

Social Justice in Mathematics Education: Acknowledgement-Action-Accountability

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ABSTRACT. The intent of this paper is to illustrate how the work of the California Mathematics Project (CMP) supports the position statement *Mathematics Education Through the Lens of Social Justice* published by TODOS: Mathematics for ALL and the National Council of Supervisors in Mathematics. This paper describes how the Core Value Statement of the CMP aligns with the spirit of the position paper and examines four aspects of social justice related to mathematics education: eliminating deficit views of mathematics learning; eradicating mathematics as gatekeeper; engaging the sociopolitical turn of mathematics education; and elevating the professional learning of mathematics teachers and leaders with a dual focus on mathematics and social justice. This report includes examples of how organizations can implement the joint position statement through acknowledgement, actions and accountability.

Introduction

For many years, the topics of access and equity have been in the forefront of discussions related to the reform of mathematics instruction in the United States. Organizations across the K-16 spectrum have addressed issues of access, equity and how people learn mathematics in their policy documents, including the National Council of Teachers of Mathematics (NCTM), National Council of Supervisors in Mathematics (NCSM), and the Conference Board for the Mathematical Sciences (CBMS). Recently a significant addition to this movement is the joint position statement on Mathematics Education Through the Lens of Social Justice published by TODOS: Mathematics for ALL and NCSM (Aguirre, 2016). Our purpose in writing this paper is to address how the California Mathematics Project's work, as defined by our Core Values Statement, supports and builds on the joint position statement.

CMP Core Values Statement

Ongoing access to an engaging and humanizing mathematical education – a sociocultural, human endeavor with emphasis on communicating, connecting, and valuing mathematical ideas to describe the world – is a universal right, central among civil rights. We all (mathematics educators, school site leaders, district decision-makers, parents, caregivers, other relevant community leaders, and local and state policy makers) must share the responsibility for ensuring that:

- All students must be provided with a mathematical education that allows them to make sense of the world quantitatively and to appreciate their own power to reason. This includes making sense of mathematics through active engagement in problem solving and grappling with increasingly challenging tasks in an interactive way, where challenging and critiquing the thinking of others is safe and valued.
- All teachers must have their own significant sense-making experiences in mathematics to provide similar experiences for their students. All teachers have the potential to be leaders and a responsibility to advocate for rigorous and relevant mathematics education at all levels. Above all, they must help their students develop an understanding that mathematics is coherent, rooted in cultural beliefs and values, and doable.

NCSM and TODOS jointly wrote a powerful statement calling for the infusion of social justice in mathematics education. This has sparked discourse between and across mathematics education groups around the country and beyond. Their call to collective action has been heard. We believe the statement on Social Justice in Mathematics Education is fully aligned with the CMP Core Values. We attempt in this paper to investigate the ramifications of this work for mathematics teaching and learning in the state of California. Social justice in any content area requires a systemic approach including fair and equitable teaching practices, high expectations for all students, access to rich, rigorous, and relevant curriculum, and strong family/community relationships. The joint position paper examines four aspects of this work for mathematics education:

- Eliminating deficit views of mathematics learning
- Eradicating mathematics as gatekeeper
- Engaging the sociopolitical turn of mathematics education
- Elevating the professional learning of mathematics teachers and leaders with a dual focus on mathematics and social justice.

Eliminating Deficit Views of Mathematics Learning

Eliminating the deficit discourse by focusing on learning rather than labels is a key step toward a more just and equitable mathematics education. (NCSM/TODOS Social Justice position statement p. 2)

A deficit view of who is capable of mathematics learning permeates our culture. Districts and schools across the state track students based on insufficient data. Students are labeled early and often solely by standardized tests. Without realizing the implications, teachers will use terms such as “far below basic” “proficient,” or “advanced” as pronouns for the people who are their students. This is compounded with the idea that mathematics is defined by the dominant culture and that students not from this powerful group cannot be mathematically competent, much less shape mathematical knowledge.

We as a mathematics community have to make a decision to change the vision of mathematics teaching and learning that currently dominates the field. Is mathematics (a) the following of an often-arcaic algorithm to get an “answer” to a not always relevant problem, or is it (b) thinking through real problems and offering multiple pathways to possible solutions? Framed this way, we assert the answer is (b). This is reflected, as well, in the CMP Values Statement’s emphasis on the importance of active engagement with challenging tasks.

The California state legislature has recently required that all districts must adopt fair, objective, and transparent placement policies to determine what mathematics course a student will enter into in high school. The way that the law is written requires multiple measures be used in making placement decisions. We consider this a good thing. Yet, when laws like these are enacted, school systems may seek (and find) ways to restrict access to college preparatory mathematics for students who have been marginalized (California Mathematics Placement Act of 2015).

Eradicating Mathematics as Gatekeeper

A social justice approach works to transform mathematics from a gatekeeper to a gateway, democratizing participation and maximizing education advancement that equitably benefits all children rather than a select few. It also advocates for the vital inclusion of diverse instructional voices, knowledge, and skills needed to transform mathematics education systems into a more holistic, just and equitable experience for our nation’s youth. (NCSM/TODOS statement p. 3)

Tracking is detrimental to a child, and indeed to the future. Assertions about readiness, the affixing of labels, and use of ability grouping structures on children ensure that vastly different mathematical experiences and outcomes are afforded to children. As noted in the TODOS/NCSM statement, a learner put into a “low” group has an isolating experience of mathematics as a disconnected collection of number-filled chores with low cognitive demand rather than a rich and sense-making conversation with others. Much of the curricula for children and teacher preparation in mathematics is based in a faulty assumption that learners must “master the basics” (e.g., times tables, number facts) before they can engage in the real mathematics of problem solving, reasoning, and proof. This, in the face of decades of educational research that demonstrate the importance of complex problem situations to create the relevance and intellectual need that will establish and reinforce the mental structures that make a piece of knowledge into a “basic fact” for a learner. As experts in mathematics we know and use this all the time. For example, one does not memorize all the trig identities just the “basic facts” like $\sin 2x + \cos 2x = 1$ in order to derive the others as they are needed, depending on the problem situation.

It is up to those who teach now to begin this transformation. What is our plan to do so? The position paper is clear in the call for democratizing classroom participation and sustained action and accountability in transforming the system to include a wide array of perspectives and experiences. One role that CMP continues to play is in recruiting and training mathematics teachers and leaders of color who work in diverse schools and districts throughout California.

Engaging the Sociopolitical Turn of Mathematics Education

A social justice commitment to mathematics education highlights mathematics as a dynamic, political, historical, relational, and cultural subject in which Identity and power play central roles. (NCSM/TODOS statement p. 3)

The sociopolitical turn in mathematics means that mathematics educators are challenging the dominant discourse about what mathematics is and who is capable of being a mathematics learner. It also situates mathematics as a tool to understand, critique, and transform the world. Mathematics provides a way to reflect on our experiences in physical, social, and intellectual worlds. Mathematics also provides a lens through which to make sense of and interact with these worlds. Once acknowledged, the socio-political value of mathematical thinking and knowing leads to the need for developing, maintaining and enlarging our openness to the perspectives on, and uses of, mathematics students can offer in the mathematics classroom. When we value and build on these contributions, students see themselves in the mathematics and see mathematics as a valuable human endeavor.

The primary power of mathematics is as an analytical tool to analyze and transform the world. The CMP Values Statement directly connects to these ideas in its placement of appreciating one’s own power to reason and critique of reasoning as central to the civil right of mathematics education.

Professional Learning with a Dual Focus on Mathematics and Social Justice

Teachers and leaders need on-going research-based professional learning that focuses on the sociopolitical turn of mathematics education and mathematical pedagogies that are equitable and culturally responsive. (NCSM/TODOS Social Justice position statement p. 3)

In order to work towards this view of mathematics education, teachers and leaders of mathematics must work to on their professional knowledge base, around and through instructional practice that has mathematics and social justice as a parallel areas of attention. As necessary as understanding of mathematical content is, it is not sufficient for effective mathematics teaching. Research confirms that

when educators combine (1) attention to equity in pedagogy with (2) high expectations of students, (3) content that is mathematically interesting and cognitively demanding, and (4) family and/or community rapport have a positive effect on mathematics learning and achievement.

Teachers across the professional spectrum – from pre-K through collegiate preparation of future teachers – can connect mathematics, learners’ mathematical thinking, and family/community-based funds of knowledge. To do so, specific and strategic support is needed. We also know from research that professional learning communities can play a powerful role in the success of such efforts (DuFour, DuFour, Eaker, & Karhanek, 2004).

Acknowledgement–Action–Accountability

Mathematics teachers and leaders must self-reflect on privileges and obstacles in their own mathematics histories, build and exchange ideas, and expand the pool of knowledge resources by partnering with families and communities to make change. Thus, working together is essential to gain intimate, multifaceted knowledge needed to replace the systems of oppression in mathematics education with new systems of equity that promote rich, rigorous, and relevant mathematical experiences for our nation’s children. (NCSM/TODOS Social Justice position statement p. 4)

The Position Statement offers three steps to implement the suggestions. These start with acknowledging that there has been and still exists an unjust system of mathematics education. More than individual noticing, the call is for a collective effort to attend and plan response to social injustice in the decisions we make as participants in institutional systems as well as responsible agents in our own classrooms.

Acknowledgement

The acknowledgment of past and current inequitable practices can be achieved, in part, through the analysis of data. Noticing and acting on fairness requires that schools and districts use data in ways that reveal gaps in student performance and opportunities to learn. In order to do this, the kind of data analyzed matters. Equity-minded educators need to look at achievement, access, and prospects data. Achievement data includes standardized assessment data, reclassification rates, teacher grades. Access data includes course enrollment, course taking patterns, placement patterns, availability of high quality teachers, graduation rates, dropout rates, and attendance. Prospects data includes AP/IB courses offered, STEM Pathways offered and other enrichment activities.

Once institutions (including colleges and universities) have identified needed data, analyzing it through a lens of equity is critical. This means thoughtful disaggregation and sub-analyses of cross-tabulated information. For example, placing data in one table so that the performance associated with various categories (e.g., different ethnic, racial groups, language proficiency, and socio-economic status) can be compared side-by-side. Moreover, it is important to look at these data longitudinally for patterns over time. The CMP continues to help schools and districts that we partner with gather and analyze data in these ways.

Action

Acknowledgment must lead to Action. In fact, multiple actions are needed by mathematics teachers and leaders “to create and sustain institutional structures, policies, and practices that lead to just and equitable learning opportunities, experiences, and outcomes for children.” (NCSM/TODOS Social Justice position statement, p.4). A systemic plan for professional learning that strives to democratize mathematics education for students, teachers and all stakeholders is needed.

The Position Statement lists actionable items under several categories.

- Belief Systems and Structures
- Curriculum and Instruction
- Partnering with Families and Communities as Resources for Mathematics Learning.

Within Belief Systems and Structures, strategies offered include:

- Questioning deficit views,
- Refraining from deficit discourse,
- Eliminating tracking systems,
- Providing evidence that these strategies work,
- Increasing recruitment and retention of diverse mathematics teachers and leaders,
- Creating fair and holistic assessment systems for both students and teachers,
- Requiring professional development opportunities focusing on all facets of mathematics and mathematics learning, and
- Creating a vision of mathematics that encourages students to want to learn rigorous and relevant mathematics.

The role of the California Mathematics Project in this endeavor must be manifold. We lead by example. We have the tools to provide the needed evidence that these strategies work. This may require us to change our own practices, to seek out and mentor those who would add to a more diverse and equity-minded teacher force. Finally, we must provide professional development that focuses on all of the strategies listed above.

Curriculum and instruction suggestions include the following:

- Cultivating and sustaining positive mathematics identities wherein students see themselves as doers of mathematics,
- Focusing on mathematical strengths and areas of growth while providing targeted meaningful feedback that promotes learning,
- Analyzing curriculum for access to high cognitive demand tasks that are meaningful and connected to children's lived experiences,
- Adapting instruction to routinely connect children's mathematical thinking and students' mathematical, cultural, linguistic, and community-based funds of knowledge,
- Including tasks that demand quantitative analysis of fairness and civic engagement issues, and
- Increasing use of complex instruction and other participation structures that maximizes mathematical discourse and student contributions while minimizing status issues in the classroom.

The California Mathematics Project has the tools and ability to lead in this effort. Our own teaching and professional development of teachers of mathematics has to include all of the above. In order to better understand the curricular issues facing teachers in California, we must become familiar with the materials being used, their strengths and shortcomings, their ability to promote competence in the Standards for Mathematical Practice for all students, and how they can best be supplemented, ignored, or replaced to better teach mathematics in a social justice format.

Suggestions for Partnering with Families and Communities include the following:

- Students developing math walks, such as the Watts Towers Math Trail developed by CMP instructors,
- Visiting student homes,
- Creating respectful bi-directional feedback pathways with families,
- Providing mathematics-specific resources in multiple languages to families,
- Strengthening partnerships with faith-based and community organizations that provide additional academic and socio-emotional supports for children in the communities, and

- Providing opportunities for the community and the school to come together to offer events like Family Math Nights that allow community-based mathematical knowledge to interact with school-based knowledge.

Accountability

NCSM and TODOS have committed to supporting and incentivizing mathematics teachers and leaders in the creation of professional learning opportunities and accountability systems that monitor progress of the implementation of actionable items. Multiple venues for this work will increase at the annual professional conferences, webinars, and other professional spaces organized by NCSM and TODOS.

CMP can participate in this by being a venue for this work and by participating in the calls for collective action put out by our professional mathematics education organizations. In addition, we can help schools develop family math programs and work jointly with the community. We can help bring to the classroom those ways in which mathematics is used by community members in their work and their everyday lives.

The Boards of professional mathematics education organizations are already planning and conducting annual audits on implementation progress of social justice actions items to make informed adjustments to professional offerings and resources for its current and future membership and affiliated partners. Advocacy outreach to inform legislators, funding agencies, and other stakeholders will also maximize resources needed for this work. We must hold the profession and our organizations accountable to making a just and equitable mathematics education a sustainable reality.

CMP can contribute to this work by making social justice a priority in our professional development offerings. CMP leadership institutes should set aside time for reading about and discussing issues of social justice. CMP will integrate these ideas into the work that they do with the schools and districts with which they partner.

References

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