Testimony in front of the Arkansas Council on Common Core Review
Ze'ev Wurman
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Lieutenant Governor Griffin, members of the Council,

My professional background: I am a former Senior Adviser at the Office of Planning, Evaluation and Policy Development in the U.S. Department of Education. Throughout the development of the Common Core standards in 2009-2010, I analyzed the mathematics drafts for the Pioneer Institute and for the State of California. In the summer of 2010 I served on the California Academic Content Standards Commission that reviewed the adoption of Common Core for California. Prior to that, in the late 1990s, I participated in the development of California mathematics content standards and framework. I served on the mathematics content review panel for the California state test since its inception in 1999 and until 2010. I have published about education and about the Common Core in professional and general press. In my non-educational life I am an executive with Monolithic 3D, a Silicon Valley semiconductor start-up.

In my testimony today I will focus on the following points:

- The mediocre and experimental nature of the Common Core mathematics standards.
- The low level of Common Core's definition of college-readiness
- The cost and limitations of PARCC assessment as compared to the previous Arkansas test

1. Quality and experimental nature of the Common Core standards

Five years ago the nation was told that Common Core will be "internationally benchmarked" to the high achieving countries, and that it will improve American competitiveness by enhancing our STEM pipeline.

In 2005 Professor William Schmidt wrote:

> *By the end of eighth grade, children in these [top achieving] countries have mostly completed mathematics equivalent to U.S. high school courses in algebra I and geometry. By contrast, most U.S. students are destined for the most part to continue the study of arithmetic*.[1]

This statement was used in 2008 to justify the need for Common Core to the nation.[2] Yet when Common Core emerged in 2010, its first Algebra course was firmly placed … in the high school.

That is not really surprising. The mediocre expectations of Common Core has been widely documented. Here is Marina Ratner, UC Berkeley professor emerita of mathematics and a member of the National Academy of Sciences, recently writing in the Wall Street Journal:

[1] Schmidt, William H. The Role of Curriculum. *American Educator*, Fall 2005
[2] Jerald, Craig D. Benchmarking for Success: Ensuring US Students Receive a World-Class Education. *National Governors Association* (2008).

> *Yet the most astounding statement I have read is the claim that Common Core standards are "internationally benchmarked." They are not. The Common Core fails any comparison with the standards of high-achieving countries, just as they fail compared to the old California standards. They are lower in the total scope of learned material, in the depth and rigor of the treatment of mathematical subjects, and in the delayed and often inconsistent and incoherent introductions of mathematical concepts and skills.*[3]

There are many other indicators of the low level of Common Core. Jonathan Goodman, professor of mathematics at the Courant Institute compared them in 2010 to the standards of high achieving East-Asian nations and found them lacking:[4]

> *The proposed Common Core standard is similar in earlier grades but has significantly lower expectations with respect to algebra and geometry than the published standards of other countries I examined. The Common Core standards document is prepared with less care and is less useful to teachers and math ed administrators than the other standards I examined.*

Sandra Stotsky and I studied the Common Core and compared it to the standards of Massachusetts and California.[5] Our conclusions:

> *Common Core's project was a laudable effort to shape a national curriculum. Unfortunately … by grade 8 their standards are a year or two behind the National Mathematics Advisory Panel's recommendations, leading states, and our international competitors.*
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> *Worse, Common Core's standards impose an experimental geometry curriculum on the nation, without piloting. … Common Core's mathematics standards miss chunks of content recommended by the NMAP for K-8, and inexplicably leave large holes in mathematics content currently in the high school curriculum.*

R. James Milgram, a professor of mathematics at Stanford and the Validation Committee content expert on mathematics, testified in front of the California Academic Standards Commission in 2010:[6]

> *… among these difficulties are that a large number of arithmetic and operations, as well as the place value standards are one, two, or even more years behind the corresponding standards for many if not all the high achieving countries. Consequently, I was not able to certify that the [Common] Core Mathematics Standards are benchmarked at the same level as the standards of the high achieving countries in mathematics.*

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[3] Ratner, M. Making Math Education Even Worse. *Wall Street Journal,* Aug. 5, 2014.
[4] Goodman, J. A comparison of proposed US Common Core math standard to standards of selected Asian countries. *Education News,* July 2010. http://www.educationnews.org/ed_reports/94979.html
[5] Stotsky, S., Wurman, Z. Common Core's Standards Still Don't Make the Grade. *Pioneer Institute*, July 2010. http://pioneerinstitute.org/download/common-cores-standards-still-dont-make-the-grade/
[6] Milgram, R. J. Testimony to the California Academic Content Standards Commission. July 7, 2010. http://pioneerinstitute.org/download/review-of-common-core-math-standards-testimony-to-the-california-academic-content-standards-commission/

The only study I am aware of that found Common Core to be comparable to international high achieving countries was done by Professor William Schmidt from Michigan State University. Unfortunately, his study suffers from major methodological issues that undermine its credibility.[7]

Yet the low level of Common Core's content expectations is just a small part of Common Core's problems. Another part is their experimental nature. Some examples.

Common Core decided to focus on explicitly teaching children the meaning of numbers and operations rather than have a traditional focus on developing procedural fluency with numbers and operations and fostering the emergence of understanding through their practice and use. This approach was promoted in this country at least since the 1989 NCTM Standards and is, in my opinion, responsible for much of the deterioration of American school mathematics in the 1990s. In my own state of California, the result of those 1989 NCTM standards was the 1992 California Math Framework, which quickly brought California to next to last place in the nation on the 1996 NAEP. Perhaps not coincidentally, the main author of that ill-fated 1992 California Framework, one Phil Daro, is also one of the three principal authors of the Common Core mathematics standards. There is a striking evidence of the success that resulted once California abandoned that "meaning-centered" experimental framework when it adopted instead its rigorous 1997 standards.[8]

Professor Andrew Porter, the dean of the University of Pennsylvania Graduate School of Education, studied Common Core in 2011 and compared it to other high achieving countries. His observation is striking (added emphasis):[9]

> *We also used international benchmarking to judge the quality of the Common Core standards, and the results are surprising both for mathematics and for ELAR. Top-achieving countries for which we had content standards put a greater emphasis on "perform procedures" than do the U.S. Common Core standards.* ***High-performing countries' emphasis on "perform procedures" runs counter to the widespread call in the United States for a greater emphasis on higher order cognitive demand****.*

Another experimental facet of Common Core is the way it insists on teaching Euclidean Geometry using rigid motions as its basis. This is a highly sophisticated approach to teaching geometry that may work for college math majors, yet when it was tried with gifted high school students in Moscow under the direction of, perhaps, the greatest soviet mathematician in the 20th century, it proved a miserable failure and was quickly abandoned.[10] With regular high school students and teachers, who lack much of the mathematical sophistication necessary, this approach is bound to devolve to arm waving and harming

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[7] Wurman, Z. Common Core's Validation: A Weak Foundation for a Crooked House. *Pioneer Institute*, 2014. http://pioneerinstitute.org/download/common-cores-validation-a-weak-foundation-for-a-crooked-house/

[8] Wurman, Z. Why Students Need Strong Standards [And Not Common Core]. *American Principles Project*, 2014. https://americanprinciplesproject.org/app-education/new-white-paper-why-students-need-strong-standards-and-not-common-core/

[9] Porter, A., et al. Common core standards the new US intended curriculum. *Educational Researcher* 40, no. 3 (2011): 103-116.

[10] Tihomirov, V. M. Andrei Nikolaevich Kolmogorov: The Great Russian Scientists. *The Teaching of Mathematics*, v6, n1 (2003) at 33-35. http://elib.mi.sanu.ac.rs/files/journals/tm/10/tm612.pdf

the little rigorous geometry that still taught in our high schools. In fact, Guershom Harel, a math professor from the University of California in San Diego, recently made a similar point:[11]

> *The [Common Core] standard approach, thus, would require enormous effort and time to be spent on plane transformations-their definitions, compositions, and properties-which will inevitably shift the attention from deductive reasoning, the main objective of the CCSS-Geometry. … Compare, for example, the insight one gets from a synthetic proof of a concurrency theorem (e.g., "The three medians in a triangle are concurrent") to the insight one gets from an analytic proof of the same theorem.*

This experimental nature of Common Core can be also seen in the overly demanding nature of the standards in kindergarten and first grade. Where traditionally kindergartners are expected to work with numbers up to 20, Common Core calls on them to handle numbers up to 100 for no good (or research-supported) reason. It expects kindergartners to write formal number sentences and equations, an expectation I have not seen in any country. Small wonder that dozens of early childhood specialists warned that they find early grades of Common Core educationally inappropriate.[12] In contrast, Common Core massively slows down after the very early grades as is one to two years behind international high achievers by grade 8, as evidenced by the previously cited references.

2. College Readiness

Common Core calls itself "college ready" yet Dr. Jason Zimba, one of their lead writers, testified that its "concept of college readiness is minimal and focuses on non-selective colleges."[13] It is hard to see how such a low level of college readiness will benefit Nevada students.

His co-lead writer, Professor William McCallum, when speaking in a forum of professional mathematicians said that "It's not what we aspire to for our children. It's not what we as a nation want to set as a final deliverable. I completely agree with that, and we should go beyond that."[14]

And, indeed, just a cursory analysis will show that the high school content of Common Core mathematics barely includes poor man's Geometry and Algebra II. It excludes content they traditionally included such as infinite geometric sequences, full treatment of conic sections, etc.

U.S. Department of Education data indicates that the probability of such student completing a four-year college degree—in any subject, not just in STEM—is below 40%.[15]

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[11] Harel, G. Common Core State Standards for Geometry: An Alternative Approach. *Notices of the AMS*, v61 n1 pp 24-35 (2014).
[12] Joint Statement of Early Childhood Health and Education Professionals on the Common Core Standards Initiative. *Alliance for Childhood*. March 2, 2010. http://www.edweek.org/media/joint_statement_on_core_standards.pdf. A tough critique of Common Core on early childhood education, *Washington Post, January 29, 2013* http://www.washingtonpost.com/blogs/answer-sheet/wp/2013/01/29/a-tough-critique-of-common-core-on-early-childhood-education/
[13] Minutes of the Regular Meeting of the Massachusetts Board of Elementary and Secondary Education, March 23, 2010, p.5. http://www.doe.mass.edu/boe/minutes/10/0323reg.pdf
[14] http://pioneerinstitute.org/video/audio-lead-mathematics-standards-writer-william-mccallum/
[15] Clifford Adelman, The Toolbox Revisited, Table 5 (2006) http://www2.ed.gov/rschstat/research/pubs/toolboxrevisit/toolbox.pdf

In fact, for STEM – Science, Technology, Engineering, and Mathematics – U.S. Department of Education data shows that with Common Core's preparation of Algebra II and Geometry the probability of achieving a Bachelor's degree is only 1 in 50.[16]

Just this week Chester Finn, past president of the Fordham Institute and a great supported of Common Core penned a piece where he warns[17]

> But what if "college-ready" no longer means that you actually have to be prepared to succeed in credit-bearing college courses? Or if "credit-bearing courses" are diluted such that more people appear "prepared" to succeed in them, even though such success means less than it once did? Won't the "real world," once it determines that "college-level" courses have been cheapened and watered down, insist on other kinds of credentials?
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> I'm not imagining this scenario. It's beginning to play out in the unreal world of American higher education …

So much for Common Core's "college-readiness." It's good enough only for community colleges and non-selective colleges.

3. PARCC Assessment versus ACTAAP

Arkansas has been spending about $30-$35 per tested student on its old CRT and NRT assessment, so hearing from the PARCC consortium that the cost of their assessment is similar – about $35/students – must have been pleasant news. Yet this seemingly-reasonable cost hides a few surprises.

The first surprise is the cost of technology needed for PARCC administration. A basic accounting shows that a cheap computer costing $500 for both software and hardware will cost another $500 – 20% a year -- in maintenance, insurance, additional bandwidth and on-site support for a five-year amortization. This comes to $200/year total ownership cost. Let's assume four students per such computer, or $50 every year per tested student. In other words, even under the best circumstances that the test administration and scoring can be covered with the $35, the total cost for testing is at least around $85/year per tested student, more than double than before.

You may not see this cost immediately because technology budgets are often hidden in regular district operation budgets, yet it will surely come up when the districts will start begging for more money to cover their unexpected technology costs.

Next is the testing time. PARCC tests require between 8 and 11 hours administering, much longer than your old ACTAAP test. Perhaps more importantly, by using PARCC Arkansas loses the control of its own student data. Once PARCC gets access to it, it is obligated by its agreement with the U.S. Department of Education to [emph. added]

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[16] STEM in Postsecondary Education, NCES 2013-152, Table 7. http://nces.ed.gov/pubs2013/2013152.pdf

[17] Finn, Chester. Defining College Readiness Down. *Flypaper,* April 24, 2015. http://edexcellence.net/articles/defining-college-readiness-down

> *"The recipient [PARCC] will ... Comply with, and where applicable coordinate with the ED staff to fulfill, the program requirements established in the RTTA [Race to the Top Assessment] Notice Inviting Applications and the conditions on the grant award, as well as to this agreement, including, but not limited to working with the Department to* ***develop a strategy to make student-level data that results from the assessment system available on an ongoing basis*** *for research, including for prospective linking, validity, and program improvement studies; subject to applicable privacy laws."*

In other words, whatever privacy protection Arkansas' laws may offer they are moot, because Arkansas loses control once the individual student data is transferred to the U.S. Department of Education.

In Conclusion

Common Core standards are mediocre, experimental, and not based on any international benchmark. Arkansas almost than doubled its fraction of Algebra 1 taking in grade 8 from 18% in 2000 to 31% in 2013, almost catching with the national average. Common Core promises to reverse this achievement and push back Algebra 1 into the high school, to the detriment of disadvantaged students, as the case of California clearly shows.

Arkansas should draft its own standards based on one the excellent and proven state standards such as Massachusetts, Indiana, or California. Fixing some holes in Common Core will not solve the problem of its experimental focus and pedagogy that are all pervasive. Arkansas should then proceed to re-establish its own test, ideally using off the shelf technology such as ACT, NWEA and/or ITBS, or through dedicated state contract rather than federally-sponsored consortium. This will guarantee you control over your own student data, and offer a much shorter test and more reliable to boot.

Last but not least, Arkansas will also retain its autonomy over its own education and promote federalism as intended by our founders, rather than as perverted by some lobbying groups in Washington.

Thank you for your time. I am looking forward to your questions.