

RESEARCH BOOKS AND SPECIAL ISSUES

Barbeau, E. & Taylor, P.J. (eds). (2009). *Challenging Mathematics in and Beyond the Classroom (The 16th ICMI Study)*. New York: Springer

Abstract: The last two decades have seen significant innovation both in classroom teaching and in the public presentation of mathematics. Much of this has centered on the use of games, puzzles and investigations designed to capture interest, challenge the intellect and encourage a more robust understanding of mathematical ideas and processes. ICMI Study 16 was commissioned to review these developments and describe experiences around the globe in different contexts, systematize the area, examine the effectiveness of the use of challenges and set the stage for future study and development. A prestigious group of international researchers, with collective experience with national and international contests, classroom and general contests and in finding a place for mathematics in the public arena, contributed to this effort. The result, *Challenging Mathematics In and Beyond the Classroom*, deals with challenges for both gifted as regular students, and with building public interest in appreciation of mathematics.

Karp A. & Leikin R. (2011). *Mathematical gift and promise: Exploring and developing*. Special issue in *Canadian Journal of Science, Mathematics and Technology Education*.

This special issue is aimed at promoting discussion of achievements and unresolved questions in the field of the education of the mathematically gifted. The education of the mathematically gifted has been and remains a phenomenon with a contradictory fate. On the one hand, the importance of developing students' mathematical gifts is not questioned by anyone. On the other hand, however, attention to the gifted is sometimes interpreted as elitism, and indeed the methods for selecting the gifted that were employed over the course of the last century do not always seem objective and acceptable today. The topics, approaches, and styles of the articles published in this issue are indeed quite varied. The editors believe that such variety reflects the need to study the different sides of the complex phenomenon with which we have to deal. The editors hope that this issue will be interesting and useful for mathematics educators and researchers, pointing to different aspects of and areas for possible research on gifted mathematics education and attracting new educators and researchers to them.

Krutetskii, V. A. (1976). *The psychology of mathematical abilities in schoolchildren*. Translated from Russian by Teller, J.; Edited by Kilpatrick J. & Wirszup, Chicago: The University of Chicago Press.

Abstract:

Leikin, R. & A. Berman (Eds.) (2010). *Intercultural aspects of creativity in mathematics: Challenges and barriers. Special issue [9(2)] of the Mediterranean Journal for Research in Mathematics Education.*

Abstract: The University of Haifa, and the Israel Institute of Technology (Technion), in partnership with the John Templeton Foundation, convened a workshop of mathematicians and mathematics educators to explore the connections between culture, creativity, and the learning and teaching of mathematics, February 29 to March 1, 2008. In attendance were 28 leading scholars and educators from 14 countries in the Near East and former Soviet Union. Among the participants was Rena Subotnik, Director of the Center for Psychology in Schools and Education at the American Psychological Association (APA).

The goal of this workshop was to implement intercultural conversation in the service of learning and teaching mathematics. Focusing teachers, mathematicians, and researchers on the cultural constructs that their students bring to the classroom may help them to perform their difficult and delicate tasks more effectively. The participants in this workshop sought ways to connect the diversity of human cultures with the gift of human creativity.

Leikin, R., A. Berman & B. Koichu (Eds.) (2009). *Creativity in mathematics and the education of gifted students. Rotterdam, the Netherlands: Sense Publisher.*

Abstract: This book breaks through in the field of mathematical creativity and giftedness. It suggests directions for closing the gap between research in the field of mathematics education and research in the field of creativity and giftedness. It also outlines a research agenda for further research and development in the field. The book consists of a balanced set of chapters by mathematicians, mathematics educators, educational physiologists and educational researchers. The authors of different chapters accept dynamic conception of creativity and giftedness. The book provides analysis of cognitive, affective and social factors associated with the development of creativity in all students and with the realization of mathematical talent in gifted students. It contains theoretical essays, research reports, historical overviews, recommendations for curricular design, and insights about promotion of mathematical creativity and giftedness at different levels. The readers will find many examples of challenging mathematical problems intended at developing or examining mathematical creativity and giftedness as well as ideas for direct implementation in school and tertiary mathematics courses. They will also find theoretical models that

can be used in researching students' creativity and giftedness. Research reports enlighten relationships between excellence in mathematics and creativity and examine different aspects of inquiry-based environment as a powerful way for developing mathematical creativity in school students. The readers can also learn about characteristics of creativity of research mathematicians. The book may be of interest to a broad audience of readers, from mathematicians and mathematics educators to mathematics teachers, psychologists and parents of mathematically promising children.

O'Brien, P. (1998). *Teaching scientifically able pupils in the primary school.* Oxford: NACE.

Abstract: Background to children's understanding of science concepts with particular reference to the education of able children in primary schools.

Pfeiffer, S. and Limburg-Weber, L. (eds.) (2003). *Early gifts: Recognizing and nurturing children's talents.* Waco, TX: Prufrock Press.

Abstract: *Early Gifts: Recognizing and Nurturing Children's Talents* offers solid advice and guidance for parents of gifted and talented children of preschool and elementary school age. The book shows parents and educators ways to identify a child's area of talent; support and nurture that talent both at home and at school; and strategies parents can use to ensure their gifted child grows to be a happy, healthy adult. The authors, leading experts in the field of gifted and talented education, discuss how to recognize and nurture talent in preschool and elementary school-aged children.

An introductory chapter provides a framework for understanding the major contributing factors to the development of talent, including the home, the school, outside programs, and the personality of the individual child. The following seven chapters each deal with a major area of talent. The talent areas discussed include:

- science,
- mathematics,
- language arts,
- musical talent,
- dramatic arts,
- performing arts, and
- sports.

In each chapter and for each talent, early behaviors indicative of potential talent are presented. The authors of each chapter discuss how parents can create a home environment that both elicits and develops their child's special abilities through activities, games, and play.

Saul, M., Assouline, S.; and Sheffield, L. J., (eds.) (2010). *The Peak in the Middle: Developing Mathematically Gifted Students in the Middle Grades*. Reston, VA: NCTM.

Abstract: Good teaching is responsive to individual differences, tailoring instruction to meet the needs of individual learners. In gifted education, students need a curriculum that is differentiated (by level, complexity, breadth, and depth), developmentally appropriate, and conducted at a more rapid rate. This collection of essays from experts in the field addresses the particular needs educational institutions have in serving their gifted students. Topics include policy and philosophy; specific program models; supplemental materials and programs; knowledge and skills that teachers need in their work; international opportunities and possibilities; and equity.

Many of the points raised are as valid for general education students as for gifted students. Many relate equally well to high school or elementary school. And many apply across the curriculum – not just to mathematics.

Sheffield, L. J. (2003). *Extending the challenge in mathematics: Developing mathematical promise in K - 8 pupils*. Thousand Oaks, CA: Corwin Press.

Abstract: This guide provides the practical tips and tools educators need to help their mathematically promising students develop their potential to the fullest.

Sheffield, L. J. (Ed.) (1999). *Developing mathematically promising students*. Reston, VA: NCTM.

Abstract: This book, written on the recommendation of the Task Force on Mathematically Promising Students, investigates issues involving the development of promising mathematics students. Recommendations are made concerning topics such as the definition of promising students; the identification of such students; appropriate curriculum, instruction, and assessment; cultural influences; teacher preparation and enhancement; and appropriate next steps.

Sheffield, L. J., Bennett, J., Berriozábal, M., DeArmond, M., and Wertheimer, R. (1995). Report of the task force on the mathematically promising. Reston, VA: NCTM News Bulletin, Volume 32.

Abstract: The NCTM Task Force on Promising Students consists of five educators who represent a number of different constituencies including public schools, programs for promising students, parents, universities, and researchers. The task force had an initial meeting at the NCTM Annual Meeting in Boston, read relevant literature, including the NCTM publication, *Providing Opportunities for the Mathematically Gifted*, disseminated a survey on the internet to relevant news groups and mailing lists, and met for three days to craft this report that includes issues, recommendations, and a draft of a policy statement. After the initial report was written, it was posted on the internet for comments, and revised. A copy of the initial survey is appended to this report, and the internet responses are available upon request from the committee chair or on-line through electronic mail.

Sriraman, B. (Ed.) (2008). *Creativity, Giftedness, and Talent Development in Mathematics*. Charlotte, NC: Information Age.

Abstract: A Volume in The Montana Mathematics Enthusiast: Monograph Series in Mathematics Education Series Editor Bharath Sriraman, The University of Montana Our innovative spirit and creativity lies beneath the comforts and security of today's technologically evolved society. Scientists, inventors, investors, artists and leaders play a vital role in the advancement and transmission of knowledge. Mathematics, in particular, plays a central role in numerous professions and has historically served as the gatekeeper to numerous other areas of study, particularly the hard sciences, engineering and business. Mathematics is also a major component in standardized tests in the U.S., and in university entrance exams in numerous parts of world. Creativity and imagination is often evident when young children begin to develop numeric and spatial concepts, and explore mathematical tasks that capture their interest. Creativity is also an essential ingredient in the work of professional mathematicians. Yet, the bulk of mathematical thinking encouraged in the institutionalized setting of schools is focused on rote learning, memorization, and the mastery of numerous skills to solve specific problems prescribed by the curricula or aimed at standardized testing. Given the lack of research based perspectives on talent development in mathematics education, this monograph is specifically focused on contributions towards the constructs of creativity and giftedness in mathematics. This monograph presents new perspectives for talent development in the mathematics classroom and gives insights into the psychology of creativity and giftedness. The book is aimed at classroom teachers, coordinators of gifted programs, math contest coaches, graduate

students and researchers interested in creativity, giftedness, and talent development in mathematics.

Sriraman, B., V. Freiman, & N. Lirette-Pitre (Eds.) (2009). *Interdisciplinarity, Creativity, and Learning Mathematics with Literature, Paradoxes, History, Technology, and Modeling.* Charlotte, NC: Information Age.

Abstract: Interdisciplinarity is increasingly viewed as a necessary ingredient in the training of future oriented 21st century disciplines that rely on both analytic and synthetic abilities across disciplines. Nearly every curricular document or vision statement of schools and universities include a call for promoting creativity in students. Yet the construct of creativity and giftedness across disciplines remains elusive in the sense that the prototypical examples of such work come from eminent scientists, artists and mathematicians, and little if any work has been conducted with non-eminent individuals. This monograph is an attempt to fill this gap by putting forth the view that interdisciplinarity and creativity are related constructs, and that the cultivation of domain general creativity is possible. Mathematics has historically been anchored to numerous disciplines like theology, natural philosophy, culture and art, allowing for a flexibility of thought that is difficult to cultivate in other disciplines. In this monograph, the numerous chapters from Australia, U.S.A., Canada, Cyprus, Denmark and Japan provide a compelling illustration of the intricate connection of mathematics with literature, paradoxes, history, technology and modeling, thus serving as a conduit for interdisciplinarity, creativity and learning to occur.

Sriraman, B. & K. H. Lee (Eds.). *The Elements of Creativity and Giftedness in Mathematics.* Rotterdam, the Netherlands: Sense Publishers.

Abstract: The Elements of Creativity and Giftedness in Mathematics edited by Bharath Sriraman and KyeongHwa Lee covers recent advances in mathematics education pertaining to the development of creativity and giftedness. The book is international in scope in the "sense" that it includes numerous studies on mathematical creativity and giftedness conducted in the U.S.A, China, Korea, Turkey, Israel, Sweden, and Norway in addition to cross-national perspectives from Canada and Russia. The topics include problem -posing, problem-solving and mathematical creativity; the development of mathematical creativity with students, pre and in-service teachers; cross-cultural views of creativity and giftedness; the unpacking of notions and labels such as high achieving, inclusion, and potential; as well as the theoretical state of the art on the constructs of mathematical creativity and giftedness. The book also includes some contributions from

the first joint meeting of the American Mathematical Society and the Korean Mathematical Society in Seoul, 2009. Topics covered in the book are essential reading for graduate students and researchers interested in researching issues and topics within the domain of mathematical creativity and mathematical giftedness. It is also accessible to pre-service and practicing teachers interested in developing creativity in their classrooms, in addition to professional development specialists, mathematics educators, gifted educators, and psychologists.

Vogeli, B.R. (1997). *Special Secondary Schools for the Mathematically and Scientifically Talented. An International Panorama.* New York: Teachers College Columbia University.

Abstract: This is a 284-page report on special schools for the mathematically and scientifically talented. These schools are one manifestation of concern for the identification and development of an important world resource - the gifted youth of every nation! Despite proliferation of special schools, information about them is widely dispersed in professional journals, news reports and advertising literature prepared by the schools themselves. One study (Green, 1993) compared several American special schools; however, no prior work has examined schools around the world. This report, which describes more than fifty special schools in twelve nations, is intended neither as a comparative study nor as an in-depth analysis of individual schools, but rather as an "international guidebook" - a ready reference for the educator, politician, philanthropist or parent concerned with the education of the gifted. Like other guidebooks, this report emphasizes interesting aspects of the included schools-in some schools the curriculum is exemplary, in others the selection process or the facilities or the faculty are of special interest. Documents of importance, translated into English and appearing as appendices, may be useful in determining differences in curricular emphases, teaching methods and admission and evaluation standards from school to school. Most foreign documents included have not been available previously in English.