

NOTICIAS de TODOS TODOS Newsletter: Mathematics for ALL Summer/Fall 2018 Volume 13

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Teaching Mathematics in Culturally, Socially, and Developmentally Just Ways

Editorial by Laura McLeman and Eugenia Vomvoridi-Ivanovic

Welcome to the Summer 2018 newsletter! We are excited to continue providing opportunities for us all to consider the theme we began in the Winter 2018 newsletter, namely that of teaching mathematics in socially and culturally just ways. In this issue of the newsletter, we extend that theme to consider not just the social and cultural aspects of learning, but the developmental aspects as well.

A common mentality of education today is that teachers are "currently preparing students for jobs that don't exist yet, technologies that haven't been invented in order to solve problems we don't even know are problems yet" (Free Working Tricks, 2017). And this is very well true. Yet, there are problems that we know exist now that need solutions. Our new TODOS president, Diana Ceja, reminds us in her first News from the President (p. 1) that students need multiple opportunities to investigate and interrogate their world. On p. 2, Eugenia Vomvoridi-Ivanovic and Cheryl Ellerbrock provide us with an example of what the investigation and interrogation might look with their framework on Responsive Middle Level Mathematics Teaching (RMLMT). Building upon students' desire to investigate how bullying is impacting their world, the mathematics lesson they provide details how teachers can be culturally responsive to students in ways that are developmentally appropriate. Specifically, they share that cultural responsiveness and developmentalism can work synergistically in the continued on page 2

From the President By Diana Ceja **News from the President**

Our children find themselves in a world engulfed with environmental issues, population growth, global poverty, economic shifts, a lack of human rights, and political conflict. They may find themselves overwhelmed. Yet, the world needs them to act and we know they can make a difference.

We find ourselves responsible for preparing our children to investigate and interrogate the conditions in their world. We find ourselves shifting from a narrow mathematical curriculum to global and culturally responsive mathematics that can enable our children to engage in their own learning, develop solutions, communicate ideas, and realize empathy and optimism that in turn may influence the world around them. TODOS: Mathematics for ALL (TODOS), the National Council of Supervisors of Mathematics (NCSM), the National Council of Teachers of Mathematics (NCTM), the Association of Mathematics Teacher Educators (AMTE), Women and Mathematics Education (NASGEm), Benjamin Banneker Association (BBA), the Journal Ceja, continued on page 2

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context of teaching mathematical content to reflect a more holistic understanding of the young adolescent. The *References that Inform Our Work* column (p. 5) provides several citations that help contextualize this work if you are interested in learning more.

In her column, Diana Ceja also speaks to how TODOS and other organizations are working collectively to understand their role in supporting this type of work for teachers. How might you support students in understanding and investigating their world? One such way might be to run for a board position within TODOS or to volunteer in whatever fashion fits with your life circumstances at a future TODOS event or activity. For example, this newsletter could not be put out if it were not for the dedication and hard work of the editorial staff. Beyond ourselves, the editorial team consists of Jose Manuel Martinez, Ricardo Martinez, and Jill Bratton. Jose is a doctoral candidate in Curriculum, Instruction and Teacher Education at Michigan State University. His research follows participatory designed-based methods to study participation in mathematics teaching and learning in language immersion classrooms. Ricardo is currently a leadsite facilitator for a Latinx youth community-based organization, where he works to provide young people with the knowledge/opportunities to discover their own human agency while developing a critical understanding of the world. He is also a PhD student in mathematics education at Iowa State whose research looks at how consciousness shifts and is developed within the learning of mathematics. Jill is in her first year as a Center for Outstanding Readiness in Education (CORE) Math and Reading Specialist at New Mexico State University. Prior to this position she taught in TESOL, bilingual and mainstream classes in Virginia, Puerto Rico and New Mexico.

As always, we invite you to contribute to future newsletters, be it through submitting citations that you believe would be useful to the TODOS family to explore or by volunteering to write a featured article. Additionally, we encourage you to contact us if there is a message that you would like to share or a specific topic or issue aligned with the TODOS mission that you would like to see addressed in a future newsletter. In the meantime, we hope you enjoy reading this newsletter and that you are having a good school year.

Laura McLeman Eugenia Vomvoridi-Ivanovic lauramcl@umflint.edu eugeniav@usf.edu

News from the President, cont'd.

(WME), North American Study Group of Ethnomathematics of Urban Mathematics Education (JUME) and the California Mathematics Council Southern Section (CMC-S) in a collective call to action have sanctioned "social justice as a key priority in the access to, engagement with, and advancement in mathematics education for our country's youth." (TODOS/NCSM Social Justice Position paper). We collectively are creating a shared understanding of what a social justice stance requires so that we may collectively change our understanding of the role of mathematics in creating a more just world. In our second year in this endeavor, From Awareness to Action: Equity and Social Justice in Mathematics Education we continue to invite our membership to participate in becoming aware, learning about new possibilities, listening to ideas, reflecting for understanding and joining in the Call to Action. Webinars have been scheduled throughout the year, facilitated by the different organizations to explore and expand our knowledge and understanding so that we may better support our children.

Our third biennial conference #TODOS2018, *It's ALL about ALL students Learning Quality Mathematics: Advocating for Equity and Social Justice* allowed for a renewed sense of energy and urgency and an opportunity to develop strategies as a community of learners. Further, the TODOS Board meeting following the conference allowed us to take stock of how we are fulfilling our commitment to our members and to our children.

TODOS will continue with a social justice stance, investigating different forums for expanding our mission. There are several possibilities for getting involved. We invite you to get involved, ask questions and share ideas. Post a comment on our membership blog, comment on Facebook, or twitter, contact a board member. ¡Que siga el movimiento!

#todosmaths #mathequity

Responsive Middle Level Mathematics Teaching

By Eugenia Vomvoridi-Ivanovic and Cheryl R. Ellerbrock, University of South Florida eugeniav@usf.edu ellerbro@usf.edu





There is a growing body of literature that highlights the importance of Culturally Responsive Mathematics Teaching (CRMT) (e.g. Aguirre, 2012; Aguirre & Zavala, 2013) and teaching that is developmentally responsive to young adolescents (e.g. Caskey & Anfara, 2014; National Middle School Association [NMSA], 2010; Steinberg, 2014). However, little is known about how to teach mathematics to young adolescents in a way that is both responsive to their cultural and developmental characteristics, needs, and interests in an integrated manner. What does middle level mathematics teaching look like when developmental responsiveness, cultural responsiveness, and mathematical thinking hold equal status in instruction? How can we teach middle level mathematics to young adolescent learners in a way that is both responsive to their cultural needs and developmental characteristics, needs, and interests in a comprehensive fashion? A desire to further explore this question led us to develop a more integrated and holistic framework on teaching middle level mathematics to young adolescent learners, called Responsive Middle Level Mathematics Teaching (RMLMT).

We define RMLMT as "quality mathematics teaching for *all* young adolescents that advances their mathematical thinking, promotes equity and social justice, and attends to their developmental characteristics, needs, and interests" (Ellerbrock & Vomvoridi-Ivanovic, in press). This comprehensive way of thinking about teaching young adolescent learners mathematics is grounded in the literature of both CRMT and developmentally responsive teaching (DRT). While in and of themselves tenets of CRMT and DRT are valuable to the teaching of mathematics and the teaching of young adolescent learners, respectively, it is our experience that

neither approach alone is comprehensive enough to address the evolving needs of young adolescents learning of mathematics. In the RMLMT framework, cultural responsiveness and developmentalism work synergistically in the context of teaching mathematical content and operate in an integrated fashion, reflecting a more holistic understanding of the young adolescent and how best to teach and reach this age group.

In what follows, we provide a brief description of a sample lesson as an example of what RMLMT may look like in practice. We then present an alignment of the different aspects of the lesson to the dimensions of RMLMT. For a more detailed explanation of the RMLMT framework and the lesson example that follows, see Ellerbrock and Vomvoridi-Ivanovic (in press).

Using Mathematics to Unpack Bullying

A team of 6th grade teachers created an interdisciplinary unit focused on bullying - an issue that their students identified as important to both their home and school life. The mathematics portion of the unit focused on ratio, rate, and percent (NGA & CCSSO, 2010), asking students to make sense of those concepts using statistics on bullying. Within this approximately 4-day mathematics lesson, students were heterogeneously arranged into groups of four based on their pre-assessment scores using Kagan's (1994) team grouping structures, with the high and low medium working together and the high medium and low working together.

The lesson began with a whole class guided mathematical analysis of statements on bullying statistics found on PACER's (2016) website. The teacher first read the statement, "More than one out of every five (20.8%) students report being bullied" and asked students to discuss its meaning. To help students unpack the statement and determine its validity, she asked questions such as "How did the authors determine that more than one out of every five students report being bullied?", and "How can we determine the exact ratio of students who report being bullied to that of those who do not report being bullied?"

The teacher then shared that "64% of children who were bullied did not report it; only 36% reported the bullving." Students first worked with their shoulder partner to determine the validity of this statement. 3

Shoulder partners then used the two statements they were given to estimate the ratio of students who have experienced bullying to those who have not. The teacher walked around and observed each pair of shoulder partners as they worked on this task and provided assistance as needed. If one student pair at the table finished before the other pair, the teacher instructed the students to create a representation of the ratios using any medium desired, including a visual representation (e.g. drawing) or a physical representation (e.g. using manipulatives). Once both pairs completed both tasks, each pair shared their findings with their table partners and discussed any discrepancies until a consensus was reached. The teacher then prompted each table of four to engage in press). A Framework for responsive middle level a discussion about what this ratio meant for bullying at their school and to collaboratively use the ratio to estimate how many students in their school may have *handbook of research in middle level education:* experienced bullying.

Each table of students then conducted a mathematical Kagan, S. (1994). Cooperative Learning. San analysis on the bullying of select groups of young adolescent students (e.g., students with special needs, students who are early/late maturers, LGBTQ students). Specifically, each student researched one aspect of their topic and shared it with their table partners. Each student group then took the collective information learned to create a visual representation that displayed the results of their investigation along with a list of recommendations for promoting tolerance and acceptance of all students at their school.

Viewing the lesson through the RMLMT lens

The example lesson shared has multiple aspects that make it both culturally and developmentally appropriate for middle school students. Table 1 (see p. 4) demonstrates the alignment of these aspects with each of the eleven dimensions of the RMLMT framework. The first six dimensions are aligned with those in the CRMT framework (Aguirre, 2012), while the other five are aligned with the literature on DRT for young adolescents (e.g. NMSA, 2010).

Conclusion

It is our hope that middle level mathematics teachers consider the role of how developmentalism and cultural responsiveness in an integrated fashion play out in their teaching practices.

References

Aguirre, J. M. (2012). Developing culturally responsive mathematics teaching. News From TODOS: Mathematics For All, 8(2), 1-4. Aguirre, J. M., & Zavala, M. R. (2013). Making culturally responsive mathematics teaching explicit: A lesson analysis tool. Pedagogies: An International Journal, 8(2), 163-190. Caskey, M. M., & Anfara, Jr., V. A. (2014). Research summary: Developmental Characteristics of young adolescents. Retrieved from http://www.amle.org/BrowsebyTopic/WhatsNew/WN Det.aspx?ArtMID=888&ArticleID=455 Ellerbrock, C. R., & Vomvoridi-Ivanovic, E. (2018, in mathematics teaching. In preparation for K. M. Brinegar, L. M. Harrison, & E. Hurd(Eds.), The Equity and cultural responsiveness in the middle grades. Charlotte, NC: Information Age Publishing. Clemente, CA: Kagan Publishing. National Middle School Association. (2010). This we believe: Keys to educating young adolescents. Westerville, OH: Author.

PACER's National Bullying Prevention Center (2016, December 8). Bullying statistics. Retrieved from: http://www.pacer.org/bullying/resources/stats.asp Steinberg, L. (2014). Age of opportunity: Lessons from the new science of adolescence. Boston, MA: Houghton Mifflin Harcourt.

ANNOUNCEMENT

Consider applying for the TODOS MET grant for *Fostering* Support for Mathematics learning in Multilingual Classrooms, funded by TODOS and NCTM. One grant of up to \$4,000 will be awarded to a school for 2018–2019. The proposal is to be submitted electronically to met-todosgrant@todos-math.org by 11:59PM PST on November 2, 2018. For more information, go to https://www.todos-math.org/todos-met-grant

TODOS Mission Statement The mission of TODOS: Mathematics for ALL is to advocate for equity and high quality mathematics education for all students-in particular, Latina/o students.



Dimension Explanation 1) Cognitive demand Tasks require complex, non-algorithmic thinking, and require considerable cognitive effort. For example, students use their knowledge about multiplication, division, and percentages to interpret bullying statistics and solve relevant ratio problems. Students develop deep content knowledge by understanding connections among concepts (i.e., 2) Depth of knowledge & student understanding ratios, fractions, and percents) and procedures for solving problems that involve these ratios (e.g. finding the whole given the part and the percent) and are asked to demonstrate their knowledge and explain their ideas. 3) Mathematical Students have the opportunity to contribute to the classroom by answering and posing questions, discourse justifying claims with evidence, voicing conjectures, and communicating their reasoning process throughout the various parts of the lesson (e.g., whole class discussion, group work, gallery walk, stations). 4)Power and participation The teacher positions students as valuable contributors, minimizes status issues, and fosters a shared authority of mathematics in the classroom by posing worthwhile tasks that tap into a wide range of knowledge, promote deep mathematical thinking, and have multiple entry points. 5)Academic language The teacher, in consultation with the ESL teacher, uses multiple strategies to support mathematics support for English learning and academic language development. Further, background context knowledge has been built and linguistically demanding text has been tackled by the Language Arts teacher in the 6th Learners grade team. 6) Cultural/ Students use mathematics to explore a topic of great concern to them. Community-based funds Specifically, they use mathematics to make sense of bullying statistics and make estimates for how of knowledge bullying affects students in their own school. Students also use the findings from their mathematical analysis of bullying statistics to create a poster and flyers that promote bullying awareness in their school. 7) Physical Students engage in teaching activities that involve movement (i.e., gallery walk). Students also investigate bullying of students who may be bullied due to their physical characteristics (e.g., characteristics early/late maturers). Students are developing a detailed understanding of the world around them and how groups of students who are bullied are mistreated. For the majority of the lesson, students are intentionally collaborating with specifically assigned peers on active learning tasks with a final product that has 8) Cognitive-intellectual characteristics real-life application (bullying awareness). Students are seeking to understand and value others and, in turn, can learn a great deal about themselves. This lesson helps students understand the large percent of young adolescents who are 9) Psychological characteristics bullied and may help those who are victims of bullying understand that their experiences and feelings are shared by other adolescents. Further, this lesson brings to the forefront timely issues for young adolescents such sex role identification. Students are asked to create a list of recommendations for promoting tolerance and acceptance of all 10) Social-Emotional students at their school. Through promoting awareness, tolerance, and acceptance, this lesson characteristics supports students' needs for approval, acceptance, and desire for a sense of connectedness and belongingness. Students research bullying of a particular group of adolescents and learn the statistics of bullying. 11) Moral characteristics The purpose is to increase awareness and promote acceptance and tolerance. Because students at this stage of development are developing their own values, beginning to take into consideration others perspectives, and are understanding of rather complex moral issues, this lesson is timely in the development of these moral characteristics.

Table I. RMLMT dimensions and explanation

TODOS Election Results

We want to congratulate Rocio Benedicto on being elected as Vice President and Zandra de Araujo on being elected to fill a Director position.



Rocio Benedicto is the Project Director of Collaborating for Outstanding Readiness in Education (CORE) at New Mexico State, whose organizational mission is to advocate and provide professional learning that supports high-quality instruction in schools that have a significant percentage of marginalized and underserved student populations. It was her experience of being in bilingual classrooms that helped her understand how systemic and deeply rooted racial stereotypes are in the learning of mathematics. As a result, of these experiences, Rocio has devoted her career to ensuring educational equity for all students in the teaching and learning of mathematics.



Zandra de Araujo is an associate professor of Mathematics Education in the Department of Learning, Teaching, and Curriculum at the University of Missouri. Her research examines teachers' use of mathematics curriculum, particularly with English learners. Zandra looks to continue the important work of developing resources to support educators as they help educate others about issues of equity and diversity in mathematics education. She wants to foster better collaboration among preservice teachers, mentor teachers, and teacher educators so the next generation is prepared to teach in impactful and empowering ways.

We want to thank the TODOS Nominations and Elections Committee: **Don Balka, Ellen Barger, María Fernandez and Michelle Graveline,** as well as the nominees and candidates who stepped up and were willing to serve. Your service is highly appreciated.

TODOS Student Awards September 2016 – April 2018

<u>1. November 4, 2016 – California Mathematics Council</u> South Conference (Palm Springs)

Joseline G. – 6th Grade, John Kelley Elementary School Coachella Valley USD Teacher: Ms. Charlotte Wang-Radi Principal: Ms. Mary Lou Padilla

Yaretzi S. – 6th Grade, Desert Springs Middle School Palm Springs USD Teacher: Ms. Karen Johnson Principal: Dr. Kiela Johnson

Stephanie S. – 7th Grade, Desert Springs Middle School Palm Springs USD Teacher: Ms. Sharon Kardos Principal: Dr. Kiela Snider

Andrea P. – 8th Grade, Bobby Duke Middle School Coachella Valley USD Teacher: Mr. Edwin Detoya Principal: Mr. Encarnación Becerra

Brian B. – 8th Grade, Bobby Duke Middle School Coachella Valley USD Teacher: Mr. Edwin Detoya Principal: Mr. Encarnación Becerra

Kaitlyn G. – 12th Grade, Lawrence F. Smith School Riverside County Office of Education Teacher: Ms. Joanne Kleveland Principal: Ms. Lucie Gonzalez



Left to right (front): Joseline G., Yaretzi S., Stephanie S. Left to right (back): Andrea P., Brian B.

TODOS Student Awards September 2016 – April 2018, cont'd

2. April 5, 2017 – National Council of Teachers of Mathematics Conference (San Antonio, TX)

Clarissa E. – 5th grade student Henry T. Brauchle Elementary Northside Independent School District Teacher: Deanna Demers Principal: Adriana Garza

Evan C. – 5th grade student Monroe May Elementary Northside Independent School District Teacher: Amanda Garner Principal: Geraldina Benitez

Leah G. – 5th grade student Kriewald Road Elementary Southwest Independent School District Teacher: Christine Bendele Principal: Mrs. Hidalgo





Left to right: Leah G., Evan C., Clarissa E.

3. April 21, 2017- California Action Network for Mathematics Excellence and Equity (CANMEE) Annual Convening (Santa Rosa, CA)

Marbella F. – 6th grade student James Monroe Elementary School Santa Rosa City School District Teacher: Nikki Winovich Principal: Michelle Smith Anthony H. – 6th grade student Albert Biella Elementary School Santa Rosa City School District Teacher: Elizabeth Graziani Principal: Aida Diaz

Leslie T. – 6th grade student James Monroe Elementary School Santa Rosa City School District Teacher: Nikki Winovich Principal: Michelle Smith

Jessica B. – 7th grade student Lawrence Cook Middle School Santa Rosa City School District Teacher: Ross Hause Principal: Julian Szot

Gabriel G. – 8th grade student Santa Rosa Middle School Santa Rosa City School District Teacher: Gloria Hurtado Principal: Tomas Fierro

2017 April Santa Rosa



Left to right (front): Marbella F., Anthony H., Leslie T. Left to right (back): Jessica B., Gabriel G.

TODOS Student Awards September 2016 – April 2018, cont'd

<u>4. October 20, 2017 – Ohio Council of Teachers of</u> Mathematics Conference (Columbus, OH)

Soledad R. – 5th Grade Burroughs Elementary School Columbus City Schools Teacher: Ms. Brittany Sparks Principal: Ms. Laura Schnebelen

Kelly V. – 6th Grade Columbus Spanish Immersion Academy K-6 Columbus City Schools Teacher: Ms. Patricia Vazquez Principal: Ms. Kathryn Myers

Marvin G. – 6th Grade Columbus Spanish Immersion Academy K-6 Columbus City Schools Teacher: Ms. Patricia Vazquez Principal: Ms. Kathryn Myers

Alba C. – 10th Grade Columbus North International School Columbus City Schools Teacher: Ms. Christine Hecht Principal: Mr. Kenny Lee

Pravin T. – 10th Grade \Columbus North International School Columbus City Schools Teacher: Ms. Christine Hecht Principal: Mr. Kenny Lee

Stephanie N. – 12th Grade Fort Hayes High School Columbus City Schools Teacher: Ms. Rebecca Woods Principal: Dr. Milton Ruffin



Left to right (front): Soledad R., Kelly V., Marvin G. Left to right (back): Alba C., Pravin T. Not shown: Stephanie N. Summer/ Fall 2018 5.October 27, 2017 – California Mathematics Council – South Conference (Palm Springs)

Jaymelee M. – 6th Grade Coral Mountain Academy Coachella Valley U.S.D. Teacher: Ms. Elena Valencia Principal: Mr. Humberto Alvarez

Melissa P. – 7th Grade Bobby Duke Middle School Coachella Valley U.S.D. Teacher: Mr. Edwin Detoya Principal: Mr. Encarnación Becerra

Leslie A. – 8th Grade Bobby Duke Middle School Coachella Valley U.S.D. Teacher: Mr. Edwin Detoya Principal: Mr. Encarnación Becerra

Monserratt Z. – 9th Grade Desert Learning Academy Palm Springs U.S.D. Teacher: Ms. Ioana Robles Principal: Dr. Todd Reed

Isaiah C. – 12th Grade Shadow Hills High School Desert Sands U.S.D. Teacher: Ms. Monika Ujkic Principal: Mr. Gabriel P. Fajardo

Alexander G. – 12th Grade Desert Hot Springs High School Palm Springs U.S.D. Teacher: Ms. Michelle Beyronneau Principal: Mr. George Bullis

Sebastian I. – 12th Grade Desert Hot Springs High School Palm Springs U.S.D. Teacher: Ms. Pamela Karon Principal: Mr. George Bullis

CONGRATULATIONS

We want to congratulate all the student and teachers for the hard work!

TODOS Student Awards September 2016 – April 2018, continued



Left to right (front): Melissa P., Leslie A., Jaymelee M. Left to right (back): Isaiah C., Sebastian I., Alexander G. Not shown: Monserratt Z.

<u>6. April 25, 2018 – National Council of</u> <u>Teachers of Mathematics Conference</u> (Washington, DC)

William H. – 8th grade student Truesdell Education Campus District of Columbia Public Schools Teacher: Ms. Veronica Torres Principal: Ms. Mary Ann Stinson

Jency M. – 8th grade student Truesdell Education Campus District of Columbia Public Schools Teacher: Ms. Veronica Torres Principal: Ms. Mary Ann Stinson

Sintia M. – 8th grade student Columbia Heights Education Campus District of Columbia Public Schools Teacher: Mr. Gabriel Morden-Snipper Principal: Ms. Maria Tukeva

Celeste A. – 11th grade student Columbia Heights Education Campus District of Columbia Public Schools Teacher: Mr. Rodney Cook Principal: Ms. Maria Tukeva Maritza M. – 11th grade student Columbia Heights Education Campus District of Columbia Public Schools Teacher: Ms. Lakshmi Peddyreddy Principal: Ms. Maria Tukeva

Gerardo H. – 11th grade student Columbia Heights Education Campus District of Columbia Public Schools Teacher: Mr. Derek Cabone Principal: Ms. Maria Tukeva

2018 NCTM (Washington, DC)



Left to right (front): Sintia M., Maritza M., Celeste A. Left to right (back): Diana Ceja (TODOS President), William H., Gerardo H., Jency M., Donald Tunstall (Texas Instrument Representative)

NOTICIAS de TODOS - Summer, 2018 Vol. 12, No. 2 Editorial board: Laura McLeman and Eugenia Vomvoridi-Ivanovic (Editors), Manuel Martinez, Ricardo Martinez, and Jill Bratton (co-editors).

Please send items to be published to: lauramcl@umflint.edu and eugeniav@usf.edu

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PO Box 25482 Tempe AZ, 85285-5482