NATIONAL COUNCIL OF SUPERVISORS OF MATHEMATICS

NCSM JOURNAL

of Mathematics Education Leadership

VOLUME 8, NUMBER 2 FALL - WINTER, 2005-2006

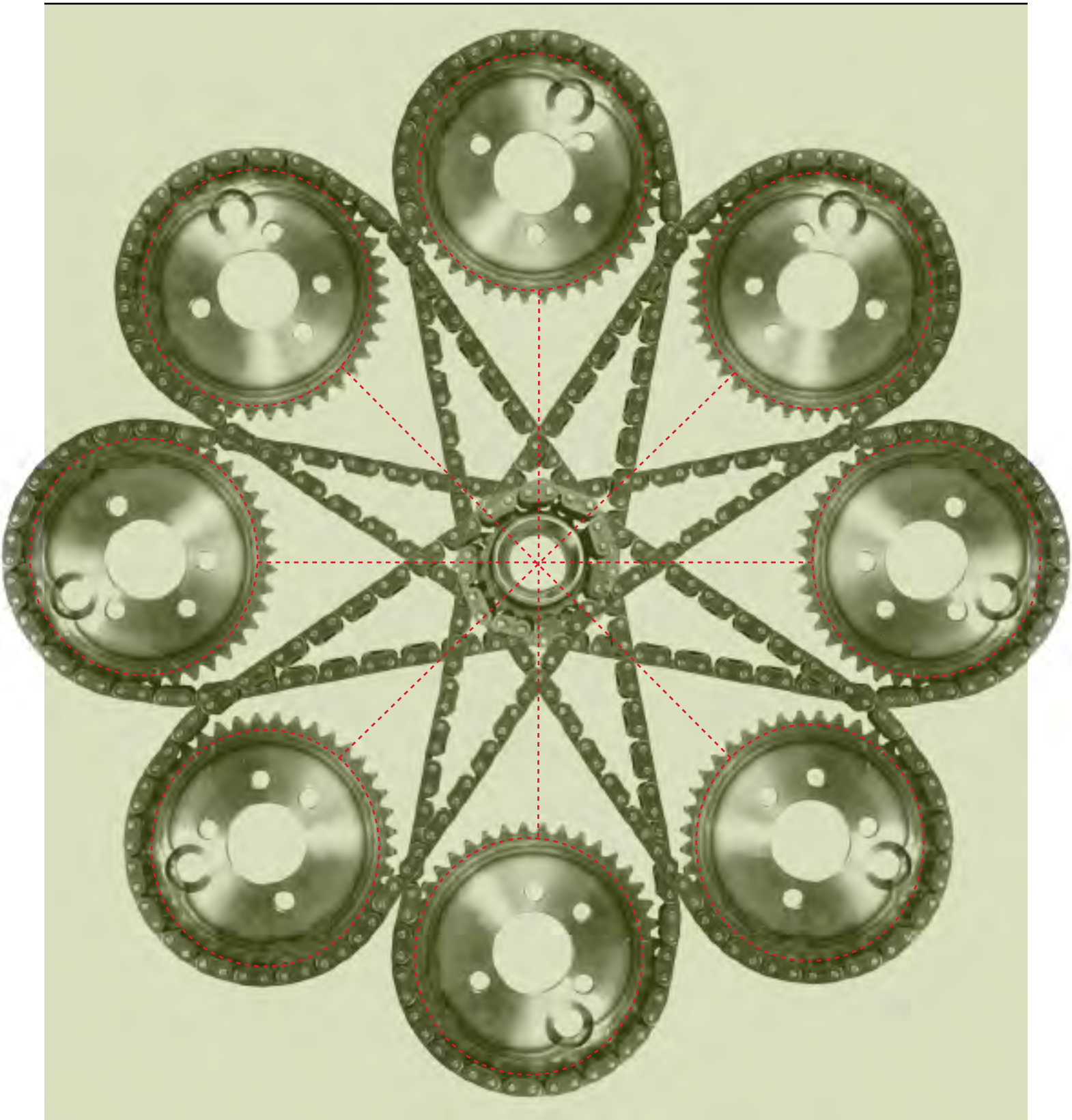

Table of Contents

Mathematics Leadership Needed To Close Achievement Gaps:
A Commentary on a Critical Issue in Mathematics Education

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The need to eliminate mathematics achievement gaps by race and other factors is the greatest challenge we leaders in mathematics education face today. Achievement in mathematics will be a major factor in determining whether a person in the information society becomes a "have" or a "have not." As we move into a global economy our country needs a high level of mathematics achievement to have the brainpower to maintain our leadership role in the world. We need to convert mathematics from a filter that screens out some students, especially students of color, from the pipeline to opportunity into a pump that propels all students ahead to opportunity. Today both of us are active in the Project to Uplift Mathematics Proficiency (PUMP) whose mission is to convert mathematics from a filter into a pump.

The No Child Left Behind (NCLB) legislation has required each state to develop testing systems that include high-stakes mathematics tests in each of grades 3 through 8 and in high school. In this paper we shall: (1) address the need for leadership by mathematics education leaders in the development and implementation of statewide testing systems, and we shall (2) identify the leadership and strategies that are needed to support teachers at the classroom level.

Each state develops standards and then designs a testing program aligned with those standards. We believe that state standards and testing should be aligned with the standards of the National Council of Teachers of Mathematics (NCTM).

One of the authors, Lesa Clarkson, has had experience with the mathematics standards in four different states. She was chair of the middle school grade band standards in Minnesota; she participated in state alignment studies in Alaska and Alabama; and she met with teachers as they worked through the Georgia standards. These experiences indicate that curricular alignment to state standards is not only the right thing to do, it is critically important in the quest to raise student achievement and to close achievement gaps in mathematics.

In addition, time spent with a charter school that was underperforming in mathematics, but which experienced a significant turnaround in eighteen months, support five "start here" strategies for increasing student achievement.

Strategy 1: Curricular alignment.

Curricular alignment provided concrete evidence that a curriculum aligned with the state standards gave students experiences with mathematics content that they were expected to know and directly improved their scores on the state test. Moreover, opportunity to learn increased when the curriculum focused on state standards as opposed to a mere walk throughout the text. Comprehensive alignment would include covering grade level skills that would otherwise follow the state assessment.

Strategy 2: Examination of existing data.

Two different types of data analyses are useful in assessing and improving achievement. The first type of analysis looks for trends over several years to uncover consistent strengths and weaknesses in student performance. The second type of analysis follows groups of students over time to determine steady growth that prepares students for their grade level expectations. These analyses serve unique purposes for guiding instruction.

Strategy 3: Professional development.

Instruction should be continually guided through professional development experiences. Teachers are more effective

when they know (not memorize) and understand state mathematics standards and have embedded the use of test specifications and sample problems within their curriculum.

Strategy 4: High quality curriculum.

While there is no perfectly aligned curriculum, there may be a curriculum that will more closely meet the standards' needs of students. Many publishers taut that their curriculum is aligned to the National Council of Teachers of Mathematics' (NCTM) standards. But states are assessing their standards. These state standards, therefore, are more grade level specific and identify the skills that will be assessed as well as when they will be assessed.

Curricular goals need to be aligned with the NCTM standards. We believe that state standards aligned with the NCTM standards provide students with mathematics that give them options for post secondary study and career choices.

Strategy 5: Effective use of time.

The challenge with underperforming students is that these students have more skills to learn in the same time frame as other students who are performing at grade level. In order to make up for the deficient skills, under-performing students need more time. Teachers then, have to be more creative about creating more opportunities for students to catch-up and move along with their peers. How much time is allocated to mathematics instruction? Most curricula were developed for fifty to sixty minute daily mathematics lessons. The real time question, however, is not "How much time is set aside for mathematics instruction?." The deeper time questions become: How is instruction time used? Is there other time during the day that can be allocated to math skills? What math skills/content can be taught/used during additional times of the day? Students who are behind in mathematics are responsible for their grade-level skills which are usually developmental and dependent upon skills from previous grades.

Both of us attend monthly meetings of Minnesota's Assessment/Accountability Stakeholder Committee. The Committee is chaired by the State Commissioner of Education and includes key leaders from the State Department of Education, the legislature, and various stakeholder groups such as the teacher unions, the administrators, the PTA, etc. However, we observed that the Stakeholder Committee had no leaders from subject-oriented groups such as the Minnesota Council of Teachers of Mathematics. To compensate, we invited ourselves to attend meetings as observers. We find that at the state level everything is political. Teacher unions have political clout. Subject matter organizations do not. Therefore, wherever relevant and possible, we leaders in mathematics education need to invite ourselves to the "table." We have found that electronic communication is an effective tool for providing leadership. For example, we have the e-mail addresses of all members of the Stakeholder Committee and we can easily send messages to the key education decision-makers in the state. We have gotten very good response from that strategy.

Our experience tells us that mathematics achievement gaps can be closed. However, our experience also tells us that we must be proactive; otherwise we could end up with a state-wide testing system that will be part of the problem instead of part of the solution. We need to ensure that we don't go back to the basics, that the test levels are appropriate, and that the testing system is aligned with the state standards, and that the state standards are aligned with the NCTM Standards.