

NOTICIAS de TODOS News from TODOS: Mathematics for ALL

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The mission of TODOS:

Mathematics for ALL is to advocate for an equitable and high quality mathematics education for all students—in particular, Hispanic/Latino students—by increasing the equity awareness of educators and their ability to foster students' proficiency in rigorous and coherent mathematics.

Developing Culturally Responsive Mathematics Teaching (Part I)

By Julia Aguirre

Assistant Professor, University of Washington Tacoma

Culturally Responsive Mathematics Teaching (CRMT) is effective mathematics teaching that advances students' understanding of mathematics while affirming their intellectual, cultural, linguistic, political, and emotional contributions. Gay [1] states that it is designed to empower "ethnically diverse students by simultaneously cultivating their cultural integrity, individual abilities, and

by simultaneously cultivating their cultural integrity, individual abilities, and academic success" (pg. 44). To implement CRMT, teachers must develop specific pedagogical knowledge, dispositions, and practices that privilege mathematical thinking, cultural and linguistic funds of knowledge, and recognize issues of power and social justice in mathematics education [2, 3, 4].

Through research and professional development experiences with k-8 preservice and in-service teachers, my colleagues and I have identified six dimensions of CRMT related to the two main goals of CRMT, which are student development of mathematics thinking and equity in the mathematics classroom [2, 3, 4].

Dimensions of CRMT and Guiding Questions

Among our previously published articles, we describe each of the dimensions and propose a *CRMT-Lesson Analysis Tool*. The tool, organized in a chart format, includes, for each dimension, a guiding question for teachers to think about when designing and critically reflecting upon their mathematics lessons. The full version in the TEACH MATH public website includes a rubric with specific descriptions of each dimension [5]. In this article, I only include each guiding question followed by answers to help get a grasp of how to develop each dimension of teaching in a culturally responsive manner. The goals and dimensions are:

Mathematics Thinking

- Cognitive Demand
- 2. Depth of student knowledge and understanding
- 3. Mathematics Discourse

Equity in the Mathematics Classroom

- 4. Power and Participation
- 5. Academic Language Support for ELLs
- 6. Cultural/community-based funds of knowledge/social justice

Aguirre, continued on p. 2

News From the President By Don Balka

Hola a TODOS /Hello to al!

Having served six months as your TODOS President, I want to share some of the exciting things that are happening with our organization.



Those of you who are fortunate to attend the NCTM Annual Convention are well aware of the reputation TODOS has for having the best party going on Thursday evening. In Denver, that Salsa Party will be a **10**th **Anniversary** party for TODOS. Plan to celebrate!

At the Spring Board meeting in Tempe, Arizona, your officers decided to hold the first ever **TODOS Conference** in the Phoenix area during June 2014. Plans are underway to locate a convenient and reasonably priced facility. The main themes of the conference will access to and equity in mathematics education for ELLs. Past President Nora Ramirez and TODOS member Melissa Hosten are co-chairing the conference committee. Keep on the lookout for further information and plan to attend.

In early August, Director Marta Civil, NCTM Representative Pat Trafton, Executive Secretary Carol Edwards, and I attended the **NCTM Affiliates Leaders Conference** in Atlanta. This meeting provides TODOS with an excellent opportunity to gain valuable information from and to network with other local, state, and national NCTM affiliates. We debriefed at the end of the conference and provided numerous recommendations to the TODOS Board at our last virtual meeting. We plan to submit a grant proposal to NCTM for professional development scholarships to attend our TODOS Conference in 2014.

As noted in the Spring *Noticias*, TODOS is now a member of the **Triangle Coalition for Science and Technology Education**. I attended the annual conference in Arlington, VA in early October. The theme for the 2-day event was "World-Class STEM Education in America." Numerous speakers from throughout the United States spoke about STEM, Common Core, and various ongoing initiatives. Lacking, however, in all presentations was any discussion about equity and the education of underrepresented students. A query to this point received little attention. I was able to connect with business/industry members about possible TODOS sponsorships.

Between our Conferences Committee Chair Florence Glanfield and our Member Services Chair

Balka, continued on p. 3

Aguirre, continued

1. Cognitive demand: How does my lesson enable students to closely explore and analyze mathematics concepts(s), procedure(s), and reasoning strategies?

Culturally responsive mathematics teaching includes *high cognitive demand tasks* that elicit student thinking, analysis and reasoning. These tasks require students to make connections among representations, understand the mathematics structure of a procedure and why it works, and expects students to articulate explanations and justification of ideas [6]. The focus of teaching is removed from low cognitive demand tasks, which emphasize reproduction of procedures, recall of facts, and superficial connections to the underlying conceptual foundations. CRMT adapts lessons that provide a variety of strategies so that *all* students engage in high cognitive demand tasks.

2. Depth of knowledge & student understanding: How does my lesson make student thinking/understanding visible and deep?

CRMT expects students to develop deep content knowledge-e.g., understanding connections among concepts and procedures, comparing/contrasting different representation of concepts, along with the ability to demonstrate their knowledge and explain their ideas. To promote this type of learning, teachers must have a strong understanding of the conceptual milestones of the mathematics content and be able to identify their students' previous knowledge, students' strengths and difficulties, and the possible confusions and misconceptions they might have for each of the mathematics topics. When the lessons are taught only at the skills or procedural level, students' knowledge stays superficial and fragmented, and students have difficulties to develop deep understanding.

3. Mathematical Discourse: How does my lesson create opportunities to discuss mathematics in meaningful and rigorous ways?

When students have the opportunity to contribute to the classroom, answering and posing questions, justifying claims with evidence, voicing conjectures, and communicating their reasoning process, they build a more solid understanding. However, as Moschkovich [7] argues, paying attention to *mathematical discourse*, not just vocabulary usage but the ways in which ideas and mathematical relationships are conveyed verbally and non-verbally through gestures, is key to fostering equity in mathematics classroom, particularly for ELLs.

Culturally responsive mathematics teachers seek a variety of strategies to foster ELLs' participation in this discourse that do not only rely on oral or written language to communicate.

4. Power and Participation

How does my lesson distribute mathematics knowledge authority, value student mathematics contributions, and address status differences among students?

Aguirre, continued on p.3

Balka, continued

Maria Torres, we have made great strides in being represented at various conferences around the country, either providing TODOS speakers or having a TODOS booth

Although our annual business meeting and awards presentations in Denver are several months away, now is the time to think about candidates for the Iris Carl Award. For members in Colorado, think about nominating an outstanding underrepresented student from your class or school for the Student Awards. Details for both awards are listed on the TODOS Website.

Don't forget our membership campaign, *Moving Upward*, with a goal of reaching 1000 AND 1 members by April 2013. An education division of Shell Oil in Houston generously donated 20 one-year TODOS memberships to teachers who attended the annual Conference for the Advancement of Mathematics Teaching (CAMT) this summer. Wouldn't it be great to celebrate our 10th anniversary with 1001 TODOS members? Get your friends to join, get your colleagues who once were members to renew!

We are making a difference! Again, if you are interested in serving on a TODOS committee or task force, or have a project that the Board might consider, please let me know.

Power and Participation ..., Aguirre, continued

As mentioned above, students' participation in the classroom is critical for their learning. There is a variety of reasons why students do not participate in class. For some students, confidence in their mathematics knowledge is an issue. If they are ELLs, it may be their confidence in communicating ideas in their second language. However, a culturally responsive mathematics teacher understands that issues of status and authority in the classroom also shape the mathematical experience of a child. Whether intended or not, the way a teacher positions students as valuable contributors or "uninvited guests" can determine who has legitimate mathematics authority in the classroom [4, 8]. To address issues of power and status, attention should be placed on how tasks are constructed and the support provided for equitable student participation. To minimize status issues and foster a shared authority of mathematics in the classroom, the teachers should create worthwhile mathematical tasks that promote mathematical thinking, have multiple entry points, and tap into a wide range of knowledge to solve the problems.

5. Academic Language Support (for ELLs)

How does my lesson provide academic language
support for English Language Learners?

Closely tied to mathematics discourse is the use of *academic language*-the language of school subjects. Teachers must consider the specialized academic language demands when constructing and implementing lessons including reading, writing, speaking, listening and representing[9].

This dimension of the CRMT would be better accomplished if mathematics and ESL teachers collaborate to plan some lessons and reflect on student learning. There are multiple strategies to support mathematics learning and academic language development of all students. In the classroom, teachers can revoice student ideas to model mathematical language use; affirm student use of L1 (first language) to communicate mathematical ideas, connect language cognates between L1 and English (e.g., as número/number, suma/sum), and make frequent use of realia (physical and graphical) to represent mathematical situations.

6. Cultural/Community -Based Funds of Knowledge/Social Justice

6a. How does my lesson help students connect mathematics with relevant/authentic situations in their lives?

Mathematical knowledge is produced, utilized and communicated in households and communities [10]. Families and communities engage in a variety of activities such as baking, sewing, weaving, fishing, gardening, household repairs, games, budgeting, purchasing, painting, music, dance, story-telling etc. Other mathematics knowledge that immigrant students might bring from home are different algorithms or representations learned in their home country that maybe unfamiliar to U.S. teachers. All of these activities and experiences should be used as resources, rather than barriers, for mathematics learning.

The use of students' culture is *not* about assuming specific kinds of traditions, activities or food and then using them as contexts to *dress up* a routine mathematics problem. It is about building lessons and units using authentic activities *grounded* in students' background knowledge and personal, family and community experiences [11].

6b. How does my lesson support students' use of mathematics to understand, critique, and change an important equity or social justice issue in their lives? This second question of the 6th dimension is designed to expand the use of cultural funds of knowledge as foundation for mathematics learning to analyze issues of power and social justice, and foster social change.

Aguirre, continued on p. 4

Aguirre, continued

Culturally responsive teachers craft lessons that empower students to learn mathematics through analysis of civic engagement, politics, justice, resource use, and other issues impacting their lives and community [11, 12]. Some examples in the literature include secondary students exploring data to examine claims of racial profiling, school closures, and uneven distribution of community resources. At the elementary level, lessons develop measurement concepts to challenge societal messages about body image as well as understanding of large numbers and money concepts through activities about government expenses, budget management, etc.

CRMT has many facets integrally connected to each other. It is not necessary for every lesson to target every single dimension. However, the CRMT analysis tool does make explicit the dimensions of practice that should be consistently evident over time.

- To help teachers get started I suggest the following: • Analyze a lesson plan using the guiding questions or full rubric version to see how your lesson reflects the various dimensions. After your analysis, brainstorm with a colleague adaptations that would make the lesson more culturally responsive.
- Collaborate with an ESL teacher (or another colleague) to prepare a lesson and/or ask them to observe your lesson and focus on some of the guiding questions. Debrief with your colleague. Then, select one or two dimensions you would like to develop better and make a conscious effort to focus your instruction on those selected dimensions.

Culturally responsive mathematics teaching emphasizes mathematical thinking and equity. Both are needed to promote children's mathematics learning and engagement.

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Honoring Susie Håkansson and Recognizing Her Remarkable Contributions to TODOS

On October 12, UCLA held a retirement dinner to honor Dr. Susie Håkansson, who is retiring as the Executive Director of the California Mathematics Project. She has been in this position since 1999 and provided service in mathematics

education to UCLA for 27 years.



TODOS Vice-President Bob McDonald was one of the speakers at the event, and he expressed TODOS' gratitude to Susie for her exceptional contributions to our organization. Bob highlighted her work with Eleanor Linn on establishing TODOS as a 501c3, non-profit organization; her assistance crafting the founding documents including the constitution; her service as chairperson of the Finance Committee, wisely advising and keeping track of our funds; her efforts working on the TODOS TI project with Mike Lutz and Jose Franco; and her work with Jim Barta on the Math for the Americas publication. Susie served in many leadership roles on the TODOS Board to help ensure the continued existence and success of TODOS in the mathematics education community.

In recognition of these significant contributions, a number of members have made donations to TODOS to honor Susie Håkansson.

TODOS LIVE! Season Three



With support from **ETA Hand2mind**, TODOS LIVE! Season Three will begin soon with sessions relating to the Common Core State Standards. TODOS members have been asked to complete a survey to help webinar planners focus on CCSSM topics of most interest.

The 2013 TODOS Elections are Coming up! Mid-January to mid-February

Saul Duarte, Chair TODOS Election Committee

TODOS will be electing a new
President Elect and two Directors to the
TODOS Board. The slate of candidates will be
announced early in January by the TODOS Elections
Committee.

This year there will be two candidates on the slate for the position of President Elect and four candidates on the slate for two positions of Directors.

Early in January the candidates will create their own pages on the TODOS website where they will tell you about themselves and their qualifications for President Elect or Director. They will have the chance to explain their thinking about the mission of TODOS and how they would lead if elected.

At that time you will also find the ballot on the Elections page and you will be able to vote electronically. You will be able to browse the candidates' pages, the TODOS By-Laws, and consider the current make-up of the Board before you vote.

All dues-paid members are eligible to vote, so keep your eyes open! You will receive notification of the election on the website, the Electronic News, and by the membership list-serv. If you have any problems voting, or have questions, please contact Saul Duarte, Chair of the Elections Committee, at elections@todos-math.org. You can also check the Elections page on the TODOS website at: www.todos-math.org/elections.

Elections Committee Members

Saul Duarte, Chair Nora Ramirez (President once removed) Debbie Trahan Katie Diaz Salguero Cindy Chapman, ex-officio non-voting

Support TODOS with a Donation

In order to continue serving members and the mathematics education community, TODOS depends on the generosity of members and sponsors. *Make a contribution* to honor a retiring colleague, to thank your college advisor, to celebrate your publication, or to help TODOS. You may also contribute in memory of someone who has passed away.

TODOS is a 501(c)(3) organization. When you make a contribution, you will receive a receipt letter with the tax statement. TODOS will also notify the honoree or, for a memorial contribution, a designated family member including the name of the donor.

Thank you!

TODOS Mission: Are we on target?

By Maria Torres

A substantial number of TODOS members volunteer their time to reach out to the community with the monthly Electronic News, Noticias de TODOS, the Monographs, and the issues of our journal TEEM. They speak at a variety of State and National conferences, lead and participate in webinars, and collaborate with other professionals to address issues in rigorous and coherent mathematics for ELLs.

YÕU ?

It has been a busy and exciting 18 months, increasing our membership with recruiting efforts at many national, regional, and state events. However, in reviewing TODOS membership data, we can see that our members come largely from the two states that have the largest number of English Language Learners: California (155) and Texas (114). But in looking at states with over or close to 100,000 English Language Learners, data indicate that we have work to do to reach our intended audience in those states (e.g., Florida (13), NY (34), Illinois (38).)

Please join us in our TODOS Membership Campaign that was launched April, 2011, to achieve the **goal of 1000** + **1 members**. The number of members on April 1, 2011 showed that we have gained 331 new members in the 18 months of the campaign. We had a boost during the NCTM annual meeting but the growth has been much slower in the months that followed the meeting. We also have to focus on retention of members. When you receive emails about your membership expiring in 90 days, 30 days, 7 days, and finally ending, please remember why you joined TODOS and renew your membership.

TEEM Vol. 4 Now Available!

Teaching for Excellence and Equity in Mathematics
The fall 2012 TEEM is now available to TODOS members via
the TODOS website www.todos-math.org, with login, while
the previous issues are already available to anyone. Spread the
word and see calls for reviewers and submissions at
http://www.math.utep.edu/Faculty/lesser/TEEM.html

Developing Culturally Responsive Mathematics Teaching (CRMT) - Part II: Connections with the Common Core State Standards for Mathematics

By Julia Aguirre,

Assistant Professor, University of Washington Tacoma Susana Davidenko,

Associate Professor at SUNY Cortland

Given the hyper-focus on the implementation of the Common Core State Standards for Mathematics (CCSS-M) [1] across the nation, we should consider how culturally responsive mathematics teaching (CRMT) relates to the approach of the CCSS-M, in particular, to the strategies supported by the Mathematical Practices (MP). Are the approaches complementary? Are they somehow contradictory? Do the teachers have to *add* some new requirements to their already full spectrum of demands?

The purpose of this part of the article is to (1) make it evident that CRMT is NOT an addition to "good mathematics teaching." Instead, it supports the CCSS-M while it embeds mathematical teaching in meaningful contexts, promoting a classroom environment that incorporates traditionally marginalized youth including African American, Latinos, Native American, English Language Learners (ELLs) and poor children; the diagram below illustrates this idea; (2) express that CRMT supports the focus on deep understanding and communication as reflected in the MP. However, CRMT expects practices to be *flexible* to accommodate and differentiate lessons in inclusive classrooms and for students who are in the process of learning English.

We will now briefly reflect on the dimensions of CRMT *in light* of the CCSS-M, specifically the mathematical practices.

Mathematical Thinking

- Cognitive demand
- Depth of knowledge and understanding
- Discourse

Aligned with CCSS-M

Equity

- Teaching is embedded in contexts that draw from students' cultural, linguistic, and life experiences of the students
- Promotes equitable opportunities for student learning with understanding.

Not explicitly addressed in the CCSS-M

Dimension 1: Cognitive Demand.

CRMT includes *high cognitive demand tasks* that require students to problem solve, use representations, make connection among ideas and communicate their thinking.

Connections with CCSS-M: The attention to cognitive demand is consistent with three MP: (1) Make sense of problems and persevere in solving them, (2) Reason abstractly and quantitatively, and (3) Construct viable arguments and critique the reasoning of others. For this to be accomplished, teachers should move away from always using low cognitive demand tasks. It is important to notice, though, that it is a common practice to assign low-cognitive demand tasks to ELLs, justifying this decision by the students' low-English proficiency levels [2]. This faulty practice hinders ELLs' opportunities to be exposed to and work on worthwhile mathematical tasks. Culturally Responsive mathematics teachers strive to provide strategies that do not rely only on oral or written communication and support ELLs to tackle high cognitive demand tasks while building language fluency.

Dimension 2: Depth of Knowledge and Student Understanding

CRMT expects students to develop deep content knowledge as they work on high cognitive demand tasks. Teachers must be competent in the content they teach and be able to find out what their students' content knowledge and language proficiency are in order to move them further in their understanding.

Connections with CCSS-M: This dimension is also connected with the MP (1), (2) and (3). We should notice, though, that it is not explicit in the definition of these practices that alternative task and assessments are needed in inclusive and culturally diverse classroom. We suggest that teachers of mathematics work closely with the English as Second Language (ESL) teachers of their ELLs. Together, they can design better tasks as well as non-traditional assessment tools that can reveal the students' knowledge and understanding, without relying only on oral or written English.

Dimensions 3: Mathematical Discourse & 5: Communication and Academic Language Support (for ELLs)

Connections with CCSS-M [1]: Dimensions 3 and 5 have strong connections to MP (3) Constructing viable arguments and MP (6) Attend to precision. MP (3) states that "students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments" (p. 7). MP (6) sates that "Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning" (p. 7). These are important abilities for students to develop rigorous mathematical thinking. But, teachers should keep in mind that the ELLs' process of second language development might not allow them to achieve the required academic language as quick as their non-ELLs peers do.

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Aguirre- Davidenko, continued

The website about the Application of the CCSS for ELLs [3] clearly states that "ELLs are capable of participating in mathematical discussions as they learn English. Mathematics instruction for ELL students should draw on multiple resources and modes available in classrooms—such as objects, drawings, inscriptions, and gestures—as well as home languages and mathematical experiences outside of school" (p. 2). This site also highlights that ELLs participate in reasoning conversations not just by learning vocabulary but "by making conjectures, presenting explanations, and/or constructing arguments" (p. 3). It is unfortunate, however, that the clear and powerful ideas included in this website are not embedded in the main document of the CCSS-M.

Dimensions 4: Power and Participation and 6: Cultural/Community-Based Funds of Knowledge/Social Justice

The largest difference between CRMT and CCSS-M relates to these two dimensions. We consider that CCSS-M do not attend to the importance of cultural background in student learning nor issues of power and status in the classroom. Critiquing the reasoning of others as highlighted in MP (3), necessitates a CRMT approach of supporting students to do this in respectful and productive ways. The mathematical practice MP(4) Model with mathematics, expects students to apply their knowledge to solve problems related to everyday life and the workplace. But, as seen in most texts and even in journals for teachers, those problems usually relate to the experiences of middle class American students. The scenarios of the problems might be unfamiliar to immigrant students, ELLs, and poor children. In a CRMT approach, teachers use what they have learned about their students' lives and the community experiences as the context in which problems for lessons and units emerge. Purposefully trying to identify multiple sources of students' knowledge and students' everyday life experiences, and employ them in designing curriculum units, are essential to engage in culturally responsive mathematics teaching. Implementing the CCSS-M embedded in contexts that are responsive to students' cultural backgrounds should help make that implementation more successful for all students.

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NCTM News

By Patricia Trafton, TODOS NCTM Representative

TODOS Presence on the NCTM Board

NCTM 2012 Election Results are in and we can proudly inform that four TODOS members were elected to the NCTM Board. Our sincere congratulations go to Diane J. Briars, President-Elect; Ruth Harbin Miles, Elementary, Florence Glanfield, Canadian Region, and Rose Mary Zbiek, Board Member at Large.

NCTM SmartBrief

NCTM SmartBrief - At the end of August 2012, NCTM began to email to its members this daily newsletter. It is FREE to ANYONE who wants to receive it. It is a great update on the latest news and trends in education. To subscribe go to: https://www.smartbrief.com/nctm/index.jsp

NCTM in TWITTER

The NCTM journals *Teaching Children Mathematics* (TCM) and *Mathematics Teaching in the Middle School* (MTMS) now have separate Twitter accounts: https://twitter.com/TCM at NCTM
https://twitter.com/MTMS at NCTM

¿TIENES TAREAS?

Tareasplus, http://www.tareasplus.com/, an online education portal for the Spanish-speaking world, offers thousands of video lessons on mathematics and science subjects from kindergarten through early college.

TODOS Iris Carl Award Nominations Due February 1, 2013

Nominate an individual who has made significant contributions to the quality of mathematics education provided to underserved students, in particular to Hispanic/Latino students, for the TODOS Iris M. Carl Leadership and Equity Award.

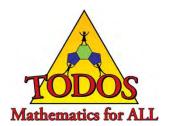
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