

Milgram's Testimony Before Texas Legislature

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Testimony on the CCSSI Core Standards and the new draft TX math standards

R. James Milgram

Professor of Mathematics Emeritus

Stanford University

I would like to testify in support of the bill Rep. Huberty filed, HB 2923, to prevent the so called Core Standards, and the related curricula and tests from being adopted in Texas.

My Qualifications. I was one of the national reviewers of both the first and second drafts of the new TX math standards. I was also one of the 25 members of the CCSSO/ NGA Validation Committee, and the only content expert in mathematics.

The Validation Committee oversaw the development of the new National Core Standards, and as a result, I had considerable influence on the mathematics standards in the document. However, as is often the case, there was input from many other sources - including State Departments of Education - that had to be incorporated into the standards.

A number of these sources were mainly focused on things like making the standards as non-challenging as possible. Others were focused on making sure their favorite topics were present, and handled in the way they liked.

As a result, there are a number of extremely serious failings in Core Standards that make it premature for any state with serious hopes for improving the quality of the mathematical education of their children to adopt them. This remains true in spite of the fact that more than 35 states have already adopted them.

For example, by the end of fifth grade the material being covered in arithmetic and algebra in Core Standards is more than a year behind the early grade expectations in most high achieving countries. By the end of seventh grade Core Standards are roughly two years behind.

- Typically, in those countries, much of the material in Algebra I and the first semester of Geometry is covered in grades 6, 7, or 8, and by the end of ninth grade, students will have finished all of our Algebra I, almost all of our Algebra II content, and our Geometry expectations, including proofs, all at a more sophisticated level than we expect.
- Consequently, in many of the high achieving countries, students are either expected to complete a standard Calculus course, or are required to finish such a course to graduate from High School (and over 90% of the populations typically are high school graduates).

Besides the issue mentioned above, Core Standards in Mathematics have very low expectations. When we compare the expectations in Core Standards with international expectations at the high school level we find, besides the slow pacing, that Core Standards only cover Algebra I, much but not all of the expected contents of

Geometry, and about half of the expectations in Algebra II. Also, there is no discussion at all of topics more advanced than these.

Problems with the actual mathematics in Core Math Standards As a result of all the political pressure to make Core Standards acceptable to the special interest groups involved, there are a number of extremely problematic mathematical decisions that were made in writing them. Chief among them are

1. The Core Mathematics Standards are written to reflect very low expectations. More exactly, the explicitly stated objective is to prepare students not to have to take remedial mathematics courses at a typical community college. They do not even cover all the topics that are required for admission to any of the state universities around the country, except possibly those in Arizona, since the minimal expectations at these schools are three years of mathematics including at least two years of algebra and one of geometry.

- Currently, about 40% of entering college freshmen have to take remedial mathematics.
- For such students there is less than a 2% chance they will ever successfully take a college calculus course.
- Calculus is required to major in essentially all of the most critical areas: engineering, economics, medicine, computer science, the sciences, to name just a few.

2. An extremely unusual approach to geometry from grade 7 on, focusing on rigid transformations. It was argued by members of the writing committee that this approach is rigorous (true), and is, in fact, the most complete and accurate development of the foundations of geometry that is possible at the high school level (also probably true). But

- it focuses on sophisticated structures teachers have not studied or even seen before.
- As a result, maybe one in several hundred teachers will be capable of teaching the new material as intended.
- However, there is an easier thing that teachers can do – focus on student play with rigid transformations, and the typical curriculum that results would be a very superficial discussion of geometry, and one where there are no proofs at all.

Realistically, the most likely outcome of The Core Mathematics geometry standards is the complete suppression of the key topics in Euclidean geometry including proofs and deductive reasoning.

The new Texas Mathematics Standards As I am sure you are aware, Texas has spent the past year constructing new draft mathematics standards, and I was one of the national reviewers of both the first and second drafts. The original draft did a better job of pacing than Core Standards, being about one year ahead of them by the end of eighth grade, *so not nearly as far behind international expectations*. Additionally, they contained a reasonable set of standards for a pre-calculus course, and overall a much more reasonable set of high school standards.

There were a large number of problems as well - normal for a first draft. However, the second draft had fixed almost all of these issues, and the majority of my comments on the second draft were to suggest fixes for imprecise language and some clarifications of what the differences are between the previous approaches to the

lower grade material in this country and the approaches in the high achieving countries.

It is also worth noting that the new Texas lower grade standards are closer to international approaches to the subject than those of any other state.

I think it is safe to say that the new Texas Math Standards that are finally approved by the Texas Board of Education will be among the best, if not the best, in the country. (I cannot say this with complete certainty until I have seen the final draft. But since I am, again, one of the national reviewers, this should be very soon.)

So it seems to me that you have a clear choice between

- **Core Standards** - in large measure a political document that, in spite of a number of real strengths, is written at a very low level and does not adequately reflect our current understanding of why the math programs in the high achieving countries give dramatically better results;
- **The new Texas Standards** that show every indication of being among the best, if not the best, state standards in the country. They are written to prepare students to both enter the workforce after graduation, and to take calculus in college if not earlier. They also reflect very well, the approaches to mathematics education that underlie the results in the high achieving countries.

For me, at least, this would not be a difficult choice. So for these many reasons I strongly support HR 2923, and hope the distinguished members of this committee will support it as well.

Respectfully,

R. James Milgram

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