

# THE Journal

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## CASE STUDY

Globalizing Education One Podcast at a Time

By Randy Yerrick

Concern for American students' science achievement has reached the cover of *Time magazine*, and the call for improving the preparation and support of math and science teachers goes beyond reformers' usual call for action. The issue has even crossed the lips of our current president's "call to arms" for education in his 2006 State of the Union address. There is a reason for all this concern.

Fourth- and eighth-grade US science students showed little if any measurable differences in achievement from 1995 to 2003, according to studies from the National Center for Education Statistics. American schools also continue to struggle with equity in science teaching and technology for children of color and children from low SES backgrounds. Aspiring visions for American scientific literacy are nothing new, but teaching science is an increasingly demanding task as teachers balance many pressures to teach more inclusively, incorporate new technologies and pedagogies, and improve science test scores.

A continual stream of research demonstrates how expert teachers improve learning when they pay closer attention to multimodality instruction and how inquiry teaching improves student learning. Studies continue to reveal that when expert teachers apply more inquiry teaching strategies and offer students opportunities to perform more authentic tasks, student engagement in classrooms is enhanced as well.

Digital media has emerged as a tool of choice for offering multimodal instruction, integrating content and pedagogy, reaching diverse learners, and complementing science instruction for today's inclusive classrooms. It has also emerged as a venue for bridging access gaps, supplementing instruction, and applying multimodality teaching practices to inclusive classrooms—particularly for capturing and disseminating best practices, as well as capitalizing on resources in web and distance education contexts. Specifically in the science classroom, the power of capturing and replaying historical scientific events in multiple languages, offering portable professional development for teachers, and extending the resources of the science classroom by inviting experts has arrived.

Podcasting can enhance science teaching by:

- Bringing science experts and other resources to teachers and students;
- Providing opportunities to replay significant scientific events and instruction;
- Sharing data and data analysis anywhere and at any time;
- Giving every student virtual access to pristine research facilities and state-of-the-art science demonstrations and simulations;
- Facilitating supplemental instruction through multiple languages;
- Extending the everyday classroom lab experience beyond the classroom walls, and promoting science equity by giving this access to every student; and
- Sharing science teaching artifacts and events for the assessment of excellence in science teaching and learning.

### **Pedagogical Design via Podcasting**

**San Diego State University** (SDSU) has been preparing science teachers using video for several years, and its program has been making strong impacts on their content knowledge, preparation, planning, and their ability to reflect on their actual teaching practices. Teachers at SDSU taking science methodology courses supplemented with digital media through podcasting and web streaming in order to facilitate a more collaborative educational community. During their college years of study, preservice teachers encounter few if any models for teaching science besides lecture, and this is particularly problematic for elementary science teachers. (For related information: [http://ali.apple.com/ali\\_sites/ali/exhibits/1000344/](http://ali.apple.com/ali_sites/ali/exhibits/1000344/), [http://ali.apple.com/ali\\_sites/ali/exhibits/1000056](http://ali.apple.com/ali_sites/ali/exhibits/1000056), [http://www.exchangesjournal.org/classroom/1092\\_Yerrick\\_pg1.html](http://www.exchangesjournal.org/classroom/1092_Yerrick_pg1.html))

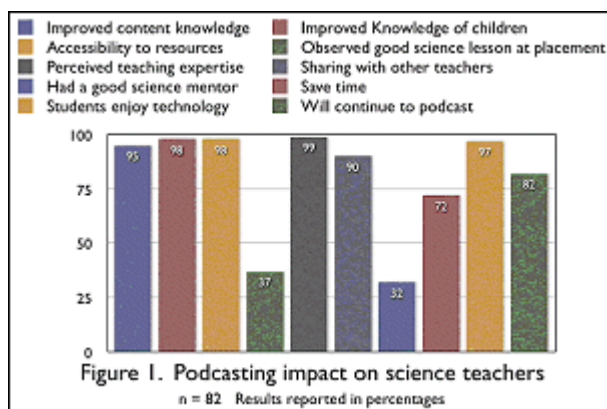
At SDSU, teachers emphasize the importance of providing preservice teachers with opportunities to reflect on science teaching prior to their roles as full-time teachers. The goals of the course are not only to improve their access to innovative pedagogy and educational theory, it is also designed to help preservice teachers understand children's prior knowledge regarding science concepts, as well as to assist teachers in reflecting on their practice. Not only do students have the opportunity to view exemplary lessons, they also edit and publish their own children's interviews and their reflections on teaching. The preservice teachers also conduct interviews with children and create artifacts that help preservice teachers identify access points into children's beliefs, stimulating ideas for ways to use contrary evidence to perturb children's non-scientific thinking.

### **Benefits from Podcasting**

Results from a survey of more than 80 students in their science methods course during a single semester reveal that podcasting has had a significantly positive impact on preservice science teachers' abilities, expertise, and dispositions toward teaching science. Preservice science teachers reported that none had taken courses from professors, prior to this semester, who had used podcasting, making this study unique for at least this university's research program, though web-supported instruction was reported in some form by most students (e.g.; Blackboard, other

web resources).

More than 90 percent of teachers reported that their content knowledge improved as a result of the professor's use of podcasting and knowledge of strategies, and 98 percent of teachers found podcasts to be useful for observing alternative strategies for teaching science according to current reform visions. The preservice teachers reported several positive influences of podcasting on the student learning experience, including: 1) podcasting saves time (78 percent); 2) the high quality of available resources (94 percent); 3) the accessibility of examples anywhere, anytime (68 percent); 4) the students' enjoyment of using technology (98 percent); and 5) the teachers' ability to share teaching examples with other teachers (88 percent). In fact, 82 percent said they planned on continuing podcasting outside of class requirements to improve their teaching.



It is important to note that more than 95 percent of the students felt their knowledge of children's thinking improved and that they are aware of a wider variety of strategies due to podcasting, and that 98 percent feel they are better teachers as a result of using podcasting in preservice courses. In contrast to their science methods experience, less than 40 percent of preservice teachers placed in the field while taking this course reported having support in the public school for teaching science. As such, the only

science lessons most preservice teachers observed were the vicarious immersion into actual teaching events and the thoughtful analysis related to their course supporting their thinking about science teaching. Due to this background learning context, it may be said that because 98 percent of students believed they were better science teachers than when they started utilizing podcasting, in-class support for exploring children's thinking about science, and alternative ways of teaching science to children, podcasting has improved preservice teachers' expertise more than their actual field experience. This is likely attributable to the heavy literacy emphasis they experienced in their teaching assignments, where most of them were discouraged from teaching science (see Figure 1).

### Implications for Future Teaching

There is little disagreement among educators, administrators, government officials, and scholars that science education in America needs serious attention. But when student teaching and field-based contexts don't fully support a teacher's ability to teach science, podcasts can be used to supplement university courses for teacher learning. Teachers are working harder than ever to provide equitable and excellent instruction for all learners on limited time and budgets. Access to media-rich assets, and the ability to easily create and distribute digital media as teaching and learning resources, can make an enormous difference. Podcasting is but one way to enable this kind of professional sharing.

Teachers can post podcasts on a secure website in order to share insights about their students and their reflections for assessment with their assigned mentor. Such a site can also serve as a venue for novice teachers to submit the progress on their thinking about teaching to their mentors and evaluators. In this way, the iPod can play an integral role in exploring learning and sharing insights with other professionals for lifelong learning and ongoing professional development. The greatest contribution to these emerging teachers is the opportunity to be connected with a digital educational community that continues to reflect upon and share best practices. It is through these growing networks of teachers, who share best practices and reflect upon their own practices amid a community of learners, that mentoring excellence for science teaching and learning can be nurtured and promoted.

### Online Resources

- Science for All Americans
- The Nation's Report Card (National Center for Education Statistics)

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