



# Intersection Points

The Newsletter of the Research Council on  
Mathematics Learning

January 2010

Volume 34, No.3

The Research Council on Mathematics Learning seeks to stimulate, generate, coordinate, and disseminate research efforts designed to understand and/or influence factors that affect mathematics learning.

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## PRESIDENT'S COLUMN

How do we serve our students?

By Anne Reynolds

We begin a new year and a new decade of the century. As we moved into the 21<sup>st</sup> century states and national agencies developed standards and evaluation procedures intended to raise the level of mathematics competency of the nation's youth. Along with this, significant funds were provided to address the professional needs of teachers so they could be better prepared to teach their students. It was recognized that 21<sup>st</sup> century life and work would require mathematically literate adults, citizens who could think and reason critically.

One would have anticipated that by now the effects of such emphasis on mathematics education should show some results. Indeed NAEP results do show some progress, in

particular in closing the gap between advantaged and disadvantaged youth. On the other hand we still have a significant number of college freshmen who are not ready to take college level mathematics courses. These are otherwise successful students, gaining admission not just into small regional colleges but the major state universities. How is it that in mathematics classes in elementary, middle, and high school these students do not learn what they need to be successful in college level mathematics classes?

In the fall, 2009, a number of students in my graduate mathematics education research class were adjunct mathematics teachers at several different universities in our region. One class

assignment was to choose a topic they are interested in and interview a student to explore how that student has made sense of the mathematical ideas. The college teachers in the class were teaching lower division and basic mathematics courses as part of their teaching assignment. Each decided to focus their interview on a mathematics topic that was part of the middle and high school curriculum, a set of ideas that would be an essential basis for success in the college mathematics class they were teaching. My students identified tasks used in previously published research on the topic, tasks that they could pose to the student they were interviewing. Part of class time before they conducted these interviews was focused on sharing the various tasks they thought might be appropriate to get feedback for others in the class. In almost every case the college teachers expressed concern that the tasks they had identified from the research might be too “easy” for their college student, especially ones that had been used with middle grades students in the research setting. During these discussions they noted that the tasks were non-routine, with no obvious solution strategy or memorized procedure that could just be applied; however, they still were ambivalent about the difficulty level. There was a sense of disbelief that these tasks would prove to be problematic for their students, even though they recognized they were in fundamental mathematics classes. (Mind you the high school and middle grades mathematics teachers in the class also had some hesitation about using research tasks that had been used with elementary students for the same reasons but I focus on the college age students here.)

After much debate my students decided to use the tasks and be prepared with “more difficult” tasks if they needed them. It was an interesting class meeting immediately after these interviews were conducted. Shock and disbelief led to some sobering discussion of the flawed thinking and reasoning their students used in solving what

they thought had been relatively simple tasks. I know this story is all too familiar with many of you who spend your time with teachers in preparation and in the profession. Sadly, it reflects how little progress has actually been made.

While I have not yet seen the descriptions of the sessions that are to be presented at our 2010 conference in Conway, Arkansas, if past years are any guide we will hear from colleagues who are working with teachers, prospective teachers, and students, sharing their research into the problems and possible solutions, our successes and failures. Our members are intimately connected with mathematics education reform. Some of us teach mathematics classes for prospective mathematics teachers, others teach mathematics methods classes for these same prospective teachers and graduate mathematics education courses for teachers who are dedicated to improving mathematics instruction in their own spheres of influence. We are also involved with national, state, and local agencies that work for the betterment of mathematics teaching and learning as well as providing workshops and professional development activities for teachers. I would challenge us all, as we interact with our colleagues in these sessions and other informal settings at the conference, to use our time at the 2010 conference to find ways to be more effective in the next ten years. At the inaugural founders lecture during our 2009 annual conference, our first president, Dr Jim Heddens, challenged us to examine what is distinctly different about us as a group and identify the strengths that would make us contribute to the field so that we continue to be vibrant for the next 35 years. While we cannot see into the future, I would suggest that maybe we will have failed, if the issues we face today are still concerns in 2050. Our mission statement is relevant to today’s needs and hopefully will inspire us to solve our present challenges and be ready to face new challenges yet to emerge.

# Upcoming Speakers 2010 RCML Conference

## "Real Challenges in Mathematics Learning"

37<sup>th</sup> Annual Meeting  
University of Central Arkansas  
11-13 March 2010

### Wilson Lecture Speaker

**Dr. Vijaya Gompa**  
Jackson State University  
Jackson, MS



**Title: Providing effective mathematics instruction to overcome challenges and increase achievement in mathematics**

#### Abstract

Dr. Vijaya Gompa will present a talk on educating K-16 students of mathematics to address inequity and achievement gaps due to gender, race, economic, and geographic factors. This talk will also include teaching strategies to raise expectations and provide strong support for all students in order to achieve measurable improvements.

### About Dr. Gompa

Dr. Vijaya Gompa is a Professor in the Department of Mathematics at Jackson State University. She served as Coordinator of Mathematics Programs at Charles A. Tindley Accelerated School (Indianapolis, Indiana), and the coordinator of Master of Science and Mathematics in Teaching Programs in Mathematics, Biology, Physics, and Chemistry (Jackson State University). She also taught at Clinton Senior Junior High School (Michigantown, Indiana). She holds a Ph.D. in mathematics and a highly qualified teacher license in mathematics, physics, and chemistry for grades 5-12 in Indiana and for grades 7-12 in Mississippi. Dr. Gompa has published several peer-reviewed articles in mathematics and mathematics education. She served as a member of the editorial board for two international peer-reviewed journals and as a lead reviewer for NCATE. She has also presented SPA (Specialize Professional Association) training for mathematics educators and DCA (Dynamic Classroom Assessment) workshops for elementary and high school teachers. She worked on several projects to improve K-12 and teacher education.

## Founder Lecture Speaker



**Dr. William R.  
Speer**

**Title: NRC, RCDPM, RCML: A Glance Back as We Strive Forward**

### **Abstract**

Every organization can benefit from a retrospective of where they began, where they've been, and how they got to where they are today. Through such an exercise, we can learn from both the successes and the mistakes embedded in our history to help mold and shape our future directions. Those old enough to remember should come and reminisce for awhile and be willing, in the truest spirit of this organization, to share what we know with others that have joined us along the way. Let's all speculate on the promise of what the future might hold for the organization.

### **About Dr. Speer**

William R. Speer is currently the Dean of the College of Education, a Professor of Mathematics Education, Director of the UNLV COS/COE Center for Mathematics and Science Education, and Director of International Student Teaching at the University of Nevada, Las Vegas. He is also an Emeritus Professor of Mathematics and Computer Education at Bowling Green State

University, Bowling Green, Ohio. Dr. Speer has been a Fulbright Scholar to the Bahamas and a Visiting Professor at Northern Arizona University's Science and Mathematics Learning Center.

His B.S. and M.S. Ed. degrees were achieved at Northern Illinois University in 1969 and 1971 while his Ph.D. was earned at Kent State University in 1976. Dr. Speer is a Past President of several professional organizations including the Ohio Council of Teachers of Mathematics, the Ohio Mathematics Education Leadership Council, the Nevada Mathematics Council (two terms), the Nevada Association of Teacher Educators (two terms), the Research Council on Mathematics Learning, and the School Science and Mathematics Association. He is a member of the Board of Directors for WestEd and has served as a board member for the Mathematics and Statistics Advisory Committee for the College Board and as a member of the Board of Directors for the Washington, D.C. based Triangle Coalition of Business, Government, and Education. He is also an Alumni Fellow of the Council of Scientific Society Presidents.

He was a member of the NCTM Commission that released the landmark publication entitled Professional Standards for Teaching Mathematics and was a major author on the teaching standards that NCTM released in 2007 under the title of Mathematics Teaching Today. He has also served NCTM as the Western Region Representative to the Affiliated Services Committee, as Chairperson of annual and regional meetings and is presently a Board member of the Mathematics Education Trust. He has been a member of NCTM for 41 years, has been a participating member of AMTE since its inception, and is a Founding Member of the Research Council on Mathematics Learning.

Dr. Speer is the primary author of the Wiley text, TODAY'S MATHEMATICS: Concepts, Classroom Methods and Instructional Activities, twelfth edition, focusing on content/teaching methods for the elementary and middle grades. Dr. Speer is currently the General Editor for the NCTM annual yearbooks covering the years

2011-13 and has authored numerous articles in various professional journals. He has served as

### **2010 RCML Conference Founder Lecture Speaker Continued...**

editor of the IDEAS section for the Arithmetic Teacher journal and editor of the INVESTIGATIONS section of Teaching Children Mathematics journal. He has also served on the Editorial Board for the research journal, FOCUS on the Learning and Teaching of Mathematics (now known as INVESTIGATIONS in Mathematics Learning). Dr. Speer has been the recipient of annual college and university-wide teaching, research, and service awards at both Bowling Green State University and the University of Nevada Las Vegas. He is the recipient of the Northern Illinois University Golden Anniversary Alumni Award from the College of Liberal Arts and Sciences.

His service has been recognized by his selection for the Christofferson-Fawcett Award for Lifetime Achievement in Mathematics Education and the George Mallinson Award for Distinguished Contributions to Mathematics and Science Education. Dr. Speer has lectured extensively throughout the United States and in 26 countries on six continents. Perhaps most importantly, he has classroom experience at each level and enjoys sharing and learning about how research informs teachers and how the classroom lends itself to generative studies of teaching/learning.

#### **Conference dates to keep in mind:**

**January 25, 2010:** Paper to vice president of conference

**February 10, 2010:** Early Conference Registration Deadline

**February 25, 2010:** Notification about the status of the paper

**March 8, 2010:** Author(s) sends revisions to vice president of conference

**March 11, 2010:** RCML conference at the University of Central Arkansas

### **RCML Conference Directions to the University of Central Arkansas (UCA) Campus**

#### **Directions by car from the North:**

From interstate highway 40, take exit 129 west (AR-286, Ar-65, AR-60, Dave Ward Drive, Industrial Boulevard). Turn right and travel 2 miles to Donaghey Avenue. Turn right and travel about 0.7 miles.

To get to the Mathematics and Computer Science Building (MCS), take a left at the intersection of Bruce Street and Donaghey. The MCS is the third building on the left.

#### **Directions by car from the South:**

From interstate highway 40, take exit 129 B west (AR-286, Ar-65, AR-60, Dave Ward Drive, Industrial Boulevard). Turn right and travel 2 miles to Donaghey Avenue. Turn right and travel about 0.7 miles.

#### **Directions to the Hilton Garden Inn Conway:**

##### **From the North:**

From interstate highway 40, take exit 127. Turn left on to US-64 (Oak Street). Take the 3rd right onto Lachowsky Dr. You are at 805 Amity Road (Hilton Garden Inn).

##### **From the South:**

From interstate highway 40, take exit 127. Turn right on to US-64 (Oak Street). Take the 3rd right onto Lachowsky Dr. You are at 805 Amity Road (Hilton Garden Inn).

#### **Directions from the Hilton Garden Inn to the UCA campus:**

Turn left onto US-64 (Oak Street). Continue on Oak Street through down town. Oak Street becomes Caldwell Street. Continue on Caldwell to Donaghey Avenue. At the traffic light (Caldwell and Donaghey), turn left. Continue on Donaghey Avenue to Bruce Street. Turn right onto Bruce, The MCS building is the third building on the left.

### Travel by Air:

The major airport is at Little Rock. To get from the airport to the hotel, one may use a taxi (can arrange from Hilton Gardens Inn), shuttle (send arrival and departure times to schedule UCA shuttle service to Belinda Robertson at [belindar@uca.edu](mailto:belindar@uca.edu)), or car rental. For the latter, one may contact [www.nationalcar.com](http://www.nationalcar.com), [www.avis.com](http://www.avis.com), [www.enterprise.com](http://www.enterprise.com) or [www.alamo.com](http://www.alamo.com).

### Travel by car:

Contact Belinda Robertson at [belindar@uca.edu](mailto:belindar@uca.edu) for a parking permit.

### Lodging:

Hilton Garden Inn Conway, Conway, Exit 127  
State/Government Rates at \$70  
[www.hiltongardeninn.com](http://www.hiltongardeninn.com)  
805 Amity Road  
Conway, AR 72032  
501-329-1444

Conference information and registration can be found on the RCML website at <http://www.unlv.edu/RCML/conference2010>

### **\*Vice President of Conferences**

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By: Elaine Young

Every semester I am amazed at the number of things I learn from my students. I believe that it means they are learning to think mathematically and test conjectures made from their understanding of mathematical concepts in our classroom. I would like to share some examples from the first of our three mathematics content courses for elementary teachers. This course covers number systems and operations. One of the goals of this first class is to help elementary preservice teachers deal with their beliefs and attitudes about mathematics.

One of the topics covered is prime numbers, and I spend one lesson talking about the number one and whether or not it is a prime number. I have collected data and find that the majority of preservice teachers in my classes believe that one is prime. Many say they think a teacher told them, but cannot explain or justify their answer. As we work through the divisibility lessons, I ask them to find multiple proofs that one is not a prime number. I was expecting a precise definition, or the use of the Fundamental Theorem of Arithmetic. However, one semester I was pleasantly surprised with a student who commented that one cannot be prime because it would ruin the Sieve of Eratosthenes. Students had color-coded a sieve handout for homework, to identify number patterns, prime numbers, twin primes, etc. She pointed out that if we had

colored one as a prime number (one is missing from my sieve handout), we would have had to color ALL the numbers which had one as a factor. Therefore one would be the ONLY prime number. I was amazed at her logic! This simple argument was much more impressive (and easier to understand) than all of the planned discoveries I had in store for my students.

Another example of learning from a student occurred while we were working with the greatest common factor (GCF) and least common multiple (LCM). As we worked through four different methods to model and calculate these numbers, a student commented to me quietly that she just multiplied the biggest number by the “uncommon” factors from the smaller number to find the LCM. She gave me several examples which all worked. I went home and looked at the idea closer, and using the standard theorem,  $a*b = GCF*LCM$ , I was able to prove her discovery. I shared her method with the class the next day and we started calling it “Jennifer’s method”. On the final exam, a large portion of the class used her method to find the LCM of two numbers.

Another semester during the same lesson, a student brainstormed from Jennifer’s method to find her own method for the GCF. She divided one of the numbers by its “uncommon” factors. Again this was easy to prove using the theorem. This method is now known as “Lisa’s method”. I teach both student methods each semester, giving credit to Lisa and Jennifer for their discoveries. I continue to be amazed by the thinking of my students, who are so often negative about mathematics. They can think mathematically and extend both their own and my knowledge. I am grateful for the opportunity to work with this group of future educators.



## MEMBERSHIP DUES

Just a friendly reminder that our membership fee was due on January 1<sup>st</sup>, 2010.

To renew a membership please send \$35.00 to the Mary Swarthout (information below).

Please direct those wanting to join RCML to our website

<http://www.unlv.edu/RCML/memberform.html>

On the website they can fill out a short form, print it off and then fax or mail that form to Mary.

**Dr. Mary B. Swarthout, Treasurer**

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