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 Message

As I was brainstorming ideas for this column, I came across an article, Integrating History of Mathematics into Curriculum: What are the Chances and Constraints? (Panasuk & Horton, 2012) that began a journey of remembrances, observations, and questions. My interest in the history of mathematics had its beginning in an undergraduate World Literature class. During the discussion of a philosophical paper by Descartes, I remember asking my professor whether this author was really Descartes the mathematician. His confirmation that indeed the philosopher and the mathematician were the same person sparked my interest and challenged me to start looking at mathematics from a new perspective. When the mathematics department decided to offer a History of Mathematics course, I jumped at the chance to learn more about the subject that I was going to teach. While captivated by my professor’s enthusiasm for the subject and intrigued by Howard Eves’ ideas, I became hooked on history of mathematics.
When teaching high school mathematics, I incorporated history of mathematics ideas by making bulletin boards and having students write biographies of mathematicians. I was particularly interested in having my students learn more about the people and the processes involved in the development of mathematics. Liu (2003) characterized these same ideas by stating that as “history reveals the humanistic facets of mathematical knowledge” (p. 416).

Looking back at my work as a high school teacher, I now see that I was not using history of mathematics ideas to make the mathematics richer for my students nor was I focusing on developing students’ mathematical thinking. Contrary to my experience, Panasuk and Horton (2012) found that teachers who used History of Mathematics in their instruction identified the construction of knowledge as one of the reasons for including historical mathematical ideas in their lessons. Liu’s work also supported the notion of developing students’ mathematical thinking through historical problems.

The relevance of this discussion really comes from the questions that need to be asked. What are different ways to include history of mathematics in school classrooms? How can content standards and process standards be addressed through historical mathematics instruction? What is the impact of history-of-mathematics-infused-instruction on student learning? Liu’s (2003) version of this question is “Is including the history of mathematics in mathematics teaching effective?” (p. 420). While stating that the cumulative empirical evidence was insufficient to answer his question, Liu identified the International Study Group on the Relations between History and Pedagogy of Mathematics as a group that is focused on finding some answers. Similar questions can be asked about the use of history of mathematics with preservice teachers. Partially to meet the National Council for Accreditation of Teacher Education’s (NCATE’s) standards, I incorporate history of mathematics ideas and projects throughout my secondary program. How does history of mathematics enhance teachers’ content knowledge? Does the use of historical problems and processes enable teachers to develop their mathematical knowledge for teaching? How can teachers use history of mathematics to design and implement effective lessons? I have not had time to thoroughly research answers to the questions posed throughout the paragraph, but I am intrigued about history of mathematics’ potential for making a difference in mathematics education.

References


Conference Evaluation Survey

Please visit this [link](http://www.iejme.com/) and complete a conference evaluation!
ELECTION: Call for Nominations

Please consider running for office! Self-nominate or nominate someone else for the RCML elections in 2012. Open positions include:

Secretary
Conference Committee (two positions)

39th Annual Conference of the Research Council on Mathematics learning

by Megan Che and Kerri Richardson

23-25 February 2012
Charlotte, North Carolina

The 2012 RCML conference was held at the Hilton Charlotte University Place in Charlotte, North Carolina. In attendance were 107 paid registrants, including students, members and non-members. 77 presentations were offered during Friday and Saturday break-out sessions. There were a total of 72 different primary speakers and 32 secondary speakers.

The conference theme was Learning, Teaching, and Knowledge: (Re)Constructing Mathematical Ontologies and Epistemologies in an Era of Transition. The 77 presentations featured scholarship on a variety of topics relevant to the RCML mission, including sessions focused on in-service teacher professional development, pre-service teacher preparation, teaching and learning of PK-16 mathematics students.

Three plenary sessions were offered over the course of the conference, beginning with the Wilson Memorial Lecture, delivered on Thursday, February 23 by Dr. Neil Calkin, Professor of Mathematical Sciences at Clemson University. Neil’s lecture, titled Origami and Magic Tricks: Sneaking Mathematics Into Children’s Lives, engaged attendees in magic tricks and origami constructions. This Wilson Memorial Lecture was followed by the Founder’s Reception, at which founder Jim Heddens was recognized and honored. The Founder’s Lecture was given on Friday, February 24 by Dr. Jayne Fleener, Dean of the College of Education at NC State University, and was titled Why Mathematics?: Redefining Core Understandings for Gen-Zers and Beyond. The keynote address was given Saturday, February 25 by Paola Sztajn, Professor of Mathematics Education at NC State University, and was titled Teacher Learning and Innovation: Challenges for Professional Development.

The 107 paid registrations generated a total of $14,180. Conference expenditures (including the final hotel bill and conference bags) were $9215.09. The organization gained $4964.91 from this conference.
RCML Conference Proceedings

The conference proceedings for the 39th Annual Meeting of the Research Council on Mathematics Learning (2012) were edited by Stacy Reeder and were comprised of 29 peer-reviewed manuscripts written by 57 authors. The conference proceedings can be accessed via the RCML website. Stacy Reeder would like to thank all the reviewers for their time and willingness to serve RCML, as well as Elizabeth Auld for her help as the assistant editor. Watch for information regarding submission of papers for the proceedings for the 40th Annual Meeting of the Research Council on Mathematics Learning (2013).

Founder’s Lecture

M. Jayne Fleener, Ph.D., Dean of the College of Education at North Carolina State University, gave a keynote address entitled Why Mathematics?: Redefining Core Understandings for Gen-Zers and Beyond. The talk explored the need to redefine what it might mean to teach and learn mathematics in an age of limitless knowledge. She proposed that the role of mathematics teacher should no longer be that of deliverer of mathematical knowledge but rather that of igniter of intellectual passion and mathematical empowerment, through an understanding of how to connect with Gen-Zers, or students who live in a digital era.
Keynote Address

Paola Sztajn, Ph.D., professor of Mathematics Education in the Department of Elementary Education at North Carolina State University, delivered a keynote address entitled Teacher Learning and Innovation: Challenges for Professional Development. The talk addressed “two important challenges for professional development: attending to the processes through which practicing teachers come to develop their professional knowledge and making sure innovations play a role in teachers professional lives.” She used her own research endeavors along with her personal experiences to examine future possibilities in professional development.

Wilson Memorial Lecture

Neil Calkin, Ph.D., professor of Mathematics in the Department of Mathematics at Clemson University, presented the keynote address entitled Origami and Magic Tricks: Sneaking Mathematics Into Children’s Lives. The presentation examined ways origami and seemingly magical tricks could be used as ways to “sneak” mathematics into children’s (or students) lives in interesting ways that are traditional not explored when teaching mathematics. He illustrated how an interest in origami could be a way to connect the aesthetic to the scientific.
PHOTOS FROM THE CONFERENCE

Kay Wohlhuter honors Bob Drake, Elaine Young and Kerri Richardson for their work and dedication to RCML.

Jayne Fleener is pictured with all her previous doctoral students and their doctoral students in attendance at RCML.
Anne Reynolds, Darlinda Cassel, Stacy Reeder, and Jayne Fleener take time at RCML to reminisce about their time together at the University of Oklahoma.

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RCML Business Meeting Minutes

February 24, 2012

Kay Wohlhuter, RCML President, called the general business meeting to order and welcomed all in attendance. Kay Wohlhuter remembered David Davidson, founding member, who passed away this past year, with a moment of silence.

First time attendees were recognized and encouraged to return each year and join the RCML community. Conference attendees who have been to several conferences were recognized. Seasoned conference attendees were recognized.

Melfried Olson’s birthday was recognized.

Kay Wohlhuter introduced the new officers:
  Mary Swarthout, President-elect
  Jean McGehee, Treasurer
  Bob Drake, Vice-President for Conferences
  Thomas Faulkenberry, Conference Committee
Approval of Minutes: Megan Che, RCML Secretary, presented the minutes from the RCML 2011 conference to the membership. The minutes have been posted on the website and were also distributed in the newsletter. Lynn Columba moved to approve the minutes, seconded by Pat Jordan. No discussion. Motion carried.

Treasurer’s Report: Mary Swarthout, Outgoing Treasurer, presented the budget report for 2011. She reminded us that there are two accounts: a general, regular account and a publication account. The regular account is for membership dues and conference types of monies. The publication account is for monies associated with publication of the journal. Expenses were more than deposits in 2011 (we lost $6304.26). There was a question about why we lost more than we brought in. Mary responded that RCML has a history of both yearly nets as well as yearly losses, so this is not unusual. For last year, the conference expenses were a little higher than usual because of how quickly the conference came together. Alan Zollman moved to accept the report, and Melfried Olson seconded. No discussion. Motion carried.

Membership Report: Mary Swarthout, Membership Chair, delivered the membership report. RCML had 93 members at the end of 2011. She noted that this is growth from 2010 (at this time last year, we had 70 members), so we are on track to reach the 100 member mark. We are in the process of taking membership and membership renewal online like this year’s conference registrations were. Membership is $35 regular, $29 for students. $29 of the membership fee is used to support the journal.

Publications Report: Sheryl Maxwell, VP for Publications, has some extra copies of one issue of the journal. We are on our 4th volume of the journal. Sheryl is offering two issues of the journal for $25. So people becoming members now will get the last two issues. Sheryl recognized Jean Schmittau for her continued and valued service as the Investigations editor. Kelli Slaten also appreciated Jean’s mentoring efforts as editor. Sheryl encouraged members to submit manuscripts to Investigations in Mathematics Learning. The new RCML webpage address is published in the journal. Sheryl recognized Elaine Young as the outgoing editor for the RCML newsletter, Intersection Points. Sheryl recognized Summer Bateiha as incoming Intersection Points editor. Sheryl noted that the Investigations journal is self-sufficient fiscally. It costs around $9000 and brings in between $10,000 to $11,000. Sheryl encouraged members to check with their libraries and make sure they subscribe to the journal.

Conference Report: Stacy Reeder, Outgoing VP for Conferences, recognized Kerri Richardson and Megan Che for hosting the RCML 2012 conference in Charlotte. We had 107 paid registrations and 77 sessions scheduled. There are 29 published papers in the proceedings this year, with more than 50 authors, which is an increase from previous years. Stacy recognized proceedings authors and proceedings reviewers (42 people reviewed for the proceedings). Next year’s conference will be in Tulsa, OK, hosted by Juliana Utley (Conference Chair) and Pat Jordan (Program Chair). Juliana Utley reported that they are in the process of choosing between two hotels. Juliana Utley and Pat Jordan provided handouts containing information about Tulsa. Final dates for the conference and location will be communicated shortly. Stacy Reeder reported that the 2014 RCML conference will be in Texas, and encouraged members to consider hosting a conference beyond 2014. Bob Drake, Incoming VP for Conferences, also encouraged members to think about hosting a conference because advance preparation is in the interest of the organization. Any members interested in hosting should contact Bob at bob.drake@uc.edu.
Mary Swarthout, Incoming President Elect, reported that we are looking for nominations for Secretary and for the Conference Committee. She encouraged members to consider self-nominating or nominate someone else using the forms provided on the table or by emailing her.

Kay Wohlhuter, President, presented the following with acknowledgements of service:

Kerri Richardson for her service as Conference Chair
Megan Che for her service as Program Chair
James Carrier for his service as conference website manager
Elaine Young for her service as Intersection Points Editor
Kerri Richardson, Elaine Young, and Bob Drake for service on the Conference Committee
Stacy Reeder for her service as Vice President of Conferences
Mary Swarthout for her service as Treasurer

Anne Reynolds for her service as Past-President

Old Business: None

New Business: As part of our plan to make RCML more visible, we are hosting an exhibit booth at the 2012 national NCTM conference in Philadelphia. Kay Wohlhuter encouraged members to volunteer to work at our booth.

RCML is looking into the possibility of establishing funds for a memorial scholarship that would provide a scholarship for early career members to attend/present at conferences. We are establishing a task force to look into the details and logistics of establishing a memorial scholarship. Members expressed support for this plan.

Bob Drake announced a meeting of the Conference Committee at the end of lunch.

Kerri Richardson, Conference Chair, acknowledged everyone for attending the meeting and, in particular, her North Carolina colleagues.

Stacy Reeder asked that recipients of acknowledgements from Kay Wohlhuter gather for a picture.

Meeting adjourned.
Pre-Service Teachers’ Beliefs and Sociocultural Mathematics: Making Essential Connections in Teacher Education Programs

by Vivian Moody, Ph.D.
Associate Professor in the Department of Mathematics and Computer Science at Western Kentucky University

According to Vygotsky’s (1986) Sociocultural Theory, learning is embedded in social contexts, activities, and events, and occurs as persons interact with others and the world around them. In light of Vygotsky’s learning theory, I have coined the term, Sociocultural Mathematics. I define sociocultural mathematics as the ideology that students construct their own knowledge of mathematics; however, this activity of construction is tempered by social interactions with their peers and teachers. Moreover, students’ learning of mathematics hinges on their cultural orientations, the cultural orientations of their peers and teachers, and the culture of the mathematics classroom in which they participate.

I believe sociocultural mathematics is ostensible in pre-service teachers’ schooling prior to their teacher preparation. Whether sociocultural mathematics is explicit or unspoken in pre-service teachers’ prior schooling is fundamental in how they respond to the process of becoming a teacher. Hence, I contend that learning environments that are purposefully responsive to sociocultural mathematics are necessary in teacher education programs. In other words, it is necessary for teacher education programs to accentuate mathematics classrooms that are sociocultural.

Notably, pre-service teachers enter teacher education programs with dispositions about mathematics and core beliefs about who can learn or do mathematics. Not only have their dispositions and beliefs about mathematics taken years to form, but their relationship with mathematics has also been influenced by their perceptions of and responses to mathematics teachers, teaching practices, and mathematics classroom environments. Thus, to successfully prepare teachers to implement teaching practices that are equitable and effective for all students, teacher education programs must challenge pre-service teachers to examine their own social realities, cultural orientations, and belief structures and question how these entities are intertwined and impact students’ mathematical experiences.

It is important to note here that not only do pre-service teachers view mathematics and teaching with particular social and cultural views,
but they also view their students with these *tinted* lenses. To improve the teaching and learning of mathematics, several scholars (Gay, 1983; Ladson-Billings, 1995; Moody, 2004) have found that it is important to conceptualize the beliefs, cognitions, cultural orientations, and perceptions of mathematics students. Further, research scholars (Banks, 1988; Cousins-Cooper, 2000; Gay, 1983; Grant, 1989; Moody, 2000) have found that teachers, who do not have some understandings of their students’ ethnic heritages, values and priorities, and perspectives, tend to have difficulty interacting constructively with and effectively relating important and relevant mathematics to their students. Hence, it is important that pre-service teachers participate in teacher education programs that challenge them to examine their profound roles in creating mathematics classroom cultures that can either hinder or contribute to students’ learning mathematics.

Documented in the research literature (Ladson-Billings, 1995; Martin, 2000; Moody, 2000; Moody, 2004), the mathematics classroom culture plays an important role in how students perceive and respond to mathematics and mathematics teaching and learning. Those mathematics learning environments that respect all students’ *voices* (Secada, 1995) tend to propel students in mathematics and significantly impact their mathematics learning. Alternately, those mathematics classroom environments that *silence* students’ voices tend to impede these students’ opportunities to learn mathematics. In this sense, voice refers to the ideology that all mathematics students contribute to the learning environment, and their prior knowledge and experiences with mathematics are fundamental to the learning environment and should be shared. Hence, listening to mathematics students’ voices authenticates the idea that the mathematical knowledge students bring with them to the classroom is not only acceptable but also valuable. By contrast, silencing mathematics students’ voices means de-valuing the mathematical knowledge they bring with them to the classroom and packaging their prior knowledge and experiences with mathematics.

Mathematics teachers who listen to their students’ voices consider each of their students on many levels, which include taking into consideration their cultural, social, linguistic, and cognitive orientations. Considering students’ many orientations recognizes and validates their voices and circumvents *silencing*.

To assist teachers in considering students’ many orientations, mathematics teacher education programs must play an active role in preparing teachers to listen to students’ voices. Pre-service teachers must be provided with opportunities to reconsider and reconstruct their beliefs and personal theories about not only teaching and learning mathematics but also about their prospective mathematics students. Further, they should be given opportunities to reflect on how these beliefs affect their teaching practices. For pre-service teachers to have such opportunities, they must participate in mathematics teacher education programs that promote inquiry into the complexity of teaching *all* students. This will assist pre-service teachers in becoming reflective, inquiring practitioners who seek to listen to and understand their students’ voices. Moreover, mathematics teacher education programs should reflect that of an inquiry-based program that challenges pre-service teachers to question and reconsider teaching practices that are ineffectual for some mathematics students, including those, who – for whatever reason – are often deemed as mathematically inept.

**Inquiry into Sociocultural Mathematics: Making Connections Explicit**

Perhaps the most important piece of recognizing and respecting (listening to) mathematics students’ voices is to pose new questions for further investigation based on what we hear. Much research on prospective teachers of mathematics has focused on pre-service teachers’ beliefs about mathematics, teaching mathematics, and learning mathematics. Research on teachers’ beliefs indicate that teachers’ beliefs and past experiences as students themselves affect what
they do in the classroom, how they see their students, and how they see the subject they teach (Thompson, 1992). Thus, how teachers see their mathematics students can play a vital role in how they teach their mathematics students. As teacher educators, we need to urge pre-service teachers to consider the voices of their students while recognizing the complex interactions of social and cultural processes affecting students’ experiences with mathematics.

Several research studies in mathematics education that have explored teachers’ beliefs have sought to answer questions that address teachers’ views, perceptions, and cognitive structures about mathematics and the teaching and learning process. Seeking answers to these questions helps serve the purpose of teacher educators’ conceptualizing the developmental process of becoming a teacher. However, less research has focused on teachers’ beliefs about cultural orientations and social constructs and how these relate to mathematics and the mathematics teaching and learning process. Fundamental questions for this type research would address: 1) pre-service teachers’ perceptions of their own sociocultural propensities as learners and how these perceptions relate to their sociocultural tendencies as teachers of mathematics; 2) the extent to which teachers recognize, respect, and respond to their mathematics students’ sociocultural tendencies and how these tendencies affect their students’ mathematical experiences; and 3) inherent challenges in teacher education programs with regards to raising the critical social and cultural consciousness of pre-service teachers to help them develop teaching roles that facilitate listening to their mathematics students’ voices and cultivating mathematics classroom cultures that contribute to their students learning significant mathematics.

Undoubtedly, the process of becoming a teacher is challenging, and understanding teachers’ beliefs and conceptions about mathematics teaching and learning helps teacher educators understand this process (Shealy, 1994). However, understanding the synergy between teachers’ beliefs and sociocultural mathematics can help teacher educators understand the process of becoming an efficacious mathematics teacher who hears, understands, and acts upon students’ voices. Of course, this is a complex goal, but it is completely attainable for all mathematics teacher educators who accept the challenge.

References


The PULSE of INVESTIGATIONS
Sheryl A. Maxwell, VP for RCML Publications
April 2012

The Volume 4, No. 3 issue of INVESTIGATIONS IN MATHEMATICS LEARNING, our official RCML Journal, has been mailed to all subscribers and members of RCML. With your continued membership in RCML, you will receive a steady stream of issues. Please check to see if you have renewed your membership to the RCML organization for $35.00 per year for 2012. Your membership is tied to you receiving INVESTIGATIONS in a timely manner. Dr. Jean McGehee is our new RCML Treasurer, so simply contact her at jeannm@uca.edu to arrange payment. Upon receipt of payment she will process the information and let me know of your renewal. When you pay for membership, this will entitle you to receive INVESTIGATIONS for the Academic Year 2012-2013 with issues mailed to you starting in Fall 2012. You will receive the three issues of Volume 5: Fall 2012, Winter 2012-13, and Spring 2013.

Additionally, check with your college and/or university to see that they are receiving the official RCML journal, INVESTIGATIONS IN MATHEMATICS LEARNING, so others can be introduced to it. If your college/university does not receive our journal, here is the information that you can share with them.

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MEMBERSHIP

Membership is due on 1 January. To renew your membership please send $35 to Mary Swarthout at the address below. Please direct those wanting to join RCML to our website http://www.unlv.edu/RCML/memberform.html

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