

## Book Review

### **Designing Coherent Science Education: Implications for Curriculum, Instruction, and Policy**

Yael Kali, Marcia Linn & Jo Roseman, Editors (Teachers College Press, 2008)

Review by

#### **Andreina Parisi-Amon**

Stanford University  
Palo Alto, California, USA  
[Andreina@stanford.edu](mailto:Andreina@stanford.edu)

The importance of science education is slowly gaining the support it deserves. President Obama stated that "science is more essential for our prosperity, our security, our health, our environment, and our quality of life than it has ever been" (Obama 2009). He recognized that "progress and prosperity of future generations will depend on what we do now to educate the next generation," while announcing a renewed commitment to math and science education and challenging states to improve achievement in these areas. To create and sustain this improvement many areas need to be addressed. These include teaching science within a context providing relevance, tackling the growing population needing language education within their science lessons, and supporting teachers in their endeavors.

In *Designing Coherent Science Education*, Kali, Linn, and Roseman have produced a collaborative editorial effort to unveil these challenges while providing curriculum and policy suggestions to overcome them. The editors begin by arguing for a coherent science curriculum, presenting the science reform of the past six decades. This starts in the 1950s, where the focus was to raise classroom level science to keep the U.S. on the cusp of scientific research. The subsequent reforms dealt with presenting this level of science to students and supporting their teachers.

This historical evidence shows that various obstacles stand in the way of the science education that students deserve, and advocates for a new approach. This approach is 'coherent' in that it interconnects "content *standards*, high-quality *curriculum* current to the science, learning *activities* that foster the development of coherent scientific understanding and literacies, formative *assessments* that can guide instructional support, *teacher development practices* that enhance how practitioners serve the aims of science learning, the roles of *educational leaders* in creating and sustaining science reforms, and the *outcome measures* that provide accountability" (Cavanagh, 11).

This idea focuses the book, leading the editors to tackle the key curriculum topics of promoting integrated understanding, focusing on diverse learners, supporting teachers in curriculum adoption, scaling curriculum advancements, and creating appropriate assessment tools. Much of this knowledge comes from the "Delineating and Evaluating Coherent Instructional Designs for Education" (DECIDE) research project, which brings together the Technology Enhanced Learning in Science (TELS) Center and the Center for Curriculum Materials in Science (CCMS). It is this synergistic compilation of knowledge and creation of new materials that provide the editors with the information they meld together and present in the second section of the book.

Each chapter focuses on a fundamental obstacle in a clearly organized way, beginning with an overview of the issue, presenting relevant examples, and providing a summary with resulting policy implications. At times the book can feel overwhelming, due to the amount and density of the material, but this systematic chapter structure helps guide the reader.

The increasing need for teacher support is shown through the growth of programs such as P-SELL (Promoting Science among English Language Learners) in which teachers undergo professional development to increase their comfort teaching science while learning techniques to embrace the linguistic challenges posed by their students (Cavanagh). While there are individual chapters focusing on teacher support and student diversity, this key point weaves throughout the entire text, promoting the editors' concept of coherence by showing that key challenges do not exist in isolation, but must be approached from all directions.

Another key focus of the book is the policy reform necessary to make the suggested change effective. This recognizes that research and growth purely through classroom initiatives are not enough. Instead, changes in policy, which will result in "major reallocations of resources and substantial rethinking of educational practices" (p. 210) are also required.

*Designing Coherent Science Education* draws knowledge from a variety of sources, through which the editors have created a notable resource manual, well equipped to provide an abundance of sources for continued exploration and learning in the areas touched upon. Beyond this, it is a call to action for all those who genuinely care about the future of science, be they curriculum creators, classroom teachers, school administrators, or policy writers. This packed book is filled with background to explain the importance of each area in need of reform, examples of how to implement new techniques, and policy considerations designed to facilitate sustained improvement.

## References

- Obama, Barack. "Remarks By the President at the National Academy of Sciences Annual Meeting." National Academy of Sciences, Washington, D.C. 27 April 2009.  
[http://www.whitehouse.gov/the\\_press\\_office/Remarks-by-the-President-at-the-National-Academy-of-Sciences-Annual-Meeting/](http://www.whitehouse.gov/the_press_office/Remarks-by-the-President-at-the-National-Academy-of-Sciences-Annual-Meeting/)
- Cavanagh, Sean. "Finding the Language to Teach Science." Education Week. 29 September 2008. Online Access. 26 April 2009.  
[http://www.edweek.org/ew/articles/2008/10/01/06science\\_ep.h28.html](http://www.edweek.org/ew/articles/2008/10/01/06science_ep.h28.html)