

Workshop 5

Changing Pedagogy

PRINCIPLE: Principal as Designer of Collaborative Learning

FOCUS QUESTION: How can we have collaborative learning and still ensure individual responsibility?

Along with changing curriculum materials, education reform in math and science implies changing classroom teaching and learning strategies. In this workshop, principals discuss ways they can foster effective pedagogy, including cooperative grouping, varying teaching and learning strategies, and giving students self-paced time to explore topics in depth. The first clip looks at what happens when teachers assume too much about what their students are learning.

Preparatory Readings

We suggest that you read the following article, included in the Appendix at the back of this Guide, prior to viewing Workshop 5:

“Revolution in One Classroom” (Cohen)

Workshop5

Video Clips

Jim Carter—Saugus High School

"Minds of Our Own excerpt"

This segment features successful veteran physics teacher Jim Carter at Saugus High School in Saugus, MA, a suburb of Boston. After presenting a unit on electricity, Jim discovers and reflects on why one of his best students has difficulty with the most basic concepts of circuits. Adapted from the award-winning television series *Minds of Our Own*, Program One: "Can We Believe Our Eyes?" (Harvard-Smithsonian Center for Astrophysics, 1994).

Patricia Wasley

"Routines and repertoire"

Patricia Wasley is a researcher, author, and dean of the Graduate School of Education at Bank Street College of Education. In this interview segment, she describes one of her long-term studies in which high school students and teachers were enthusiastic at the beginning of the year, yet by mid-year, this enthusiasm had flagged. In asking why this happened, she discovered one of the factors leading toward better student outcomes: teachers finding the correct balance between routine and repertoire.

Barbara Alcalá—Whittier High School, Whittier, CA

"Learning cooperatively"

Whittier High School in Whittier, CA, a suburb of Los Angeles, has been adopting a number of innovative strategies for teaching and learning and for professional development. Integrated Math/Science teacher Barbara Alcalá describes how she changed from being a traditional teacher to one who uses cooperative student groups on a daily basis. Her students use a variety of techniques to work together to solve equations, graph the results, and present their findings to the class. Adapted from the video "Routines and Repertoire in the Math Classroom" (Annenberg Institute for School Reform, Brown University, 1999).

Dotty Simpson/Jennifer Wright, Mercer Island High School

"Taking the time to understand"

At Mercer Island High School in a suburb of Seattle, WA, two physics teachers are practicing "depth" not "breadth": making sure that their students have time to master fundamental concepts, even if it occupies classroom time that otherwise would be used to cover more material. This segment shows students learning about electric circuits in a way that is not just "hands-on" but "minds-on" as well. Adapted from *Minds of Our Own*, Program One: "Can We Believe Our Eyes?" (Harvard-Smithsonian Center for Astrophysics, 1994).

Workshop5

Discussion Questions

(remember to choose a Structure from those listed on pages 12 to 14)

- How can we make classrooms more exciting for students without losing rigor?
- What kind of teaching leads to real understanding? How do we know when students “get it”?
- How can the teacher really meet the varied needs and skill levels of students when they’re working in groups?
- How can I, as the principal, support risky approaches: the noisy classroom, less coverage, mixed groups?
- What is real understanding? What does it look like?
- Why stress collaborative learning ? Is it just fun or is it effective?
- What do principals have to do if they want collaborative learning to take place in schools?

Bibliography

Chapin, S. *The Partners in Change Handbook: A Professional Development Curriculum in Mathematics*. Boston: Boston University, 1998.

College Entrance Examination Board. *Academic Preparation in Science: Teaching for Transition from High School to College*. New York: College Board Educational Equality Project, 1990.

Guskey, T. R. “Staff Development and the Process of Teacher Change.” *Educational Researcher* 15. 5 (1986): 5-12.

Newmann, F. M., H. M. Marks, and A. Gamoran. *Authentic Pedagogy: Standards that Boost Student Performance*. Madison: Wisconsin Center for Education Research, 1995.

Russell, S. J. *Explorations in Number, Data, and Space*. Palo Alto: Dale Seymour, 1994.

Schifter, D. “Mathematics Process as Mathematics Content: A Course for Teachers.” *Journal of Mathematical Behavior* 12. 3 (1993): 271-83.

Schifter, D. and C. T. Fosnot. *Reconstructing Mathematics Education: Stories of Teachers Meeting the Challenge of Reform*. New York: Teachers College Press, 1993.

Schifter, D., S. J. Russell, and V. Bastable. “Teaching to the Big Ideas.” *Reinventing the Classroom*. Ed. M. Solomon. New York: Teachers College, In Press.

Silver, E. A., J. Kilpatrick, and B. Schlesinger. *Thinking Through Mathematics-Fostering Inquiry and Communication in Mathematics Classrooms*. Educational Equity Project.

Workshop 5

Tobin, K. *Practice of Constructivism in Science Education*. Washington, DC: American Association for the Advancement of Science Press, 1994.

Web Sites

Ask Eric Lesson Plans. Internet Address: <http://ericir.syr.edu/Virtual/Lessons/>

Collaborative Planning Time for Teachers. Internet Address:
<http://www.scsd.k12.ny.us/levy/colab.html>

Explore & Discover: A Museum School Partnership. Internet Address:
<http://world.std.com/~brd/index.html>

EXTEND. Internet Address: <http://www.stolaf.edu/stolaf/other/extend/>

Integrating the Internet. Internet Address: <http://seamonkey.ed.asu.edu/~hixson/index/>

National Education Association, Charting New Frontiers: Creating High Performance Schools.
Internet Address: <http://www.nea.org/resource/perform/html>

Serendip. Internet Address: [http://serendip.brynmawr.edu/Science oriented area](http://serendip.brynmawr.edu/Science%20oriented%20area). Internet
Address: <http://serendip.brynmawr.edu/sci-edu/>

South Central Regional Technology in Education Consortium. Internet Address:
<http://scrtec.org/solutions/>

Teachers helping Teachers. Internet Address:
<http://www.pacificnet.net/~mandel/ClassroomManagement.html>

The Well-Connected Educator. Internet Address: <http://www.gsh.org/wce/>

Other Sources

Global Systems Science (GSS). Lawrence Hall of Science, Berkeley, CA 510-642-9635

Just Think: Problem Solving through Inquiry [Video Series]. NY State Education Dept. Office of
Educational Television and Public Broadcasting. Videocassette 518-474-5862.

Sense Making in Science [Video Series]. Ed. Ann S. Rosebery and Beth Warren of TERC.
Heinemann. Videocassette. 800-541-2086.