

HIGHLIGHTS

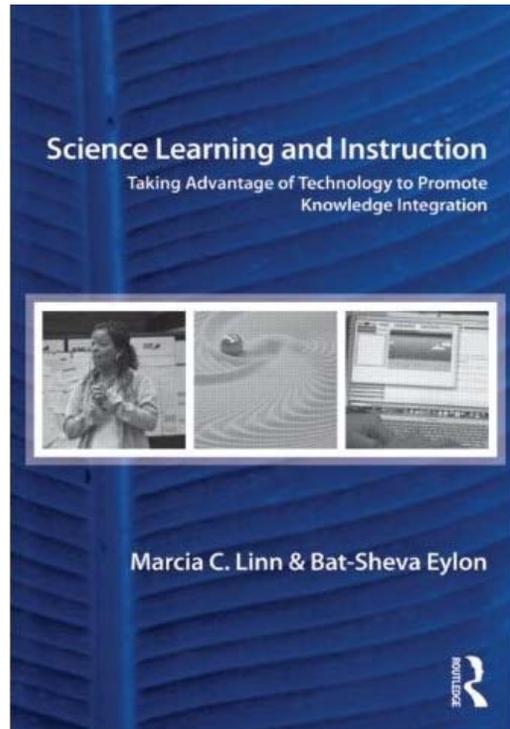
SCIENCE LEARNING AND INSTRUCTION

Science Learning and Instruction: Taking Advantage of Technology to Promote Knowledge Integration by Marcia C. Linn and Bat-Sheva Eylon (Routledge, 2011) describes how everyone can learn science.

It juxtaposes the failure of transmitting knowledge with the success of knowledge integration.

It illustrates the promise of online learning environments to amplify the effectiveness of teachers, take advantage of powerful scientific visualizations and virtual experiments, guide students to develop coherent ideas, and continuously assess students using embedded items. It offers:

- *Undergraduate students* a synthesis of the literature in science education by juxtaposing the failure of transmitting knowledge with the success of knowledge integration.
- *Graduate students* insights into the design of a research programs by illustrating findings for lectures, experiments, science visualizations, collaboration, and professional development.
- *Classroom teachers* guidance for refining their own instruction by describing the knowledge integration pattern.
- *Curriculum designers* the Web-based Inquiry Science Environment (WISE) that makes it easy to create materials following the knowledge integration principles.
- *Researchers* a detailed, constructivist knowledge integration framework that they can use to align instruction, assessment, professional development, and school leadership.



The book attacks the intuitive belief that *transmitting information* is key to learning. Many textbooks, lectures, and even some cookbook-like experiments fail because they are designed to transmit information rather than to help students make sense of scientific ideas.

It shows why adding *motivating features* such as attractive photographs or humorous anecdotes to capture the attention of students are not sufficient to promote coherent understanding. Many educational reforms focus on motivating students to pay attention but then transmit information rather than promoting coherent ideas.

It emphasizes the importance of eliciting and building on the ideas that students bring to science class so they will become lifelong learners. Many programs aim to eradicate *misconceptions* and transmit accurate ideas rather than guiding students to sort out alternative ideas.

It stresses the value of helping students distinguish among ideas so they can critique the many persuasive messages they will encounter in their lives. Many educational reforms call for *active learning*. The knowledge integration framework emphasizes focusing learner activity on

distinguishing ideas and reflecting on progress. It describes ways to empower learners to continuously refine their views and become lifelong science learners.