

Written Testimony of Dr. Jason Zimba

to the

HOUSE EDUCATION COMMITTEE

Legislative Office Building
33 North State Street, Room 207
Concord, New Hampshire 03301

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Chairman Gile, Vice Chairman Grassie, and honorable members of the House Education Committee, I thank you for the privilege of addressing this written testimony to you.

I am a former professor of mathematics and theoretical physics. I hold a doctorate in mathematical physics from the University of California at Berkeley; an M.Sc. by research in mathematics from the University of Oxford; and a B.A. in astrophysics and mathematics from Williams College. I am a founding partner of Student Achievement Partners, a non-profit organization.

I was a member of the writing team for the Common Core State Standards for Mathematics, a job that involved working closely with hundreds of state and national experts, including research mathematicians, teachers, nationwide educator organizations such as the National Council of Teachers of Mathematics, and both of the national teacher unions. Having served in this capacity, I know firsthand that New Hampshire educators provided valuable feedback during the development of the standards. New Hampshire educators identified weaknesses in the early drafts—for example, in the area of representations of linear relationships. This area is now much stronger in the published standards (see for example page 42).

I am writing to explain why I believe the state of New Hampshire under Gov. Lynch's leadership did right by its students when it supported the development of the Common Core State Standards and later adopted them.

1. Research shows that the Common Core State Standards are world-class.

- Peer-reviewed research by William Schmidt, a leading expert on international mathematics performance and a previous director of the U.S. TIMSS study,¹ has compared the grades and topics in the Common Core to high performing countries in grades K–8. The agreement was found to be high, in fact higher than that of any state's previous math standards. That includes New Hampshire.
- This study also found that states whose previous standards more closely matched the Common Core tended to have higher NAEP scores.
- After more than three years, Common Core opponents have not provided any counterevidence of comparable quality.²

¹ See <http://edr.sagepub.com/content/41/8/294.abstract>; a description of the study is here: <http://edwp.educ.msu.edu/news/2012/study-supports-move-toward-common-math-standards>.

² The best they have managed to do is link to an amateur 2010 article from an online newspaper. That newspaper article isn't in a scholarly journal. It isn't peer reviewed. And it isn't by an expert on international mathematics performance.

2. The Common Core State Standards are supported by leading mathematicians and experts.

- In an editorial in the *Wall Street Journal*,³ mathematicians Edward Frankel and Hung-Hsi Wu of the University of California at Berkeley described the standards as “the culmination of a meticulous, 20-year process initiated by the states and involving teachers, educators, business leaders and policy makers from across the country and both sides of the aisle.”
- In an editorial in the *Los Angeles Times*,⁴ mathematician Solomon Friedberg of Boston College called the Common Core “a high-quality foundation for math and English language arts instruction.”
- In a letter to the Georgia State Board of Education,⁵ mathematician Sybilla Beckmann of the University of Georgia called the Common Core “the strongest K-12 mathematics standards that I know of,” on the basis of her extensive experience in K-12 mathematics education.
- These mathematicians are not alone. They are also joined by the presidents of every major mathematical society in America, who have called the standards “an auspicious advance in mathematics education.” Describing the standards as rigorous, these presidents’ statement concludes: “This is not the time to turn away from our good fortune. We ... hereby express our strong support for the Common Core State Standards for Mathematics.” This statement is signed by:

David Vogan, President, American Mathematical Society
Robert Devaney, President, Mathematical Association of America
Nathaniel Dean, President, National Association of Mathematicians
Irene Fonseca, President, Society for Industrial and Applied Mathematics
Alasdair Urquhart, President, Association for Symbolic Logic
Hans Keunsch, President, Institute of Mathematical Statistics
Marie Davidian, President, American Statistical Association
James Roznowski, President, American Mathematical Association of Two-Year Colleges
Diana Kasbaum, President, Association of State Supervisors of Mathematics
Linda Gojak, President, National Council of Teachers of Mathematics
Valerie Mills, President, National Council of Supervisors of Mathematics
Fran Arbaugh, President, Association of Mathematics Teacher Educators
Don Balka, President, TODOS: Mathematics for ALL
Vanessa Cleaver, President, Benjamin Banneker Association
Ruth Charney, President, Association for Women in Mathematics

³ <http://online.wsj.com/article/SB10001424127887324482504578453502155934978.html>

⁴ <http://articles.latimes.com/2013/dec/11/opinion/la-oe-friedberg-pisa-tests-common-core-20131211>

⁵ <https://mathematicsteachingcommunity.math.uga.edu/index.php/735/letter-georgia-education-common-state-standards-mathematics>

3. The Common Core State Standards are more rigorous than New Hampshire's previous math standards.

- The Fordham Institute's 2010 review⁶ gave the Common Core full marks for content and rigor. By contrast, the K-8 content in the previous New Hampshire standards was described as "severely deficient." The Fordham report concluded that New Hampshire's previous mathematics standards were "among the worst in the country." The point here is not to disparage the previous standards, but rather to emphasize the productive step the state took when it adopted the Common Core.
- The Common Core requires students to know the basic addition facts and multiplication facts from memory (pp. 19, 23). By contrast, the previous New Hampshire standards did not require New Hampshire students to know basic facts from memory.
- The Common Core requires fluency with the standard algorithm for each of the four operations on whole numbers and decimals (pp. 29, 35, 42). By contrast, the previous New Hampshire standards did not require New Hampshire students to demonstrate fluency with the standard algorithms.

4. The Common Core State Standards are better for STEM-intending students.

- The Common Core State Standards provide much better preparation for advanced mathematics. Dr. Craig Barrett, a former professor of engineering and former head of the pioneering computer chip company Intel, has said that the Common Core "will prepare *more* students to take advanced math coursework ... Students who have mastered the Common Core will be ready to take higher-level math coursework in high school and college, enabling them to pursue the career of their choice, including STEM fields."⁷ (Italics in the original.) Critics have spread the myth that the standards are community-college level and insufficient for STEM-intending students. Both of those claims are false.
- States and districts must continue to support students pursuing STEM pathways. New Hampshire should consider adding standards for Calculus, as other states have done. And state education leaders should give districts guidance about pathways leading to Calculus in the senior year, for all students able to succeed on that pathway (as Massachusetts has done).

Conclusion

The Common Core State Standards were designed not just to "raise the bar" in mathematics, but to serve as a blueprint for *raising achievement* in mathematics. The standards build on the best of previous state standards plus a large body of evidence from international comparisons and domestic research to define a sturdy staircase to college and career readiness.

The standards finally act on longstanding recommendations and research on high performing countries, whose teachers tend to focus on fewer topics in each grade, teach them to greater mastery, and build on them the next year in a coherent sequence of topics. For years, major national reports have called for

⁶ Fordham Institute (2010), *The State of State Standards—And the Common Core—in 2010*

⁷ <http://www.jsonline.com/news/opinion/why-ceos-support-common-core-b99203817z1-245621801.html>

us to abandon our “mile-wide, inch-deep” approach and embrace focus and coherence in school mathematics. With the Common Core State Standards, we can do this.

I think it is appropriate to give a teacher the last word. I have emailed with a National Board-Certified teacher of high school mathematics, who had the following words to say about how the standards are playing out in her district:

We are recognizing the difference between students trained as robots vs. students who can think.

Elementary school teachers are welcoming professional development so that fractions make sense to them. Many have struggled to be positive about a very intimidating subject for them and the increasing awareness of the importance of mathematics is compelling for growth Few want to pretend it is okay to be “bad at math” any more.

I am humbled by stories like this, and by the dedication to this work that I witness when I talk with teachers across the country. I applaud New Hampshire educators’ work in helping to bring the standards to life, and New Hampshire educators’ efforts to implement the standards well for your students.

Jason Zimba, Ph.D.
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