VOLUME 6 – ISSUE 2 SPRING 2017

HAMTE Crossroads

The Official Newsletter of the Hoosier Association of Mathematics Teacher Educators

Message from the President

Hello Indiana mathematics teacher educators! Happy Spring!

We had a great turnout of HAMTE members at the 2017 Annual AMTE Conference. Several members attended the Affiliate Connections Committee Session, led by ACC Chair and HAMTE member **Jean Lee**, on Thursday. The session provided an opportunity to meet with other affiliate groups and to identify goals for our organizations. The suggested goals for HAMTE were to have a spring retreat and to establish better connections with the Indiana Department of Education. The photo below shows several shining HAMTE faces at the Saturday morning AMTE Affiliate's Breakfast (*see picture below).*

HAMTE members remain committed to advocacy of various forms. At the AMTE Conference, **Gina Borgioli Yoder** and I, with input from **Jill Newton** and **Nandini Bhowmick**, led a discussion about Advocacy Efforts by AMTE Affiliates. We are preparing a summary of that discussion to be shared later. In the meantime, thank you to Gina, Jill, and **Alan Zollman** who initiated our advocacy efforts last year.

In early February, several HAMTE members participated in the Elementary Education Transfer Single Articulation Pathway (TSAP) Mathematics Discussion, a statewide gathering of Ivy Tech instructors and university mathematicians and mathematics educators. The goal of the meeting was to help Ivy Tech redesign the mathematics content requirements of the TSAP to better prepare students for successful transfer to Indiana's four-year institutions. From the discussion, five models emerged and at the end of the day the group voted to accept one of the models, one that included Ivy Tech's MATH 123 and MATH 141. Following the group's suggestions, Ivy Tech will make revisions to their MATH 141 course. It certainly is not a perfect model, but it seemed to represent solutions to the majority of the participants' concerns. In the future, I hope we can have additional opportunities to discuss our collaborative efforts to engage in the mathematical preparation of elementary teachers.

The HAMTE board has suggested we hold our first **HAMTE Spring Retreat** in Indianapolis on **May 15, 16, or 17**. Please email me ASAP at sstump@bsu.edu if you have a date preference. Thank you!

~Sheryl Stump~

Inside This Issue:

Newsletter Editor:
Andrew Gatza,
Indiana University, IUPUI
agatza@iupui.edu

2016 HAMTE Business Meeting

There were changes in the HAMTE board at the 2016 business meeting. Then Past-President **Enrique Galindo** (left) and then Secretary **Craig Willey** reached the end of their terms. **Signe Kastberg** was elected for the position of President-Elect and **Mark Creager** was elected for the position of Secretary. Thank you Enrique and Craig for your service to HAMTE!

The HAMTE board would officially like to welcome new members to the HAMTE organization. New members include:

Elizabeth Suazo Flores, Purdue University

Christine Zumbren, Trine University

Rob Matyskz, Indiana University-Bloomington

Musa Sadak, Indiana University-Bloomington

Pavneet Kaur Bharaj, Indiana University-Bloom.

CALL for Manuscripts!

ICTM is seeking manuscripts for their academic journal, *Indiana Mathematics Teacher*. Please visit the ICTM website and/or contact journal editors **Doris Mohr** (djmohr@usi.edu) and **Sheryl Stump** (sstump@bsu.edu) for more information.

Indiana Mathematics Education Research Symposium 2017

The IMERS Planning Committee-**Elizabeth Suazo Flores**, **Sherri Farmer**, **Mahtob Aqazade**, **Sue Ellen Richardson**, **Musa Sadak**, **Rebecca Borowski**, **Andrew Gatza**, and faculty advisors **Erik Tillema**, **Signe Kastberg**, and **Craig Willey**-is happy to announce there were eight universities from around the Midwest represented at IMERS 2017 on March 3rd at IUPUI!

Throughout the symposium there were also a record high 27 presentaions as well as keynote presentations from Dr. Alyson Lischka from Middle Tennessee State University and Dr. Gloriana Gonzalez from the University of Illinois, Urbana-Champaign.

Please email imers2017@gmail.com if you would like to join the IMERS 2018 planning committee.

Mathematics Teacher Leadership Conference 2017

The HAMTE Elementary Mathematics Specialist Task Force (**Betsy Berry**, **Jodi Frost**, **Doris Mohr**, **Brooke Max** and **Sheryl Stump**), in partnership with MSD Washington Township, hosted the second annual HAMTE Mathematics Teacher Leadership Conference on **Friday, March 10**, in the Schwitzer Student Center at the University of Indianapolis.

Many thanks to **Travis Miller** for securing this venue when registrations exceeded the seating capacity of the MSD Washington Township Community and Education Center! The final count of participants, speakers, and facilitators was 174. In addition to several sessions led by Indiana mathematics coaches, school leaders, and mathematics teacher educators, keynote speaker Lynsey Gibbons, from Boston University, presented, "Organizing for Collective Learning: Transforming Practice Together."

For more information go to: https://hamte.org/resources/mtlc2017/

Let's Talk Equity. But REALLY. Let's talk Equity!

Andrew Gatza
Indiana University, IUPUI

While you will be hard-pressed to find someone who opposes equitable circumstances in education, conceptualizations and actions toward achieving equity take many shapes and sizes. On the one hand, this makes sense. Different contexts require policies and practices designed for specific circumstances. On the other hand, however, who gets to decide what is appropriate and when? Furthermore, who gets to decide when equitable circumstances have been achieved, and equity for whom? While these are extremely complicated questions, they are certainly worth keeping at the forefront of our work as a field, and more locally as a mathematics education community here in Indiana, regardless of the type of work we do.

Indiana is at a particularly interesting educational moment both nationally and at a state level. With changes in teaching certification practices, the rise of a charter school and voucher system contingent, and continued debate on issues of privatizing public education services, it is important to watch who is making these decisions and who is best served by them (regardless of where you fall on the aforementioned issues) as well as to situate the current educational moment within the long history of public education in the U.S. You might ask, who has access to a "high-quality" education? What defines a "high-quality" education? Who is successful within current education systems at the state level, district level, school level, and even classroom level? Whose culture and values are represented in schools and what messages are being conveyed to our students (unintentionally or otherwise)? By seeking answers to these questions, we might clarify how *power* is distributed in the different spaces in which we interact. After all, the *distribution of power* can be seen as the heart of equity (Gutiérrez, 2009).

The responsibility of equitable circumstances, therefore, rests upon all our shoulders and requires collective action to really disrupt inequitable systems we operate within on a daily basis (i.e., public school systems and the universities that employ us just to name a couple). The purpose of the new "Thinking Equity in Mathematics Education" section in *HAMTE Crossroads*, then, is to provide an additional outlet for us to share perspectives and practices that we have found helpful in addressing equity in mathematics education regarding issues of access, achievement, power, and identity (Gutiérrez, 2002, 2009). The idea being that since we are up against inequitable systems that have had hundreds of years to take root and prosper, it really is going to take all of us to change the game, whether it be through critiquing and changing current policies and practices or designing new systems all together. Given this initiative, the remainder of this article is designed to help start this conversation by situating race (and specifically whiteness) in mathematics education within a historical context, providing resources to provoke critical self-reflection and a critical examination of the work we do, and ending with some challenges to the mathematics education community in Indiana.

Introduction

As a white, male educator who has been working in public schools with low-income and predominantly Latinx and African American youth for approaching a decade, a major focus of my doctoral studies have been dedicated to race and racism and the negative impact of ideological discourses of whiteness and colorblindness in education, and specifically mathematics education. Through my teaching and studies, I have had the pleasure of working with and learning from hundreds of students, and this process has been and continues to be personally and professionally rewarding in understanding myself and unpacking the implications of being a white educator in these spaces (certainly a difficult process at times in truly questioning my own lived experiences having grown up in predominantly white schools). I feel

this process has been transformative in how I see the world, and furthermore, has impacted how I operate on a daily basis as well as the work I do. To be clear, this is a process and even as someone who consciously makes an effort to reflect on issues of race and racism and situate the unearned powers and privileges of myself as a white male within this system, I am reminded often of my blind spots.

With that said, the remainder of the article will focus on issues of racial (in)equity in mathematics education. Though there are certainly many issues of equity to consider and intersectionality among these issues should certainly be considered, a focus on race, and more specifically the idea of "whiteness," seems to be a logical conversation starting point for this new section of the newsletter given that almost 94 percent of public school teachers in Indiana are white (Indiana Department of Education, 2017). Yes, 94 percent. This is certainly a high percentage, but perhaps the larger issue is that these white teachers are teaching a growing population of students of color, approximately 32 percent as of last year (Indiana Department of Education, 2017). Furthermore, the population of students of color in Indiana has increased just over 40 percent in the last 10 years and nationally students of color now make up the majority of students enrolled in public schools. Thus, there is an even greater need for race consciousness among white teachers.

Historically Situating Race in Math Education

Education in the United States has a long history of racial inequality (Tyack 1974, Gutiérrez, 2008; Kozol, 2005; Woodson 1933/1990), and this racial stratification is present and persists in mathematics education (Martin, 2015) despite numerous calls for equity (e.g., NCTM, 1989; 2000; 2014). Given this racial hierarchy, it is clear mathematics, though often positioned as a race neutral curricular domain (e.g., "it's just numbers"), has a racial hierarchy that invests more in whites and less in people of color (Battey, 2013). Furthermore, this has created "*symbolic* narratives about who is better mathematically—Whites and [certain] Asian [groups]"—and these perceptions have been made "*materially* real" in regard to how African American and Latinx students are treated and what types of instruction and course offerings are even available (Battey & Leyva, 2015, p. 495). This context, then, leads to different testing outcomes or what is frequently discussed as "achievement gaps." Discussing these gaps in absence of the racialized sorting system that has created these gaps paints a very misguided picture of the mathematics education landscape (Davis & Martin, 2008; Gutiérrez, 2008). Furthermore, categories like "effective mathematics teachers" and "high-quality mathematics teachers" continue to be used, but are designed "strictly around lines of mathematics or narrow visions of pedagogy" (Gutiérrez, 2013, p. 17). These conceptions of what makes a "good" mathematics teacher fails to include things like teacher disposition (Hand, 2012), racial competence (Milner, 2003), and commitment to anti-oppressive and anti-racist teaching, which are just as important as subject knowledge and are especially important for supporting *marginatized* students in mathematics (Gutiérrez, 2013; Martin, 2007).

Again, in an effort to build historical context and situate race and specifically whiteness in mathematics education, let's now explore some key constructs that might further enable continued deep reflection on whiteness and the racialized nature of mathematics education as these kinds of conversations can often stray from the point of equity (and in fact perpetuate inequities) if some historical and theoretical unpacking is not done first to provide a more critical frame of analysis (Sleeter, 2013).

Whiteness and Colorblindness

The "fictive identity of whiteness" appeared as an abstraction in law and was actualized in everyday practices (Lipsitz, 1995). Battey and Leyva (2015) further note that just as "'black' is a cultural construction based on skin color, not biology, whiteness developed out of the reality of slavery and segregation, giving groups unequal access to citizenship, immigration, and property" (2015, p. 494). This privileged position of whites in relation to "others" allowed European Americans to unite in a fictitious community, and at the same time the boundary of whiteness has been malleable, reflecting the needs of those in power (Battey & Leyva, 2015; Bonilla-Silva, 2010). While the ideology of whiteness and its material benefits has been sustained through a gruesome system of overt racism (e.g., slavery, murder, Jim Crow, etc.),

Bonilla-Silva (2010) describes a newer system of covert racism known as *colorblind racism*, which "explains contemporary racial inequality as the outcome of nonracial dynamics" (p. 2). Again, this system ensures privilege and power are maintained for whites, and furthermore, provides white people a way to talk around race and deny any ownership of the racial inequalities in our society. As a way to name and address these racist acts, Bonilla-Silva's (2010) colorblind framework can be helpful and includes four frames to analyze racism—*abstract liberalism* (i.e., supports issues of equity in theory, but is against practical ways to achieve equity), *naturalization* (i.e., explains away racial implications through natural occurrences), *cultural racism* (i.e., explains the social standing of different communities through culturally based arguments), and *minimization* (i.e., suggests racism is no longer a central issue of today). This analytical framework, then, can be a useful tool in moving toward an anti-racist mathematics teacher orientation, and is particularly important given the white-dominated field of mathematics education. Remember, 94 percent of public school teachers are white in Indiana.

White Habitus and White Fragility

While sometimes "not seeing color" is positioned as a positive among teachers (e.g., "I don't care if they are Black, White, Green, Blue, etc., I treat all my students the same"), this positioning does not allow one to see racial inequities (Ullucci, & Battey, 2011). That is, implicit in this colorblind stance is that race is insignificant and racism is something from the past. In considering how, particularly white people, might adopt such a colorblind framing, it is important to consider trends of "white habitus"—"a set of primary networks and associations with other whites that reinforces the racial order by fostering racial solidarity among whites and negative affect toward racial 'others'" (Bonilla-Silva, 2010, p. 16). In other words, historically speaking, the majority of white people do not typically interact with people of color (e.g., housing segregation and school segregation), and thus whiteness becomes normalized (see also *How racial bias helped turn Indianapolis into one city with 11 school districts* and the larger series called *Indianapolis Schools Divided* produced as a collaborative effort among Chalkbeat, the Indianapolis Star, and WFYI). Whether or not one consciously assumes a "white" identity, is unimportant in terms of receiving the privileges associated with whiteness (Battey, & Leyva, 2015). Given the fact that the majority of white people interact on a daily basis in spaces that do not require them to think about *themselves* as racialized beings, having conversations about race is frequently problematic for white people due to an underdeveloped sense of race consciousness (Frankenberg, 1993; King, 1991). DiAngelo (2011) describes this phenomenon as *White Fragility*.

> White Fragility is a state in which even a minimum amount of racial stress becomes intolerable, triggering a range of defensive moves. These moves include the outward display of emotions such as anger, fear, and guilt, and behaviors such as argumentation, silence, and leaving the stress-inducing situation. These behaviors, in turn, function to reinstate white racial equilibrium. (p.54)

Given the profound racial inequities and a long history of racism in the United States, it is important that educators, and particularly white educators, acknowledge and address this history through critical conversations on race and critical self-reflection. Once again, given that 94 percent of Indiana educators are white with a growing number of students of color, this need is not new, but continues to impact larger populations of communities of color. DiAngelo powerfully summarizes this need in saying, "The societal default is racism and White supremacy. If we are not actively seeking to interrupt it, we are necessarily colluding with it; to not address racism and Whiteness, as White people, is to reproduce racism" (DiAngelo, 2016, p. 40).

With that said, I would like to challenge all of us as the mathematics education community in Indiana to recognize and incorporate issues of racial equity, and particularly my fellow white math educators, in our teaching, research, and service. For white people, myself included, it can be easy to forget about the centrality of racial dynamics in our society and many times deadly implications of racism in this country since we are often able to move through our daily lives forgetting we are white. This fact is certainly saturated with power and privilege and another example of the ideological and social construction of "race" (though very real

consequences of racism) and thus requires conscious resistance.

Resources

Given this context, below is a list of a *few* resources I have found helpful in thinking about issues of equity. Perhaps you might also find them helpful for your own personal reflection as well as your work in educating future math educators or as a math educator yourself.

Getting Started

1. **Gutiérrez, R. (2009). Framing equity: Helping students "play the game" and "change the game."** ***Teaching for Equity and Excellence in Mathematics, 1*****(1), 4-8.**
   a. This short paper discusses issues of equity—access, achievement, identity, and power—and also includes discussion questions for teachers. This is a great way to start and/or continuing discussions on conceptualizing equity and its enactment. You might also check out a related presentation on equity at https://www.msri.org/workshops/836/schedules/21847
2. **Sensoy, O. & DiAngelo, R. (2012).** ***Is everyone really equal? An introduction to key concepts in social justice education*****. New York, NY: Teachers College Press.**
   a. Introduces readers to social justice education and discusses common stumbling blocks to understanding social justice. This resource includes examples, scenarios, and vignettes that help unpack issues of justice in a user-friendly, accessible manner. Great for secondary students, teachers, and teacher educators!
3. **Aguirre, J., Mayfield-Ingram, K., & Martin, D. (2013).** ***The impact of identity in K-8 mathematics: Rethinking equity-based practices*** **(pp. 27-39). Reston VA: The National Council of Teachers of Mathematics.**
   a. Provides accessible readings on re-thinking mathematics learning, identity and equity, including unpacking mathematics identity and mathematics teacher identity. Also included are sample lessons and activities as well as an equity-based practices reflection tool.
4. **Gutiérrez, R. (2016). Strategies for creative insubordination in mathematics teaching.** ***Teaching for Equity and Excellence in Mathematics, 7*****(1), 52-60.**
   a. This article discusses the importance of "political agility" for mathematics teachers and outlines strategies for everyday interactions with administrators, colleagues, parents, and students when political scenarios related to mathematics teaching and learning arise.
5. **Joseph, N. M., Haynes, C., & F. Cobb (Eds.). (2016).** ***Interrogating whiteness and relinquishing power*** **(27-42). New York: Peter Lang.**
   a. This book links issues of inclusion to teacher excellence at all levels by illustrating the importance of race consciousness on the behaviors of white faculty, specifically in STEM areas.

A More In-Depth Look

1. Battey, D. (2013). Access to mathematics: A possessive investment in whiteness. *Curriculum Inquiry, 43*(3), 332-359.
2. Battey, D., & Leyva, L. (2016). A framework for understanding whiteness in mathematics education. *Journal of Urban Mathematics Education, 9*(2), 49-80.
3. Larnel, G., Bullock, E., & Jett, C. (2016). Rethinking teaching and learning mathematics for social justice from a critical race perspective. *Journal of Education, 196*(1), 19-29.
4. Leonard, J., Brooks, W., Barnes-Johnson, J., & Berry III, R. (2010). The nuances and complexities of teaching mathematics for cultural relevance and social justice. *Journal of Teacher Education, 61*(3), 261-270.
5. Martin, D. B. (2009). Researching race in mathematics education. *The Teachers College Record, 111*(2), 295-338.
6. Martin, D. B. (2007). Beyond missionaries and cannibals: Who should teach mathematics to African American children? *The High School Journal, 91*(1), 6-28.
7. Steffe, L. P. (1994). Children's construction of meaning for arithmetical words: A curriculum problem. In D. Tirosh (Ed.), *Implicit and explicit knowledge: educational approach* (pp. 131-168). Norwood, NJ: Ablex.

Recommended Resources from Outside Math Education

1. Alexander, M. (2012). *The new Jim Crow: Mass incarceration in the age of colorblindness* (revised edition). New York: The New Press.
2. Bonilla-Silva, E. (2010). *Racism without racists: Color-blind racism and racial inequality in contemporary America* (3rd Ed.). Lanham, MD.
3. Collins, P. H. (2008). *Black feminist thought* (2nd ed.). New York: Routledge.
4. Tyack, D. (1974). *The one best system: A history of American urban education*. Cambridge, MA: Harvard University Press.
5. Ullucci, K., & Battey, D. (2011). Exposing color blindness/grounding color consciousness: Challenges for teacher education. *Urban Education, 46*(6), 1195-1225.
6. Valencia, R. R. (2010). *Dismantling contemporary deficit thinking*. New York: Routledge.
7. For a less traditional academic style, you might also check out the work of writer, comedian, and producer, W. Kamau Bell at http://www.wkamaubell.com

Next Up on My Reading List

1. Fanon, F. (1963/2004). *The wretched of the earth.* New York: Grove Press.
2. Hottinger, S. (2016). *Inventing the mathematician: Gender, race, and our cultural understanding of Mathematics.* Albany, NY: State University of New York Press.

Challenges

At this point, I would like to leave you with a few specific challenges in going forward in hopes that we can continue to push each other to become more critical educators and continue collaborative efforts as a mathematics education community.

1. *Reach outside mathematics education to consider an additional resource that might inform your work.* For example, sociological perspectives might be great to consider in studying mathematics teaching and learning dynamics.
2. *Seek out a colleague to a be a critical friend.* Work with this colleague to question things you might normally take for granted. For example, if you teach a course, check the reading list on your syllabus. Who is included, or maybe more importantly who is not? Are scholars of color represented? If not, do your homework and cite scholars of color as the citation process is certainly a political one and not incorporating the work of scholars of color merely perpetuates the same inequities discussed previously. In addition to critiquing course outlines and material, you might also invite this colleague to critique your teaching.
3. *Question what assumptions you are bringing to your teaching and research.* Think about the history on which your assumptions are built, including your lived experiences. What are the underlying tenets of your frameworks? What implications might this have for your research? How, if at all, do they take up issues of power?

The Author

Andrew Gatza (agatza@iupui.edu) is a doctoral student working toward degrees in Mathematics Education and Urban Education Studies. He has taught middle school mathematics as well as elementary mathematics education courses for prospective teachers. His research interests include mathematical learning and issues of equity, particularly the impact of discourses of whiteness and colorblindness on teaching and learning.

References

Aguirre, J., Mayfield-Ingram, K., & Martin, D. (2013). *The impact of identity in K-8 mathematics: Rethinking equity-based practices* (pp. 27-39). Reston VA: The National Council of Teachers of Mathematics.

Battey, D. (2013). Access to mathematics: A possessive investment in whiteness. *Curriculum Inquiry*, *43*(3), 332-359.

Battey, D., & Leyva, L. (2015). Developing a framework for assessing the impact of whiteness in mathematics education. *Proceedings from the Thirty-Seventh Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education,* (pp. 494-501). East Lansing, MI, Nov. 5-8, 2015.

Berry, R. Q. (2015). Addressing the needs of the marginalized students in school mathematics: A review of policies and reforms. *Proceedings from the Thirty-Seventh Annual Meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*, (pp. 19-32). East Lansing, MI, Nov. 5-8, 2015.

Bonilla-Silva, E. (2010). *Racism without racists: Color-blind racism and racial inequality in contemporary America* (3rd Ed.). Lanham, MD.

Davis, J. & Martin, D. B. (2008). Racism, assessment, and instructional practices: Implications for mathematics teachers of African American students. *Journal of Urban Mathematics Education, 1*(1), 10-34.

DiAngelo, R. (2011). White fragility. *The International Journal of Critical Pedagogy*, *3*(3) 54-70.

DiAngelo, R. (2016). When nothing's lost: The impact of racial segregation on white teachers and students. In N. M. Joseph, C. Haynes, & F. Cobb (Eds.), *Interrogating whiteness and relinquishing power* (27-42). New York: Peter Lang.

Frankenberg, R. (1993). *White women, race matters: The social construction of whiteness*. Minneapolis: University of Minnesota Press.

Gutiérrez, R. (2002). Beyond essentialism: The complexity of language in teaching mathematics to Latina/o students. *American Educational Research Journal*, *39*(4), 1047-1088.

Gutiérrez, R. (2008). A "gap-gazing" fetish in mathematics education? Problematizing research on the achievement gap. *Journal for Research in Mathematics Education, 39*(4), 357-364.

Gutiérrez, R. (2009). Framing equity: Helping students "play the game" and "change the game." *Teaching for Equity and Excellence in Mathematics, 1*(1), 4-8.

Gutiérrez, R. (2013). The sociopolitical turn in mathematics education. *Journal for Research in Mathematics Education, 44*(1), 37-68.

Hand, V. (2012). Seeing culture and power in mathematical learning: Toward a model of equitable instruction. *Educational Studies in Mathematics*, *80*(1–2), 233–247.

Indiana Department of Education (2017). State of Indiana *Teacher Count 2015-2016 by Ethnicity.* Retrieved from http://compass.doe.in.gov/dashboard/personnel.aspx?type=state

King, J. E. (1991). Dysconscious Racism: Ideology, Identity, and the Miseducation of Teachers. *The Journal of Negro Education*, *60*(2), 133. https://doi.org/10.2307/2295605

Kozol, J. (2005). *The shame of a nation: The restoration of the apartheid schooling in America.* New York: Three Rivers Press.

Martin, D. B. (2007). Beyond missionaries and cannibals: Who should teach mathematics to African American children? *The High School Journal, 91*(1), 6-28.

Martin, D. B. (2009). Researching race in mathematics education. *The Teachers College Record, 111*(2), 295-338.

Martin, D. B. (2015). The collective Black and Principles to Actions. *Journal of Urban Mathematics Education, 8*(1), 17-23.

Milner, R. (2003). Reflection, racial competence, and critical pedagogy: How do we prepare pre-service teachers to pose tough questions? *Race, Ethnicity and Education, 6*(2), 193-208.

National Council of Teachers of Mathematics. (1989). *Curriculum and evaluation standards for school mathematics.* Reston, VA: Author.

National Council of Teachers of Mathematics. (2000). *Principles and standards for schools mathematics.* Reston, VA: Author.

National Council of Teachers of Mathematics. (2014). *Principles to Actions: Ensuring Mathematical Success for All.* Reston, VA: NCTM

Sensoy, Ö., & DiAngelo, R. (2015). *Is everyone really equal?: An introduction to key concepts in social justice education*. New York, NY: Teachers College Press.

Sleeter, C. E. (2013). *Power, teaching, and teacher education: Confronting injustice with critical action and research.* New York: Peter Lang.

Tyack, D. (1974). *The one best system: A history of American urban education*. Cambridge, MA: Harvard University Press.

Ullucci, K., & Battey, D. (2011). Exposing color blindness/grounding color consciousness: Challenges for teacher education. *Urban Education, 46*(6), 1195-1225.

Woodson, C. G. (1933/1990). *The mis-education of the Negro.* Trenton, NJ: Africa World Press, Inc.

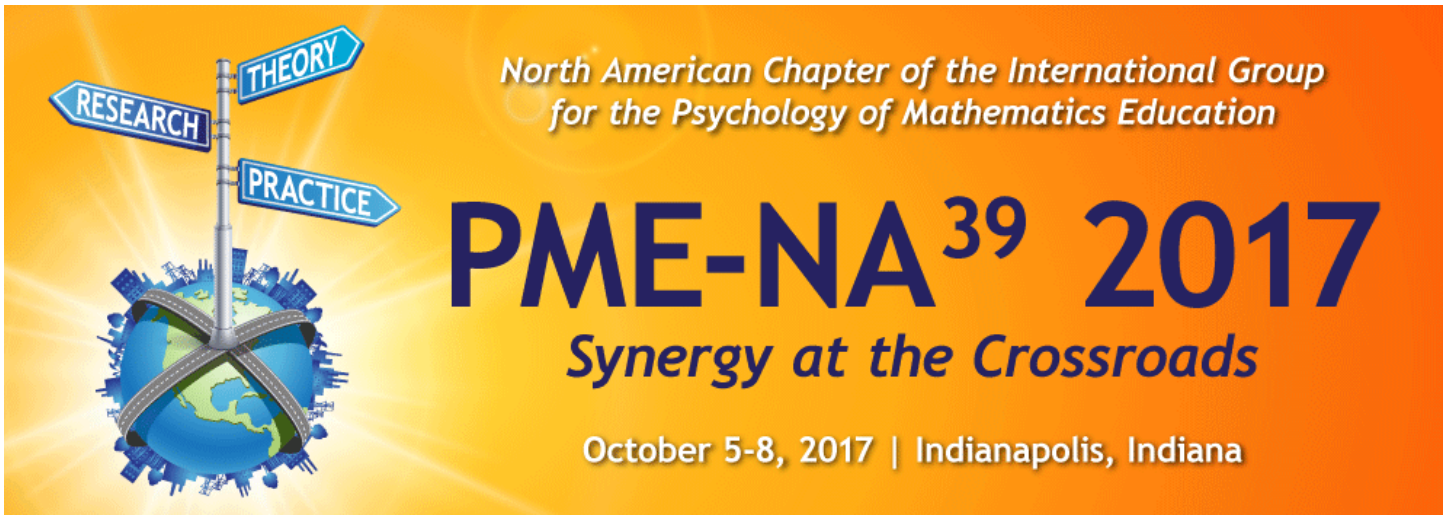
Notes

1. http://www.chalkbeat.org/posts/in/2016/08/03/how-racial-bias-helped-turn-indianapolis-into-one-city-with-11-school-districts/
2. http://www.chalkbeat.org/series/indianapolis-schools-divided/#.V-BB65MrL-Y

Upcoming Events

- NCTM National Conference: April 3-8, San Antonio, TX
- AERA Conference: April 27-May 1, San Antonio, TX
- PME-NA 2017 Conference: October 5-8, Indianapolis

HAMTE Hosts PME-NA 2017!



Conference Theme

Synergy at the Crossroads: Future Directions for Theory, Research, and Practice

The metaphor of crossroads is inspired by the conference venue —the historic Indianapolis Union Station, as well as by the State motto, a reference to how Indiana is connected to the rest of the United States. PME-NA 39 will encourage research presentations, discussion, and reflection focusing on four driving questions connecting to the metaphor of crossroads: 1) What have we learned from the routes we have traversed, what are potential routes for mathematics education research in the future, and what considerations are relevant as we make choices about future directions in mathematics education? 2) How do we address issues of access and equity within mathematics education today? 3) How can we lay the groundwork for future crossroads or intersections between theory, research, and practice? and 4) What barriers within research traditions, educational policy, & teaching practice impede researchers', students' & teachers' success and how can we work to overcome these barriers?

Conference Planning Updates and Volunteer Opportunities

The 2017 PME-NA Local Organizing Committee (LOC) has been busy on different tasks in preparation for this year's conference. We received 135 proposals for Brief Research Reports, 195 for Research Reports, 191 for Poster Presentations, and 13 for Working Groups. The Strand Leaders and reviewers are currently working on the review process. Other committees are working on food and entertainment options and many other arrangements. We are also very excited to announce the lineup of plenary speakers: **Rochelle Gutiérrez** from the University of Illinois, Urbana-Champaign; **Les Steffe** from the University of Georgia; **Maggie McGatha** from the University of Louisville; and a panel consisting of **Ana Isabel Sacristán** from CINVESTAV, **Karen Hollebrands** from North Carolina State University, and **Nathalie Sinclair** from Simon Fraser University. While many have joined the LOC, more tasks will be needed as the conference date approaches so if you are interested in becoming involved in this effort please contact **Jill Newton** (janewton@purdue.edu) or **Enrique Galindo** (egalindo@indiana.edu), conference co-chairs.

What Mathematics Teachers Need to Know and Do for English Language Learners (ELLs)

Lisa Hoffman and Alan Zollman
Indiana University Southeast

Population demographics are changing in the United States. Mathematics teachers have an increasing number of students who do not speak English proficiently in their classrooms. This paper gives a background of how ELL literacy and mathematics learning can be used productively together. Strategies for ELL literacy are good strategies for all students. We discuss specific strategies mathematics teachers can use to benefit all students in developing academic language and conceptual understanding and meaningful skills.

Introduction

Not that long ago, mathematics teachers had homogenous student groups. We separated students by IQ and test scores. Students were placed into ability tracks. If a student was not performing at the same level as other students in the class, the student was moved to another track.

Then schools began to change. Students with special needs were included, not separated, in the mathematics classroom. All teachers, not just Special Education specialists, were expected to know and implement RtIs and IEPs.

Lately states have passed laws requiring *Algebra for All*. Mathematics teachers at every level adapted their teaching for the individual needs of students, while upholding standards. All students were in the algebra class, not just the college-intending mathematics and science majors.

As population demographics change across the country, mathematics teachers again are faced with a new challenge. How do we adapt our teaching for the significant number of immigrant students entering our classrooms? What do mathematics teachers need to know and do for English Language Learners (ELLs)?

The purpose of this paper is to synthesize research in English language learning to correlate with best practices in mathematics teaching. How does the research on English language learning inform what mathematics teachers need to know and do to serve ELL students in the learning of mathematics?

"STEM literacy should not be viewed as a content area but as a *shifting*, *didactic* means (composed of skills, abilities, factual knowledge, procedures, concepts, and metacognitive capacities) to gain further learning" (Zollman, 2012, p. 12). As with other STEM fields, teaching for mathematical literacy involves shifting a focus "from *learning for STEM literacy* to using *STEM literacy for learning*" (p. 12). Table 1 shows a comparison of ELL students' needs and students' needs in developing mathematical literacy. When teachers understand the similar developmental needs of students who are learning mathematics and students who are learning both mathematics and English at the same time, teachers can integrate practices that help both groups of students (Bennett & Ruchti, 2014; Hoffman & Zollman, 2016).

Table 1

Comparing ELL Language Needs with Mathematics Literacy Needs

English language learning needs	Mathematics literacy needs
Multiple opportunities to hear and use both social and academic English	Multiple opportunities to hear and use language to express mathematical understandings
Rich contexts to help language comprehension, and the opportunity to engage and contribute to the interactive learning community	Rich contexts to help illustrate mathematical concepts, and the opportunity to engage and contribute to the classroom learning community
Instructional supports for written and spoken language—e.g., intentional student grouping, multiple representations, scaffolding strategies for different tiers of English vocabulary	Appropriate supports for mathematical concepts—e.g., hands-on student engagement, multiple representations, scaffolding strategies for mathematics-specific vocabulary
Acceptance of "flawed" language for example non-standard English grammar in earlier stages of language learning	Acceptance of "flawed" language--for example, non-mathematical language

Note. Adapted from Riley & Figgins (2015) and Hoffman & Zollman (2016), used with permission from the authors.

We summarize research-based points that teachers need to know about ELLs in three major categories, discussed below.

First, ELL students must learn two types of English to be successful in the classroom. The most common misconception about language learners may be that if a student can speak English, then the student knows English. However, much like mathematics learning, language acquisition is not a

linear process (Hoffman & Zollman, 2016). ELLs usually learn basic interpersonal communication skills—or social language—within 1-2 years (Collier & Thomas, 2002). This English proficiency allows students to communicate with their classmates and teachers about familiar and cognitively undemanding matters. Successfully learning cognitively demanding content such as mathematics, however, requires more than social language proficiency. To be successful in a content area classroom, ELLs must also develop proficiency in academic language. This "cognitive academic language proficiency" (Cummins, 1984) involves the level of technical English skill that allows students to comprehend prompts for a standardized test question, interpret a word problem, or understand the multiple meanings of mathematics vocabulary. For example, "variable" has a social meaning, an academic science meaning, and a very different academic mathematics meaning. Teachers and even parents can easily mistake a student who speaks social English fluently as being proficient in English overall. However, a student's ability to *speak* fluent English does not equate with the ability to succeed in grade-level content area work (Hoffman & Zollman, 2016).

Second, teachers already have resources available to help support students learning English. In the U.S., federal guidelines require local education agencies to monitor the progress of ELLs in developing English language proficiency. To meet these guidelines, schools must assess students' progress in learning English and provide support for their language learning. ELLs are given an annual English language proficiency test—the name of the test varies among states—and student results are available to teachers. Along with the test results, information is given about interpreting these results to know how to support ELL students and scaffold instruction at different levels of language development. Another useful resource for teachers is the instructional recommendations published by WIDA, an organization that includes a consortium of 35 states that jointly use resources to comply with federal mandates for educating English language learners (WIDA, 2013). Even teachers in states that are not members of the WIDA Consortium can access information about teaching students at different levels of language proficiency at *www.wida.us*.

Third, when teachers follow research-based best practices for teaching English learners, both ELLs and native English speakers benefit. Scaffolding language development helps all students, particularly students struggling to learn, increase both academic language and mathematical understandings. Literacy in language acquisition for ELL students is not the end product but a process for further learning of the mathematics content (Hoffman & Zollman, 2016).

For this paper, we reviewed the current best practices literature for teaching English language learners in the content areas. There is a growing body of research on helping ELL students develop both conceptual and skill-specific abilities in the learning of English. This research has many parallel approaches to our knowledge of learning conceptual and meaningful procedures in mathematics. The following sections detail the relevance and implications of these connections for teachers of mathematics.

Discussion

To illustrate our advice to mathematics teachers of ELLs we use the Effective Mathematics Teaching Practices from the NCTM *Principles to Actions* (National Council of Teachers of Mathematics, 2014). All of these suggestions are valuable for all students in the learning of mathematics.

1. *Establish mathematics goals to focus learning*: The mathematics teacher posts written and states orally the daily objectives, for both mathematics content and language skills, that coincide with the unit goals. At the closure of the lesson, the teacher asks different ELL students to say, in their own words, what was the purpose of the lesson and what students are to take away from the lesson.
2. *Implement tasks that promote reasoning and problem solving*: The teacher poses activities that require active student learning beyond procedural exercises. ELL students evaluate the reasonableness of their results.
3. *Use and connect mathematical representations*: The activities begin with real-world situations then progress with manipulatives and pictorial representations to lay the groundwork for the symbolic representation. The lesson closes by connecting back to the real-world application.

4. *Facilitate meaningful mathematical discourse*: The teacher encourages student-to-student discussions by having students compare and contrast methods, solutions and justifications. The ELL student at times is partnered with another ELL student of the same language, and at other times, partnered with an English-only student.
5. *Pose purposeful questions*: The teacher poses both lower-order and higher-order questions to assist ELL students in forming their own conceptual understandings.
6. *Build procedural fluency from conceptual understanding*: The teacher scaffolds lessons that assimilate and associate the development of the procedural algorithms from conceptual understandings. ELL students are given time to digest these connections while practicing for fluency of both language and procedures.
7. *Support productive struggle in learning mathematics*: ELL students are given both lower- and higher-level questions and problems. Positive reinforcements are given for effort and persistence not intellect or natural ability. Errors are viewed as opportunities for new learning.
8. *Elicit and use evidence of student thinking*: Formative assessment responses are used to guide ELL student's conceptual understandings and procedural development as well as to plan for further instruction.

Build Background of New Concepts

Skilled teachers know they need to connect with students' cultures and lived experiences. In addition to this background, students need to have experiences in multiple representations: concrete with manipulatives, pictorial or graphical, numerical or algebraic, and real-world applications (Zollman, 2012). This is in accordance with National Council of Teachers *Professional Teaching Standards for School Mathematics* (1991) and, again, is helpful to both English-only students as well as ELLs. Graphic organizers of a variety of types are particularly useful in helping ELLs understand and communicate understanding of complex topics (Haynes & Zacarian, 2010).

Support Students' Vocabulary-Building Skills and Model Vocabulary Uses

ELLs must learn a vast amount of vocabulary to keep up with grade-level content area academics. Teachers can support vocabulary development in a variety of ways—such as encouraging students to keep vocabulary journals or creating mnemonic aids—but the key to learning vast numbers of words is to use the words often in a variety of mathematics discourse interactions. Research on language learning supports the necessity of students using target vocabulary multiple times in reading, writing, speaking, and listening in order for students to retain large numbers of new words (Mancilla-Martinez, 2010; Folse, 2006; Lee & Muncie, 2006). Simply writing definitions of words does not speed development, but using the words in meaningful contexts does. Modeling new words in sentences helps ELLs learn English sentence structure in addition to discrete vocabulary terms (Hoffman, 2013).

Increase Interaction Opportunities with Different Grouping Strategies

Students cannot learn academic English unless they actively use academic English. Cooperative activities in pairs and small-group allow ELLs opportunities to practice mathematical vocabulary in less intimidating environments than speaking in front of the class. Although many teachers are uncomfortable with students speaking their native language in class, research supports the value in ELL students using their native language to clarify and solidify concepts (Echevarría, Vogt, & Short, 2012) and federal mandates specify that schools may use a student's native language to help teach both English and academic content (Zacarian, 2012). The National Literacy Panel on Language Minority Children and Youth found that literacy skills, concept attainment, and content knowledge learned in one language will transfer to a new language more quickly if a student can utilize one's background in the home language (August & Shanahan, 2006; Cummins, 2000). Students in mathematics classrooms often find great benefit in using their home languages periodically in order to check their understanding and solidify their learning with peers and teachers who speak their first language. Similarly, mathematics teachers should take advantage of any print or multimedia resources available in students' home languages to use as supplementary teaching materials. Mathematics teachers can benefit from grouping

Similarly, mathematics teachers should take advantage of any print or multimedia resources available in students' home languages to use as supplementary teaching materials. Mathematics teachers can benefit from grouping students flexibly so that sometimes ELLs may be paired with other ELLs from the same language background so that they can use their home language to check their understanding of a difficult new concept. At other times, teachers can pair ELLs with English-only students so that ELLs must use their developing academic English skills.

Implications

Good instruction for learning is good for every student (Hoffman & Zollman, 2016). Mathematics teachers possess most of the skills needed to facilitate success for ELL students in mathematics. First, educators have modified their practice before to accommodate students, when they first began consulting IEPs and accommodating needs of students with learning differences. In the same way, educators can become accustomed to providing scaffolding and language support for ELL students' needs.

Second, since ELL students are emerging bilinguals (or may already be multilingual before learning English), ELL students already are utilizing more of their brain function than English-only students in class. So, we challenge mathematics teachers to view having ELL students in one's class as having gifted students in the class. The breadth of experience and worldview ELLs bring to a class can benefit all students.

Third, the teacher has a responsibility to all students to challenge them to succeed. We want all students to problem solve, reason, communicate, model, use tools strategically, attend to precision, and make use of structure (National Governors Association, 2010). These standards will not be attained if the teacher expects only lower-level responses from the ELL student. Teachers sometime assume that a specific group of students (ELLs) are not as capable as other students and ask only lower-level questions to those students, not wanting to make students uncomfortable (Shahrill & Mundia, 2014).

Fourth, teaching for success with ELL students is not based upon the teacher's natural teaching or language ability. Like with students, it is the teacher's persistence and the willingness to learn that is important. A teacher's effort to establish rapport is critical for any marginalized student.

"An ELL student may speak with an accent, but this does not mean that the student thinks with an accent" (Hoffman & Zollman, 2016, p. 92). Research consistently demonstrates that all students achieve more from teachers who scaffold instruction, activate schema, and connect the content to the students' real world. Our goal for mathematics teachers is not to become literacy teachers, but to use literacy to teach mathematics. Literacy is a process, not the end product of good teaching.

The Authors

Dr. Lisa Hoffman (lhh@ius.edu) researches cultural identity and education among immigrant and refugee children and families.

Dr. Alan Zollman (alanzoll@ius.edu) investigates mathematics education learning for all, and is a Past-President of School Science and Mathematics Association.

References

August D., & Shanahan T. (2006). *Developing literacy in second-language learners: Report of the national literacy panel on language minority children and youth*. Mahwah, NJ: Lawrence Erlbaum Associates.

Bennett, C. A., & Ruchti, W. (2014). Bridging STEM with mathematical practices. *Journal of STEM Teacher Education, 49*(1), 17–28. Retrieved from https://casit.illinoisstate.edu/ojs/index.php/CeMaST/article/view/865/821

Cummins, J. (1984). *Bilingualism and special education: Issues in assessment and pedagogy.* Clevedon, England: Multilingual Matters.

Cummins, J. (2000). *Language, power and pedagogy: Bilingual children in the crossfire.* Clevedon, England: Multilingual Matters.

Collier, V. P., & Thomas, W. P. (2002). Reforming education policies for English learners means better schools for all. *The State Education Standard, 3*(1), 30-36.

Echevarría, J., Vogt, M., & Short, D. J. (2012). *Making content comprehensible for English learners: The SIOP model* (4th ed.). Boston, MA: Pearson.

Folse, K. S. (2006). The effect of type of written exercise on L2 vocabulary retention. *TESOL Quarterly, 40*(2), 273–293. doi:10.2307/40264523

Haynes, J., & Zacarian, D. (2010). *Teaching English language learners across the content areas.* Alexandria, VA: ASCD.

Hoffman, L. (2013, November). Talk like a scientist! Simple "frames" to scaffold the language of science. ERIC Number: ED566950.

Hoffman, L. & Zollman, A. (2016). What STEM teachers need to know and do for English Language Learners (ELLs): Using literacy to learn. *Journal of STEM Teacher Education, 51*(1) 83-94.

Lee, S. H., & Muncie, J. (2006). From receptive to productive: Improving ESL learners' use of vocabulary in a postreading composition task. *TESOL Quarterly, 40*(2), 295–320. doi:10.2307/40264524

Mancilla-Martinez, J. (2010). Word meanings matter: Cultivating English vocabulary knowledge in fifth-grade Spanish-speaking language minority learners. *TESOL Quarterly, 44*(4), 669–699. doi:10.5054/tq.2010.213782

National Council of Teachers of Mathematics. (1991). *Professional teaching standards for school mathematics.* Reston, VA: Author.

National Council of Teachers of Mathematics. (2014). *Principles to actions: Ensuring mathematical success for all.* Reston, VA: Author.

National Governors Association & Council of Chief State Schools Officers. (2010). *Common core standards for mathematics.* Retrieved from http://www.corestandards.org/

Riley, C., & Figgins, L. (2015, October). Connecting NGSS and the Common Core through integration in the elementary classroom. Presented at the annual meeting of the School Science and Mathematics Association, Oklahoma City, Oklahoma.

Shahrill, M., & Mundia, L. (2014). The use of low-order and higher-order questions in mathematics teaching: Video analyses case study. *Journal of Studies in Education, 4*(2), 15–34. doi:10.5296/jse.v4i2.5318

WIDA. (2009). WIDA: Can do descriptors. Madison, WI: University of Wisconsin.

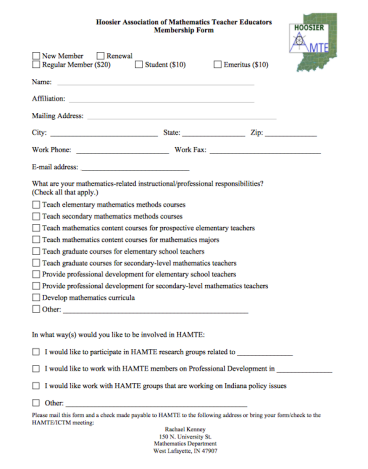
Zacarian, D. (2012). *Serving English learners: Laws, policies, and regulations*. Washington, DC: WETA. Retrieved from http://www.colorincolorado.org/guide/serving-english-learners-laws-policies-and-regulations

Zollman, A. (2012). Learning for STEM literacy: STEM literacy for learning. *School Science and Mathematics, 112*(1), 12–19. doi:10.1111/j.1949-8594.2012.00101.x

Connect with HAMTE!

- ***Visit our website:*** www.hamte.org
- **Join an Advocacy Team** to connect and collaborate with others across the state to address crucial issues in the field of mathematics education! Contact the facilitators below if you are interested.
  - **Pre K-12 Curriculum Team**
    - **Facilitator**: Gina Borgioli Yoder, gbyoder@upui.edu
  - **Mathematics Teacher Recruitment / Support for Public Education Team**
    - **Facilitators**: David Feikes dfeikes@pnc.edu and Jill Newton janewton@purdue.edu
  - **Teacher Licensure Testing Team**
    - **Facilitator:** Liz Brown, Liz.Brown@indstate.edu
- ***Submit an article and/or teaching methods or ideas to the newsletter***, *HAMTE Crossroads*. Email your submission to Andrew Gatza, Newsletter Editor, at agatza@iupui.edu. We publish a Fall, Spring, and Summer edition.
- ***Write an article for*** *the new newsletter section called "Thinking Equity in Mathematics Education." Contact* Andrew Gatza, Newsletter Editor, at agatza@iupui.edu for further details.

BECOME A HAMTE MEMBER!



Hoosier Association of Mathematics Teacher Educators
Membership Form

☐ New Member ☐ Renewal
☐ Regular Member ($20) ☐ Student ($10) ☐ Emeritus ($10)

Name: _____

Affiliation: _____

Mailing Address: _____

City: _____ State: _____ Zip: _____

Work Phone: _____ Work Fax: _____

E-mail address: _____

What are your mathematics-related instructional/professional responsibilities? (Check all that apply.)
☐ Teach elementary mathematics methods courses
☐ Teach secondary mathematics methods courses
☐ Teach mathematics content courses for prospective elementary teachers
☐ Teach mathematics content courses for mathematics majors
☐ Teach graduate courses for elementary school teachers
☐ Teach graduate courses for secondary-level mathematics teachers
☐ Provide professional development for elementary school teachers
☐ Provide professional development for secondary-level mathematics teachers
☐ Develop mathematics curricula
☐ Other: _____

In what way(s) would you like to be involved in HAMTE:
☐ I would like to participate in HAMTE research groups related to _____
☐ I would like to work with HAMTE members on Professional Development in _____
☐ I would like work with HAMTE groups that are working on Indiana policy issues
☐ Other: _____

Please mail this form and a check made payable to HAMTE to the following address or bring your form/check to the HAMTE/ICTM meeting:

Rachael Kenney
150 N. University St.
Mathematics Department
West Lafayette, IN 47907

https://hamte.org/join/

Submit a completed **membership form** and $20 ($10 for students and emeritus faculty) to HAMTE Treasurer Rachael Kenney,

150 N. University St.

Mathematics Department

West Lafayette, IN 47907.

The membership year runs October 15 through October 15 (to coincide with our annual fall meeting).

What's the Word on Campus?

University of Indianapolis

John Somers, **Rachael Aming-Attai**, and **Usef Faghihi** were awarded UIndy's Interdisciplinary Research & Performance Grant for the Mathematics and Computer Science Serious Games Lab (MCS-SGL) Project. In collaboration, they will develop a games lab along with UIndy undergraduates from different disciplines to design digital and analogue games that will deepen participants' mathematical and computational thinking. Qualitative and quantitative data will be collected to determine game effectiveness, educational benefit, and collaborative creativity.

Faculty from the School of Education and the Mathematics Department have organized collaborative initiatives. The UIndy Mathematics Education Collaborative Team strengthens our programs by bridging the gap between pre-service teachers' pedagogical knowledge and mathematics content knowledge. The committee meets regularly to coordinate collaboration on various aspects of mathematics teacher preparation such as recruitment and retention, assessment, instruction, and outreach. They are in the beginning stages of their work, and would love to talk with anyone who is also doing collaborative initiatives between their Education and Mathematics Departments. Please contact **Travis Miller** at tmiller@uindy.edu for more info.

Dr. Clayton Roan joins the Department of Mathematics & Computer Science, teaching math and math education courses and university supervising student teachers in secondary mathematics. Dr. Roan studied secondary mathematics education at Eastern Illinois University, where he also received his master's in mathematics education. In Toledo, Illinois, he worked for Cumberland Schools as a middle and high school mathematics teacher. In 2012, he received his PhD in K-12 Educational Administration from Indiana State University. Dr. Roan has previously been Instructor of Mathematics at Eastern Illinois University and Ball State University.

Indiana University - Bloomington

Amy Hackenberg and a team of graduate students continue to work on **project IDR²eAM**, http://www.indiana.edu/~idream/. IDR²eAM stands for **I**nvestigating **D**ifferentiated Instruction and **R**elationships between **R**ational Number Knowl**e**dge and **A**lgebraic Reasoning in **M**iddle School and is funded by the National Science Foundation.

The purposes of this 5-year project are to investigate how to differentiate mathematics instruction for middle school students at different levels of reasoning and to understand how students' rational number knowledge and algebraic reasoning are related. In the first two years of the project (Phase I) they conducted three iterative, after school design experiments with cognitively diverse middle school students. In the third year (2015-2016, Phase II), they conducted retrospective analysis, student thinking and learning, as well as the functioning of differentiated instruction, in these experiments.

During the 2015-2016 school year they also led a Teacher Study Group (TSG) with 15 middle school mathematics teachers from around the state (Evansville, Bloomington, Ellettsville, Indianapolis, and Hammond). Four teachers from the TSG will participate in the last two years of the project (Phase III); Amy will co-teach with these teachers to study how to differentiate instruction in classrooms, as well as to study how teachers learn to differentiate instruction. This phase began in January.

Indiana University - Purdue University Indianapolis

Craig Willey continues to work with Dr. Stefanie Livers of the University of Alabama on a project called "Taking Power Seriously: An Exploration of Mathematics Teacher Educators' Priorities in Preparing Novice Teachers." Taking up Danny Martin's call to consider what mathematics education would look like if we were genuinely invested in disrupting differential opportunities to learn math, the pair is currently engaged in collaborative auto-ethnographic work to understand how histories and sociopolitical perspectives affect how MTEs construct curriculum and instructional practices.

Craig and Paula Magee continue to work on their project "Building a Coalition of Urban Teacher-Researchers: Science-Mathematics Mentorship and Action Research for Teaching (SMMART)." At this point, the cadre of mentor teachers are implementing math and science action research projects around equitable math and science instruction while supporting student teachers. The pair presented this work at the annual conference of the Council of Professors of Instructional Supervision (COPIS) in October and will also present at AERA in April. Craig will also participate in the *Equitable Mathematics Classroom Observation Tools* conference March 9th-11th in Pittsburgh.

Recent Publications:

- Musgrove, J. & **Willey, C.** (Forthcoming). Problem-based mathematics learning in urban spaces: Exploring mathematical circles in youth's community circles. In D. White, A. Fernandes, & M. Civil (Eds.), *Access and equity: Promoting high quality mathematics in grades 9-12*.

- **Willey, C., Gatza, A., & Flessner, C**. (March, 2017). Mathematics discourse communities: Language ideologies and urban mathematics teaching with Latinas/os. *Journal of Cases in Educational Leadership*.

- **Willey, C.** & Magee, P. A. (2016). Clinical experiences and mediational activities in urban teacher preparation: Learning and critical consciousness. *Global Education Review, 3*(4), 107-126.

- **Willey, C.** (2016). Supporting novice mathematics teachers' racial consciousness. In D. White, S. Crespo, & M. Civil (Eds.), *Cases for teacher educators: Facilitating conversations about inequities in mathematics classrooms*. Information Age Publishing.

Dr. Crystal Morton, while on sabbatical, continues to work on her Girls STEM Institute project where she has been conducting in-depth interviews with Girls STEM Institute participants and parents in order to 1) develop an understanding of the schooling and mathematics learning experiences of Black females from their perspective, and 2) develop an understanding of both how parents advocate for their child/children and support their development as learners of mathematics and what resources parents may need to become more effective educational advocates on behalf of their child/children.

The Girls STEM Institute project includes weekend workshops on leadership and self-development, and the summer institute portion of the project, which is focused on personal health and wellness, includes the following foci:

- Anatomy and Physiology –in partnership with Martin University
- Public Health -- in partnership with IUPUI School of Public Health
- Coding—in partnership with IUPUI Mathematics Assistance Center
- Entrepreneurship, leadership, and social development – in partnership with local non-profit Always Making Progress
- College readiness
- Literacy (i.e. reading, writing, oral and numeracy skills, critical literacy, financial literacy)
- Physical fitness

Indiana University - Purdue University Indianapolis …*continued*

Erik Tillema and graduate student **Andrew Gatza** continue to work on the project Generalization Across Multiple Mathematical Areas (GAMMA), a project funded by the National Science Foundation. GAMMA is a 3-year multi-site project that is investigating the kind and quality of generalizations that middle grades through collegiate level students make in the domains of combinatorics, algebra, geometry, and advanced algebra, and the instruction necessary to support these generalizations. Erik is the PI for the Indianapolis site. In the first year of the project they interviewed 32 middle and high school students four times each in order to determine the kind and quality of generalizations that students made. During the 2015-2016 school year they conducted two teaching experiments. The teaching experiments were run with pairs of 10th and 8th grade students in order to understand how the quality of student generalizations develop over time and support their learning. The third year the project, which is currently in progress, includes two design experiments with 8th and 10th graders, respectively.

Indiana University - Southeast

Indiana University Southeast will have a newly approved Master's of Science in Secondary Education with a Concentration in Mathematics (when approved by the HLC). The main purpose of this concentration is to respond to the dual-credit high school teacher qualifications by the Indiana Higher Learning Commission (HLC), stating that dual-credit (secondary and college) high school mathematics teachers hold a master's degree in the discipline. This 36-hour master's degree has 12 hours in the core education courses of instruction, assessment, and research; 6 hours in secondary mathematics education courses; and 18 hours in 400/500-level mathematics courses. For further information about this master's program contact Dr. Faye Camahalan, Director of IUS Education Graduate Studies, at fcamahal@ius.edu.

Dr. Lisa Hoffman and **Dr. Alan Zollman** presented on the teaching of mathematics to English Language Learners (ELLs) at the 44th Annual Meeting of the Research Council on School Mathematics in Fort Worth, TX, March 2-4, 2017.