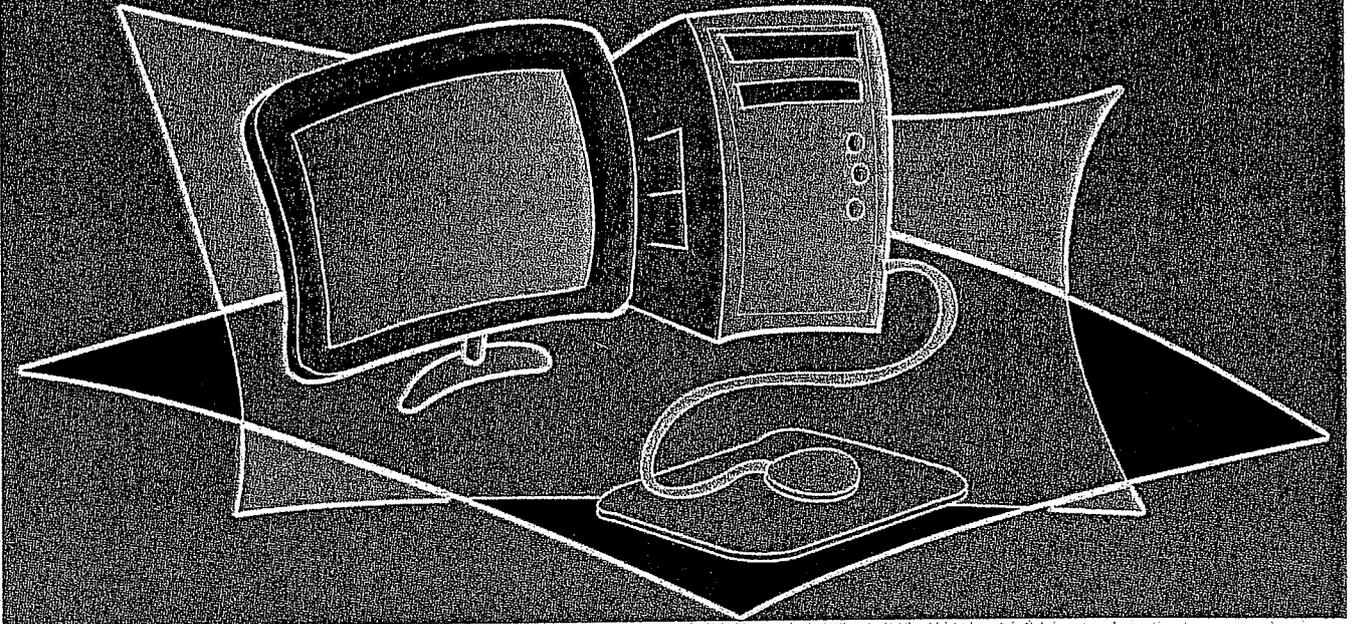


# Blogging to Improve Instruction in Differentiated Science Classrooms



The need for highly qualified science teachers who can differentiate instruction for diverse learners is acute. The authors show how the wise use of classroom blogs, coupled with podcasts and vodcasts, can help teachers extend and differentiate their instruction.

BY MICHAELA W. COLOMBO AND PAUL D. COLOMBO

**T**HERE IS a shortage of science teachers in the U.S.<sup>1</sup> That is a problem because this country's future could depend on our expertise in science and technology. Fortunately, while there is no magic wand to increase the number of qualified science teachers, there is a way to extend the instructional impact of the teachers we have. And the advantage of this method is that it uses a technology that is popular among students and allows teachers to differentiate their instruction for students with diverse needs.

■ *MICHAELA W. COLOMBO is an assistant professor of leadership in schooling at the University of Massachusetts, Lowell. PAUL D. COLOMBO is a high school environmental and physical science instructor in the Science Department, Clinton (Mass.) Public Schools.*

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## SCIENCE INSTRUCTION IN DIFFERENTIATED CLASSROOMS

When thinking about the potential of blogs to increase effective instructional time, it's worthwhile to

first consider how science teachers provide high-quality, differentiated science instruction for all students in the classroom.

For example, consider Ms. Daniels, a (composite) seventh-grade life science teacher, and three of her students. Ms. Daniels has a master's degree in science education and has been teaching life science for eight years. She stays current in her field and has participated in teacher development projects through the National Science Foundation. Over the past three years she has worked to differentiate instruction for the diverse students she teaches. Ms. Daniels teaches English-language learners (ELL students), students with individualized education programs, and gifted and talented students in her heterogeneous, mainstream science classes of 20 to 24 students. She differentiates instruction to help all students learn high-level science content and develop the academic language skills necessary to effectively communicate science concepts. She builds units and lessons around the "enduring understandings" that she and her colleagues have established for seventh-grade life science. She explains, "Helping students focus on the essential questions provides context for learning and keeps students focused. It also allows students to demonstrate their level of understanding in various ways."

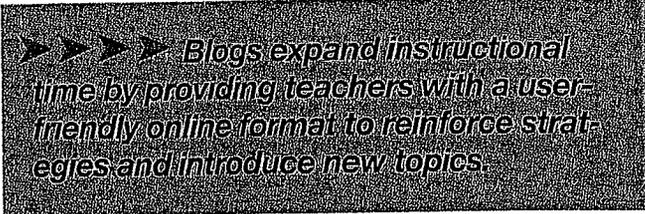
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The students take notes in their daily science journals. Every other week, Ms. Daniels holds individual journal conferences that engage students in academic discussions about their work. She wants students to understand that scientists do not work alone. Students learn to discuss concepts using scientific terms and expressions. In these conferences, Ana uses journal notes to practice the language of science. The conferences allow Robert to verbally express understandings he cannot make clear in writing. And they give Taylor the chance to discuss the links on the class blog that allow her to access more advanced content.

At the beginning of each school year, Ms. Daniels conducts several lessons focusing on text structure. She uses overheads of pages from the science text to demonstrate to the students where and how they can find key concepts, new vocabulary, and important explanations. "Regardless of students' current reading levels, understanding text structure helps them improve their

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Blogs expand instructional time by providing teachers with a user-friendly online format to reinforce strategies, introduce new topics and concepts, review important class points, review for tests, and provide enrichment. Blogs contain text, audio, and video files that are archived on a Web page for easy student access.

The text files are similar to those found on Web discussion boards. These allow students and teachers to engage in written, two-way communication. The audio files, commonly referred to as podcasts (play on demand), allow students to listen to a description or explanation. And the video files, called vodcasts (video on demand), allow students access to a file that combines video with audio.

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- Audacity, podcasting software, available for both Macintosh and Windows, <http://audacity.sourceforge.net/download>.
- WordPress offers two options: open-source blogging software available for Macintosh, Windows, and Linux; users load to their own servers for full blogging capabilities, <http://wordpress.org>. Free blog account including full text and graphic capabilities; participants need to store podcast files elsewhere and link to them, <http://wordpress.com>.

### SOFTWARE FOR PURCHASE

- Camtasia 3.0, podcasting and vodcasting software for Windows, [www.techsmith.com/camtasia.asp](http://www.techsmith.com/camtasia.asp). The cost is \$299.
- ProfCast 1.5, podcasting and vodcasting software for Macintosh, <http://profcast.com/public/index.php>. The cost is \$35.
- QuickTime Pro, podcasting and vodcasting software for Macintosh and Windows, [www.apple.com/quicktime/pro/mac.html](http://www.apple.com/quicktime/pro/mac.html). The cost is \$29.

operating systems of Windows XP or Mac OS X, with a minimum processor speed of 2 GHz and a RAM of 2 GB, are recommended.

## SUPPORTING TEACHERS IN INTEGRATING TECHNOLOGY

While creating and maintaining a classroom blog is not difficult, it is time-consuming, and the effort will not be successful if it is considered as an add-on to a full-time teaching schedule. Successful blogging requires content-area master teachers to rethink current teaching models and to make important decisions regarding the effective integration of technology. Teachers need time to consider how best to adapt content and pedagogy to the online format. They also need time to experiment and to share their work with others

in the same content areas in order to evaluate its effectiveness and to make necessary adjustments.

Teachers also need ongoing access to technology and to professional development that meets their individual needs. Those who are technologically savvy will benefit from experimenting with new technologies and sharing ideas with colleagues; those without technological expertise will need more focused training and sufficient practice time. Less-experienced teachers can review existing educational blogs, develop a sense of what works, and then gradually create their own technology-enhanced educational materials.

## USING BLOGS TO EXTEND SCIENCE EXPERTISE

There is no substitute for qualified science teachers. Blogs, however, can help school systems expand access to science expertise. Consider a seventh grade with eight classes of students, eight teachers, and only one highly qualified science teacher. Even if the qualified teacher teaches four sections of science, the other four sections will be taught by teachers without science licensure. This arrangement may result in little in-depth instruction and even less enrichment. The teachers' assessment of student understanding may be limited to end-of-section check-up questions and tests supplied by the book publisher.

Schools can increase access to science expertise by providing technical support that allows highly qualified science teachers to create text, podcasts, and vodcasts for class blogs; training other teachers to use these blogs with their students; and providing time for the grade-level teachers to meet regularly for discussions. These blogs will also allow students at all levels — and their parents, tutors, and specialist teachers who scaffold their learning — to benefit from the knowledge and skills of a qualified science teacher.

We are currently collecting anecdotal information that will help us determine the effects of science blogs on the achievement of diverse learners in two secondary science courses. We anticipate having preliminary findings during the summer of 2007.

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