

Mathematics Fairfax County Public Schools

Constructions of Literacy explores and represents, through a series of cases and commentaries, how and why secondary school teachers and students use literacy in formal and informal learning settings. As used in the context of this book, secondary literacy refers to speaking, listening, reading, writing, and performing. It also refers to how these processes or events are constructed, negotiated, and used for specific purposes by teachers and students as they engage in various classroom, school, and community practices and interactions. The authors operate from a stance that literacy is socially, culturally, and historically constructed. They recognize that there are many different perspectives on how that construction occurs--some arguing for institutional and structural influences--others suggesting that people have some degree of agency within the constraints imposed by larger structures. A distinguishing feature of the volume is that the contributors explore and make explicit differing perspectives on literacy as a social construction. The volume is built around case studies of secondary school teachers' and students' literacy practices inside and outside of schools. The cases include diverse (critical, cultural, feminist, interpretive, phenomenological, and postmodern) theoretical and epistemological perspectives and research methodologies, making this one of the first collections of studies in secondary content area classrooms conducted from multiple perspectives. It concludes with two Commentaries, one by Donna Alvermann and one by David Bloome, in which they discuss and critique the contributions made from the different perspectives and grapple with how they simultaneously illuminate and confuse issues in literacy theory, research, and practice. Preservice and in-service teachers, school professionals, and researchers in literacy education, secondary education, and curriculum theory will find this book stimulating and informative. It will help them analyze the complexities of secondary literacy teaching and learning, and examine their own understandings of literacy within their own literacy contexts.

Theory and Practice of Lesson Study in Mathematics An International Perspective Springer

The Research Review for School Leaders, Volume III is specifically designed as a practical resource for school leaders whose schedules preclude opportunities to locate and review key research on every issue they must address. It places comprehensive, current, and accessible reviews of educational research at their fingertips, and is organized to make the research and practices it summarizes useful to them in their professional endeavors. This is the third volume of the Review. Although the title has changed, its purpose and substance is continuous with the work of the earlier volumes. The first Annual Review of Research for School Leaders (1996) summarized research on the status of public schooling, interdisciplinary curriculum, and educational applications of computers. The second volume (1998) addressed the topics of middle-level education, the extracurriculum, mathematics education reform, and drop outs. The present Volume III offers educational leaders reviews of research on five timely educational issues: * citizenship education; * multicultural education; * gifted and talented education; * classroom assessment; and * scheduling. A basic premise of this volume is that, to make sound decisions, professionals need to be up to date on current research related to the problems with which they grapple. A second premise is that research cannot simply be imposed in a formulaic way on a local setting; the nature of the particular problem to be solved will always bear upon the relevance of research to a specific context. Thus, this volume is envisioned as a helpful resource for school leaders as they engage in important discussions of the research with teachers, school board members, parents, and other interested parties as they collaboratively seek effective resolutions to local educational problems.

The purpose of this volume is two-fold. First, the book attempts to initiate a research-based dialogue from a variety of perspectives specifically about teacher training and teaching in the context of student linguistic and cultural diversity; and, second, to cast a wide net over three major areas of professional development that have the potential to impact on teacher quality and on the educational services provided to ELLs at all levels of instruction. This book represents a first attempt to a quiet revolution going on in teacher education (Johnson, 2000). It allows the reader to uncover research activities and experiences that constitute individual teacher education program initiatives. A revolution, because it is stirring the very essence of what stands at the core of teacher education, a core that has long been based more on training to teach monolingual English speaking students and less on teaching ELLs, their first and second language development, using their bilingualism to teach academics, and on the process of becoming an effective teacher of ELLs. This state-of-the-art review brings together research on effective pedagogy and teacher training. The nine feature chapters are directly concerned with effective new structures and practices for professional development and are presented in a framework that considers a wide spectrum of topics to address issues such as: what teachers need to understand about English language learners, what kind of professional experiences are likely to facilitate those understandings, and what kinds of teacher education programs and school settings are able to support their ongoing learning. The authors also discuss the implications of their work for helping English language learners connect and benefit from school from the points of view of (1) school reform, (2) teachers' bilingual proficiencies, (3) teachers' knowledge and beliefs, and (4) teacher training programming and sustainability.

Each vol. a compilation of ERIC digests.

What makes girls avoid math, science, and technology in school? And what can teacher educators do to help new teachers keep this from happening so that all of our children's talents can find expression? These two volumes provide teaching materials and background information on gender equity for teacher educators in mathematics, science, and technology education and their students. A practical guide, Gender Equity Right from the Start is usable by professors of education for preservice teachers and by staff

developers for in-service teachers. By adapting the material for other subjects, it can also be used by teacher educators in content areas other than math, science, and technology. It consists of two volumes: Instructional Activities for Teacher Educators in Mathematics, Science, and Technology contains some 200 teaching activities on the major issues in gender equity, emphasizing solutions and not just problems. Activities take place in out-of-class assignments and field experiences whenever possible to minimize demands on class time. Sources and Resources for Education Students in Mathematics, Science, and Technology contains student materials needed for the activities as well as extensive print, electronic, organizational, and other resources for further information.

Make math matter to students in grades 5 and up using Math Projects! This 64-page book provides exciting individual, partner, and small-group projects that promote creative problem solving. Students compute, read, write, and utilize social and artistic skills with the more than 50 projects! The book supports NCTM standards and aligns with state, national, and Canadian provincial standards.

This book conceptualizes the nature of mathematical modeling in the early grades from both teaching and learning perspectives. Mathematical modeling provides a unique opportunity to engage elementary students in the creative process of mathematizing their world. A diverse community of internationally known researchers and practitioners share studies that advance the field with respect to the following themes: The Nature of Mathematical Modeling in the Early Grades Content Knowledge and Pedagogy for Mathematical Modeling Student Experiences as Modelers Teacher Education and Professional Development in Modeling Experts in the field provide commentaries that extend and connect ideas presented across chapters. This book is an invaluable resource in illustrating what all young children can achieve with mathematical modeling and how we can support teachers and families in this important work.

"Hands Down, Speak Out is an innovative book that looks at how we can teach students how to talk and listen to one another, without all discourse running through the teacher. Kassia is a math coach and Christy is a literacy coach. Together, they show how to teach dialogue "micro-lessons" alongside content, both within and across math and literacy, so students become increasingly skilled and independent in conversations. Their hope is that students will have better, deeper discourse within the content areas, and also beyond the classroom"--

The United States must restructure mathematics education--both what is learned and the way it is taught--if children are to develop the mathematical knowledge and skills they will need to be personally and professionally competent in the twenty-first century. Joining the recent reports that have opened a national dialogue on these issues, Reshaping School Mathematics focuses discussion on essential ideas that transcend details of current curricula or assessment results. It examines changing perspectives on the role of mathematics in society and changing practice in the use of technology--particularly calculators and computers--in mathematics education.

Teacher-tested Math Games is designed for fifth and sixth grade students to use various math skills while applying strategy to correctly solve three problems in a row to win each of the games. Concepts covered include place value, math operations, estimation, fractions, decimals, percents, proportions, properties, patterns, algebra, measurement, geometry, scale, data analysis, and problem solving. Meets NCTM standards and is correlated to state, national, and Canadian provincial standards. 128 pages

In order to compete in the modern world, any society today must rank education in science, mathematics, and technology as one of its highest priorities. It's a sad but true fact, however, that most Americans are not scientifically literate. International studies of educational performance reveal that U.S. students consistently rank near the bottom in science and mathematics. The latest study of the National Assessment of Educational Progress has found that despite some small gains recently, the average performance of seventeen-year-olds in 1986 remained substantially lower than it had been in 1969. As the world approaches the twenty-first century, American schools-- when it comes to the advancement of scientific knowledge-- seem to be stuck in the Victorian age. In Science for All Americans, F. James Rutherford and Andrew Ahlgren brilliantly tackle this devastating problem. Based on Project 2061, a scientific literacy initiative sponsored by the American Association for the Advancement of Science, this wide-ranging, important volume explores what constitutes scientific literacy in a modern society; the knowledge, skills, and attitudes all students should acquire from their total school experience from kindergarten through high school; and what steps this country must take to begin reforming its system of education in science, mathematics, and technology. Science for All Americans describes the scientifically literate person as one who knows that science, mathematics, and technology are interdependent enterprises with strengths and limitations; who understands key concepts and principles of science; who recognizes both the diversity and unity of the natural world; and who uses scientific knowledge and scientific ways of thinking for personal and social purposes. Its recommendations for educational reform downplay traditional subject categories and instead highlight the connections between them. It also emphasizes ideas and thinking skills over the memorization of specialized vocabulary. For instance, basic scientific literacy means knowing that the chief function of living cells is assembling protein molecules according to the instructions coded in DNA molecules, but does not mean necessarily knowing the terms "ribosome" or "deoxyribonucleic acid." Science, mathematics, and technology will be at the center of the radical changes in the nature of human existence that will occur during the next life span; therefore, preparing today's children for tomorrow's world must entail a solid education in these areas. Science for All Americans will help pave the way for the necessary reforms in America's schools.

Jessica Shumway has developed a series of routines designed to help young students internalize and deepen their facility with numbers. The daily use of these quick five-, ten-, or fifteen-minute experiences at the beginning of math class will help build students' number sense. --from publisher description

Engage students with a rich curriculum that strengthens their capacity as learners and thinkers! Every learner is somewhere on a path toward expertise in a content area. This resource promotes a model for developing high-quality curriculum that moves learners along the continuum toward expertise and provides sample units and rubrics to help implement differentiated curriculum. Teachers can use four curriculum parallels that incorporate Ascending Intellectual Demand to: Determine current student performance levels Appropriately challenge all students in each subject area Extend the abilities of students who perform at advanced levels Provide learning activities that elevate analytical, critical, and creative thinking

Teacher education is an evolving field with multiple pathways towards teacher certification. Due to an increasing emphasis on the benefits of field-based learning, teachers can now take alternative certification pathways to become teachers. The Handbook of Research on Field-Based Teacher Education is a pivotal reference source that combines field-based components with traditional programs, creating clinical experiences and “on-the-job” learning opportunities to further enrich teacher education. While highlighting topics such as certification design, preparation programs, and residency models, this publication explores theories of teaching and learning through collaborative efforts in pre-Kindergarten through grade 12 settings. This book is ideally designed for teacher education practitioners and researchers invested in the policies and practices of educational design.

This easy-to-read summary is an excellent tool for introducing others to the messages contained in Principles and Standards.

Designed to promote reflection, discussion, and action among the entire learning community, Educating Everybody's Children encapsulates what research has revealed about successfully addressing the needs of students from economically, ethnically, culturally, and linguistically diverse groups and identifies a wide range of effective principles and instructional strategies. Although good teaching works well with all students, educators must develop an extensive repertoire of instructional tools to meet the varying needs of students from diverse backgrounds. Those tools and the knowledge base behind them are the foundation of this expanded and revised second edition of Educating Everybody's Children. Each strategy discussed in the book includes classroom examples and a list of the research studies that support it. The most important thing we have learned as a result of the education reform movement is that student achievement stands or falls on the motivation and skills of teachers. We must ensure that all teachers are capable of delivering a standards-based curriculum that describes what students should know and be able to do, and that these standards are delivered by means of a rich and engaging "pedagogy of plenty." By these two acts we can ensure that all schools will be ready and able to educate everybody's children.

Traditionally, small-group math instruction has been used as a format for reaching children who struggle to understand. Math coach Kassia Omohundro Wedekind uses small-group instruction as the centerpiece of her math workshop approach, engaging all students in rigorous "math exchanges." The key characteristics of these mathematical conversations are that they are: 1) short, focused sessions that bring all mathematical minds together, 2) responsive to the needs of the specific group of mathematicians, and 3) designed for meaningful, guided reflection. As in reading and writing workshop, students in Kassia's math workshop are becoming self-directed and independent while participating in a classroom community of learners. Through the math exchanges, students focus on number sense and the big ideas of mathematics. Teachers guide the conversations with small groups of students, mediating talk and thinking as students share problem-solving strategies, discuss how math works, and move toward more effective and efficient approaches and greater mathematical understanding. Although grounded in theory and research, Math Exchanges is written for practicing teachers and answers such questions as the following: How can I use a math workshop approach and follow a certain textbook or set of standards? How should I form small groups? and How often should I meet with small groups? What should I focus on in small groups? How can I tell if my groups are making progress? What do small-group math exchanges look like, sound like, and feel like?

FAST Math is a mathematics program designed for non-native speakers of English who have limited backgrounds in formal educational settings. The curriculum is based on the Fairfax County Mathematics Program of Studies, grades 1-6 and classes are provided at the high school, middle school, and upper elementary grade levels.

Teacher-tested Math Games is designed for seventh and eighth grade students to use various math skills while applying strategy to correctly solve three problems in a row to win each of the games. Concepts covered include place value, math operations, estimation, fractions, decimals, percents, proportions, properties, patterns, algebra, measurement, geometry, scale, data analysis, and problem solving. Meets NCTM standards and is correlated to state, national, and Canadian provincial standards. 128 pages

A strong chemical workforce in the United States will be essential to the ability to address many issues of societal concern in the future, including demand for renewable energy, more advanced materials, and more sophisticated pharmaceuticals. High school chemistry teachers have a critical role to play in engaging and supporting the chemical workforce of the future, but they must be sufficiently knowledgeable and skilled to produce the levels of scientific literacy that students need to succeed. To identify key leverage points for improving high school chemistry education, the National Academies' Chemical Sciences Roundtable held a public workshop, summarized in this volume, that brought together representatives from government, industry, academia, scientific societies, and foundations involved in outreach programs for high school chemistry teachers. Presentations at the workshop, which was held in August 2008, addressed the current status of high school chemistry education; provided examples of public and private outreach programs for high school chemistry teachers; and explored ways to evaluate the success of these outreach programs.

This book brings together and builds on the current research efforts on adaptation, conceptualization, and theorization of Lesson Study (LS). It synthesizes and illustrates major perspectives for theorizing LS and enriches the conceptualization of LS by interpreting the activity as it is used in Japan and China from historical and cultural perspectives. Presenting the practices and theories of LS with practicing teachers and prospective teachers in more than 10 countries, it enables the reader to take a comparative perspective. Finally, the book presents and discusses studies on key aspects of LS such as lesson planning, post-lesson discussion, guiding theories, connection between research and practice, and upscaling. Lesson Study, which has originated in Asia as a powerful effective professional development model, has spread globally. Although the positive effects of lesson study on teacher learning, student learning, and curriculum reforms have been widely documented, conceptualization of and research on LS have just begun to emerge. This book, including 38 chapters contributed by 90 scholars from 21 countries, presents a truly international collaboration on research on and adaptation of LS, and significantly advances the development of knowledge about this process. Chapter 15: "How Variance and Invariance Can Inform Teachers' Enactment of Mathematics Lessons" of this book is available open access under a CC BY 4.0 license at link.springer.com Theory and Practice of Lesson Study in Mathematics: An International Perspective shows that the power of Lesson Study to transform the role of teachers in classroom research cannot be explained by a simple replication model. Here we see Lesson Study being successful internationally when its key principles and practices are taken seriously and are adapted to meet local issues and challenges. (Max Stephens, Senior research fellow at The University of Melbourne) It works. Instruction improves, learning improves. Wide scale? Enduring? Deep impact? Lesson

study has it. When something works as well as lesson study does, while alternative systems for improving instruction fail, or only succeed on small scale or evaporate as quickly as they show promise, it is time to understand how and why lesson study works. This volume brings the research on lesson study together from around the world. Here is what we already know and here is the way forward for research and practice informed by research. It is time to wake up and pay attention to what has worked so well, on wide scale for so long. (Phil Dara, A leading author of the Common Core State Standards of Mathematics in the U.S.)

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