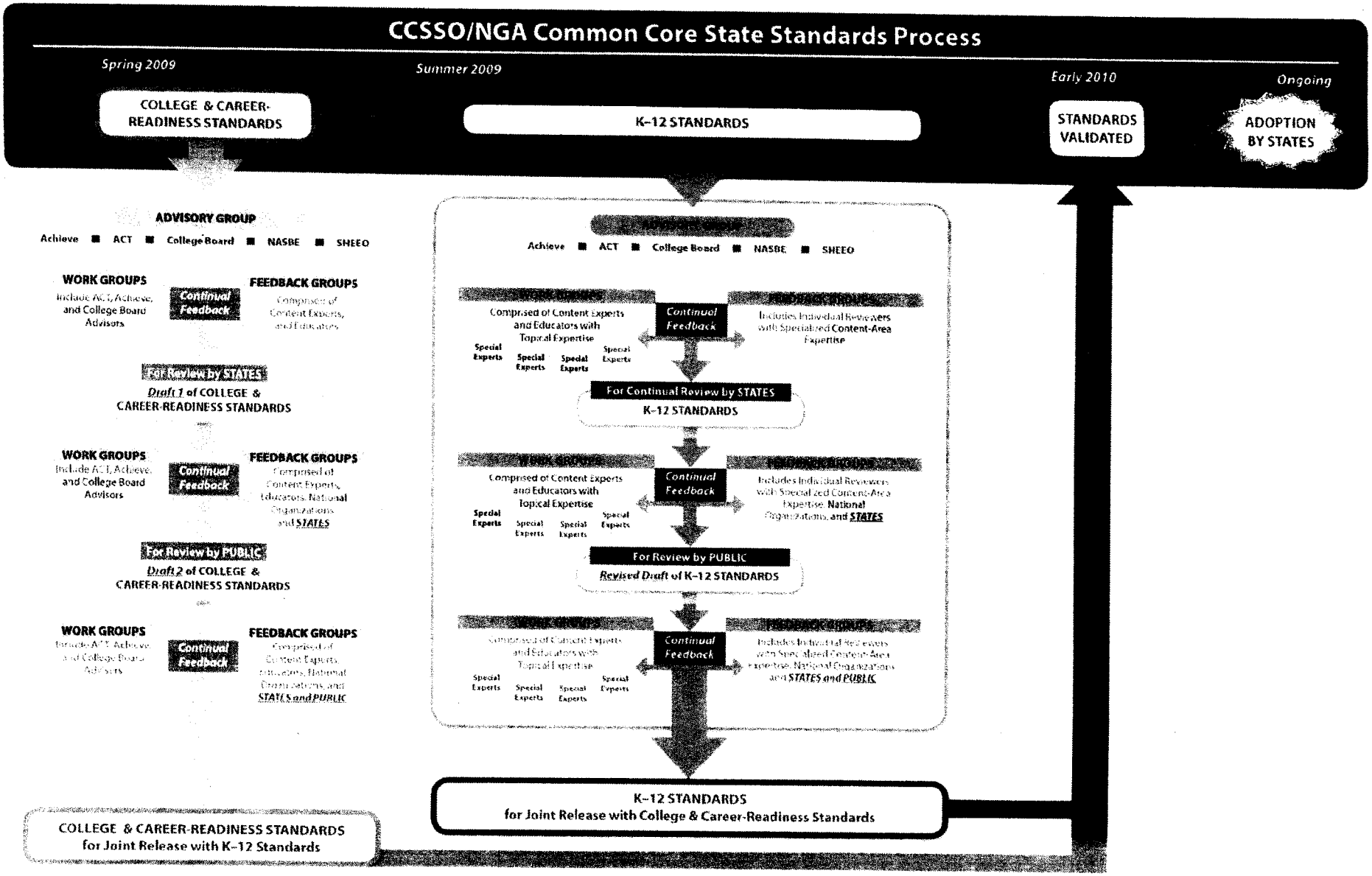
APPENDIX


CCSSO/NGA Common Core State Standards Process
Spring 2009
Summer 2009
Early 2010
Ongoing
COLLEGE & CAREER-READINESS STANDARDS
K–12 STANDARDS
STANDARDS VALIDATED
ADOPTION BY STATES
ADVISORY GROUP
Achieve ■ ACT ■ College Board ■ NASBE ■ SHEEO
WORK GROUPS
Include ACT, Achieve, and College Board Advisors
Continual Feedback
FEEDBACK GROUPS
Comprised of Content Experts, and Educators
For Review by STATES
Draft 1 of COLLEGE & CAREER-READINESS STANDARDS
WORK GROUPS
Include ACT, Achieve, and College Board Advisors
Continual Feedback
FEEDBACK GROUPS
Comprised of Content Experts, Educators, National Organizations and STATES
For Review by PUBLIC
Draft 2 of COLLEGE & CAREER-READINESS STANDARDS
WORK GROUPS
Include ACT, Achieve, and College Board Advisors
Continual Feedback
FEEDBACK GROUPS
Comprised of Content Experts, Educators, National Organizations, and STATES and PUBLIC
COLLEGE & CAREER-READINESS STANDARDS for Joint Release with K–12 Standards
Achieve ■ ACT ■ College Board ■ NASBE ■ SHEEO
Comprised of Content Experts and Educators with Topical Expertise
Special Experts
Special Experts
Special Experts
Special Experts
Continual Feedback
Includes Individual Reviewers with Specialized Content-Area Expertise
For Continual Review by STATES
K–12 STANDARDS
Comprised of Content Experts and Educators with Topical Expertise
Special Experts
Special Experts
Special Experts
Special Experts
Continual Feedback
Includes Individual Reviewers with Specialized Content-Area Expertise: National Organizations, and STATES
For Review by PUBLIC
Revised Draft of K–12 STANDARDS
Comprised of Content Experts and Educators with Topical Expertise
Special Experts
Special Experts
Special Experts
Special Experts
Continual Feedback
Includes Individual Reviewers with Specialized Content-Area Expertise: National Organizations and STATES and PUBLIC
K–12 STANDARDS for Joint Release with College & Career-Readiness Standards

UNIVERSITY of ARKANSAS
1871 ®

College of Education and Health Professions
Department of Education Reform

201 Graduate Education Building
Fayetteville, Arkansas 72701
(479) 575-3172
(479) 575-3196 (FAX)

Invited Testimony Prepared for the Ohio Senate Education Committee

Why Ohio Needs World-Class Content Standards for K-12, and How To Get There

Sandra Stotsky, Ed.D.
Professor of Education Reform
21st Century Chair in Teacher Quality
University of Arkansas
April 15, 2009

Dear Chairman Cates, Ranking Member Sawyer, and members of the Senate Education Committee:

I appreciate the opportunity to speak with you today about state standards and aligned accountability systems. You face a huge challenge as you think about ways to improve Ohio's academic standards. The standards you have today are mediocre at best. The governor's budget seeks to make drastic changes in them. Many thoughtful people are concerned that the direction of these changes would make Ohio's K-12 academic standards worse, not better. I am here today to recommend resources and procedures that will help you to get world-class academic standards. But I would like to tell you first how the state that is widely regarded as having the best academic standards in the country got them.

The Position and the Charge: I have spent over a decade evaluating the quality of state standards across the country and advising many states on how to create academically strong standards. My expertise in this area is based on my work as Senior Associate Commissioner at the Massachusetts Department of Education from 1999-2003. In that role, I was in charge of complete revisions of all of the Bay State's preK-12 standards, teacher and administrator licensing regulations, teacher tests, and professional development criteria. A line item in the state budget for the specific position I held had been funded by a chiefly Democratic State Legislature in January 1999 at the request of then Governor William Weld, a Republican. I was hired for the position by the Commissioner of Education, David

Driscoll, a Democrat, in March, a choice that was enthusiastically supported by the Chair of the Board of Education, James Peyser, a Republican.

Thus, I worked in an authentic bipartisan environment. I was expected to enhance the academic rigor of all of the Department's documents for preK-12 that had been developed to implement the education reform measures enacted and funded by the Massachusetts legislature in the 1990s.

The legal framework within which I worked was the Massachusetts Education Reform Act of 1993, a comprehensive piece of progressive legislation that linked a clear measure of accountability to state funding in every component of preK-12 and teacher education. Its overall goal was to increase both preK-12 student academic achievement and the academic quality of the state's preK-12 teaching force. My goal was to improve the state's major curriculum frameworks, its regulations for licensing teachers and administrators and for approving their preparation programs, and the teacher tests required for licensure, drawing on the soundest scholarship or research evidence I could find in every subject area and in the field of education. How to recognize sound scholarship and research was exactly what I had been trained for in my graduate work at Harvard's Graduate School of Education in the 1970s.

The first components the Department needed to get right to increase student achievement and teacher quality were clearly the curriculum frameworks in each subject area: mathematics, English, reading, science, history, geography, economics, civic education, foreign languages, and the arts. Why are curriculum frameworks with strong academic standards the beginning and the end? Because they heavily shape (or should) the academic components of all the other documents a state department of education develops for preK-12. These include student assessments in basic subjects, guidelines for state-funded programs for preschools, English Language Learners, and instructional technology, and regulations for teacher and administrator preparation programs, licensure tests, and professional development. State standards also influence directly the content of classroom curricula and course configurations, even though departments of education cannot mandate specific curricula and instructional strategies, in theory the province of local school boards.

What I Found: My first step was to review critically the Department's existing curriculum frameworks, guided by authoritative discipline-based commentary on what the school curriculum should contain and how its content should be sequenced (especially in mathematics and science), as well as by whatever

3x

credible educational research I could locate. Each subject area suffered from a number of deficiencies. Although some were subject- specific, generic deficiencies were more serious and afflict most states' standards, regardless of subject. I highlight here the three most serious problems in the original drafts or frameworks I examined.

*Statements on skills, processes, and strategies cluttered the documents. Educators on the original standards development committees had spent most of their time arguing about, and developing prescriptions for, how teachers should teach or what strategies and skills student should learn, not the specific intellectual content to be taught from grade to grade. As a result, much of what was in the original documents or drafts was unassessable.

*Academic experts in the disciplines had played only a minor role in shaping the content standards, and what passed for a content standard was often vague or inaccurate. In addition, many content standards were organized and sequenced incoherently from a discipline-based perspective.

*As a result of poorly designed or vague standards, many of which were not actually standards, essential intellectual content was often lacking or hard to see. In English/reading, it was mostly invisible because of the failure to specify an increasingly demanding sequence of significant texts and/or authors to help teachers and schools construct an authentic English curriculum; in mathematics, essential topics were spread over too many grades and diluted by less important topics; in science, authentic content was diluted by non-content issues; and in history and the social sciences, content was expressed at too high a level of generality, leaving teachers in the dark as to what specific events, people, trends, places, and times should be taught within an appropriate narrative framework in history, geography, economics, U.S. government, and civic education.

My staff and I concentrated on the six following objectives in revising the state's original standards:

*To make disciplinary content the central focus in each subject area

*To specify the disciplinary content to be taught by teachers in each subject area, grade by grade, or course by course in high school mathematics, science, or history

*To craft intelligible and assessable standards in a coherent sequence

*To organize the high school standards for each subject in ways that reflected the normal disciplinary training of teachers of that subject

4x

*To make clear that acceptable teaching/learning strategies included teacher-directed as well as student-directed strategies

*To include as many examples as possible showing how a standard might be implemented in a classroom lesson so that teachers could see exactly what the standard meant and how critical thinking, problem solving, and other skills were naturally intertwined with the content being taught and developable when teaching to an intellectual objective

What I Did: What was done to ensure a set of strong and coherent academic standards in each subject? First, we eliminated all so-called standards above the primary grades (preK-2) focusing chiefly on skills and learning processes or strategies. They were and are not standards chiefly because they are generic in nature, content-free (or not sufficiently content-specific), and unassessable in isolation. That is why attempts to add a layer of explicit skills, processes, or strategies to classroom instruction and state assessments will point teachers in the wrong direction and retard student acquisition of the knowledge base needed for their appropriate use. Basic academic content is both foundational to critical thinking, problem solving, and effective oral or written communication as well as inseparably intertwined with the development of these skills. These skills can be effectively deployed only after students have acquired the specific content that guides the choice of a specific skill to use in a specific context and how it is to be used.

Second, we arranged for academic experts in each area to work directly on the revised standards or to review them. Teachers were regularly consulted on developmental appropriateness, teaching load (number of objectives at a grade level), and grade level placement. But specific content in mathematics, science, history, geography, economics, and US and comparative government was determined chiefly by mathematicians, scientists, economists, historians, geographers, and political scientists, with assistance from experienced and well-trained high school teachers in English and history, especially.

Third, we re-organized the way in which middle and/or high school standards were presented, so that schools could see what should be covered in subject-specific courses in US or world history, science, and mathematics.

Empirical Results: Let's get quickly to the proof of the pudding. On the 2007 NAEP tests (commonly referred to as the Nation's Report Card), Massachusetts students scored first in grades 4 and 8 in

mathematics and in grade 4 in reading, and tied for first in grade 8 in reading. The Bay State's low-income students also made stunning gains. When the scores of low-income students were compared *with the scores of low-income students in the other states,* it turns out that the Bay State's low-income students are tied for first place in mathematics in grades 4 and 8 and in reading in grade 4. And in grade 8 in reading, they are tied for second place. These dramatic gains by student subgroups also turn up in scores on our state tests. For example, in 2001, when the high school graduation requirement kicked in, only about 15% of black and Latino tenth graders scored at the proficient/advanced levels on the state's grade 10 mathematics test. In 2007, the percentage of black and Latino tenth graders who are proficient/advanced was about 45%, a three-fold increase.

Results on international tests in mathematics and science given in 2007 were even more stunning. Massachusetts 4th graders ranked second worldwide in science achievement and tied for third in mathematics; its 8th graders tied for first in science and ranked sixth in mathematics. The Bay State also leads the nation today in the percent of its public high school students taking and passing Advanced Placement courses with a 3 or more--almost 21 percent--a larger percentage than most other states in the nation and well above the national average of 15.2 percent.

These impressive results are due to more than world-class standards, however. Several other factors contributed to the so-called Massachusetts Miracle. The academic knowledge base for teaching to the state's strong content standards in mathematics, science, English language arts and reading, and history/social science was fully embedded in the state's revised teacher licensing regulations, teacher licensure tests, and criteria for state-funded professional development. The revised or new subject area licensure tests for elementary teachers, in particular, weighted mathematics and science more heavily than before, and we eliminated all pedagogical items from all subject area tests. In addition, we mandated a dedicated test of research-based reading instructional knowledge for all prospective early childhood, elementary, and special education teachers. All these changes in our licensure regulations and tests have led to stronger preparation programs and an academically stronger teacher corps in K-8 since 2002. But, there is one more factor that is obvious to everyone in the Bay State--the state's generally acknowledged high quality student assessments, which are based clearly on our strong content standards. Without strong content standards as the central and overarching component of systematic educational reform, no "miracle" would ever have occurred.

6x

Resources for 21st Century Content: Let me first suggest some key resources (all public documents) Ohio should draw on to ensure 21st century content in world-class content standards. I will indicate key documents or reports in the four major subjects in the school curriculum.

For English or reading, the best resources to draw on are the contents, examples, and reading lists in the curriculum frameworks for Massachusetts (2001), California, and Indiana. Texas's 2008 standards and their organization, as well as the English and Communication standards in Achieve's American Diploma Project and the examples for its backmapped benchmarks, can also be very useful .

For mathematics standards, there are no better resources than the standards for California, Singapore, Minnesota, Indiana, and Massachusetts. The recommendations in the National Mathematics Advisory Panel's final report of 2008 should be followed as much as possible, as should the recommendations in the report by the Panel's task group on Conceptual Knowledge and Skills. Curriculum Focal Points, issued by the National Council of Teachers of Mathematics in 2006, should also be consulted.

For science standards, the best resources are the 2006 Massachusetts science standards, and those in California, New York, Indiana, and New Mexico. And for history and the social sciences, the best documents for specific details are California's standards, the 2003 Massachusetts history and social science standards, and the National Civic Standards issued by the Center for Civic Education in California.

Procedures for Developing Content Standards: Let me now recommend a few generic procedures that can help ensure that strong content standards emerge from a revision of Ohio's K-12 content standards.

*First, the state superintendent and her team should prepare a **critical review** of the content standards in each subject, referring to the most highly regarded standards documents in the subject (national and international), as well as research reports. This review should point out the major features that the best documents share and differ on, as well as the strengths and weaknesses of the state's documents. Feedback on the state's document should also be solicited from the state's teachers, parents, and others by means of an extensive online survey. The review should be sent to the State Board of Education, the legislature, and the Governor's office detailing exactly what general changes are recommended to strengthen current state documents, together with a rationale for the recommendations based squarely on the documents and reports that have been reviewed, as well as a synthesis of the solicited feedback.

7.

*After approval or amendment by all relevant powers that be, the state superintendent should designate several people to be in charge of the basic drafting process. In each subject area, a content expert or two (with a Ph.D. in the subject) should work with a high school chair/teacher and a K-8 curriculum specialist to draw up the **first draft of the standards**, in sections over a span of several grade levels. One staffer should be in charge physically of the draft document at all times. A first draft cannot and should not be written up by a group of people at a meeting, or staffers without Ph.D. expertise.

*The state superintendent should establish a **small review committee of about 15 teachers** for each document. District superintendents should be asked to recommend a well-regarded, experienced elementary, middle, or secondary teacher of that subject. In other words, 15 school districts should be represented, with equal numbers at each level, on each committee. As each section of a document is drafted, the relevant committee should review them together to assure appropriateness of grade level placement and teaching load, and to raise or address questions about content and curricular sequence.

*The revised draft should go for **review by academic experts** (people with Ph.D.s) and relevant groups (e.g., in mathematics, the Mathematical Association of America), who are asked to send back comments with their names attached to assure responsible feedback. All feedback should be posted on the ODE website. Changes to the document to address reviewer comments should be based on agreement by the drafting group and approval by the state superintendent.

*The draft of the standards that goes out for **public comment** should also be sent to all the academic experts again. After the public comment period, the state superintendent and her staff should provide the State Board of Education, the legislature, and the governor with a summary of the feedback and a **rationale for the final shape of a the revised document**.

Thank you Chairman Cates, Ranking Member Sawyer, and members of the Senate Education Committee for this opportunity to speak with you today. I look forward to your questions and comments.

December 7, 2009

In 1996 the New Jersey State Board of Education adopted the first set of "Core Curriculum Standards". They were designed to provide the school districts with a set of benchmarks (skills and content knowledge) in which students should demonstrate proficiency upon graduation. To assess whether the students have mastered the content, they are given standardized test such as the NJ ASK or HSPA to determine the level of proficiency. The scores on these tests are not realistic, for they are scaled. Assessment is a critical part of the learning process. It must be directed at what a student knows and what a student needs to move successfully through a well-defined mathematics curriculum. To this end, any testing, whether it is a state or national assessment in specific mathematics content (Algebra I/II.) cannot be developed with scaled scores as the reporting device. It is unconscionable for educators to give students a passing scale score knowing that the probability of future success for students with such a passing score is highly unlikely.

" Proof that high schools are failing is the number of first-year college students who take remedial classes", Education Commissioner Lucille Davy said. "In two-year colleges, 80 percent need remedial math or English classes; in four-year colleges, 40 percent to 50 percent need them."[1] Not much has improved since this statement was made.

New Jersey high school graduates believe that the diploma they hold proves that they are ready for college-level academic work. Parents believe it, too. The truth is that their public-school experience has lied to them about their level of competence in mathematics with the grades they received and the courses they took. These students have never learned what they should have, and probably could have, learned because the curricula to which they have been exposed are misguided. A student's K-12 experience should provide a mathematics curriculum that prepares them for college-level mathematics. The lack of good mathematics standards adversely affects mathematical literacy, and also limits students' future educational and career opportunities. For a state purporting to prepare students for 21st century work skills in an increasingly technological society, the skills of our students simply do not measure up.

They come to college, especially to the community colleges, needing remedial mathematics in large numbers. The cost of developmental education across the nation is estimated to be between 1.5 and 2 BILLION dollars a year, money which could and should be spent on more innovative teaching strategies. Not only is the cost outrageous, but data have shown that only about 37 percent of students enrolled in developmental courses will graduate with a college degree. President Obama has also pledged support to the movement to "fix" remedial education for, as he stated, "it is such a drain on state dollars".

Looking at the cost of developmental education in New Jersey, the number of students enrolled in developmental courses has risen this past fall as the placement score to test out of remedial (developmental) mathematics courses was raised statewide. The cost in resources is staggering. Taxpayers have a right to be outraged, and colleges should be

9x

allowed to charge back school districts for every student who needs remediation. In a 1998 study by Breneman and Harlow, [2], the cost of remedial education in New Jersey was listed as 50 million dollars. So what is the estimated cost today? **On average**, a community college will run 70 remedial math courses per semester: 70 x 3 semesters x 25 (on average) students per class x 19 community colleges = 99,750 students taking remedial math over the course of a year. The most recent data from the U.S Department of Education (2004-2005) puts the cost of remediation at a two-year school at between $1607 and $2008 per student.[3] Assume $1800 per student (a little less than the average cost figure), and mathematics remediation is costing the community colleges somewhere around $179,550,000. We are spending this money and still it presents a barrier to these students in completion of their college degree. The potential economic benefit of improving students' academic outcomes should be a wake-up call to the importance of reforming school curricula.

The table below shows the remedial rates at New Jersey community colleges and four-year colleges and universities for 2004.

Community College	Remediation Rate (%)		Four-Year College/University	Remediation Rate (%)
Atlantic Cape	77.6		Kean	70.0
Camden	81.0		Montclair	54.0
Cumberland C	80.0		New Jersey City	62.0
Gloucester	73.2		NJIT (estimated)	40.0
Salem	92.5		Ramapo	23.0
Bergen	81.8		Rowan	21.0
Essex	91.4		Rutgers	33.0
Hudson	67.9		Stockton	14.0
County College of Morris	76.0		The College of New Jersey	8.0
Passaic	96.3		William Patterson	72.0
Sussex	75.0			
Union	67.0			
Warren	75.0			
Brookdale	79.8			
Burlington	73.8			
Mercer	83.0			
Middlesex Community	78.5			
Ocean Community	67.7			
Raritan Valley Community	78.0			
STATEWIDE COMMUNITY COLLEGES	**77.8**		**STATEWIDE FOUR-YEAR**	**40.0**

Based on the data, it is evident that what we are doing is not working. We cannot solve the problem by pointing a finger at any one factor. It is not only the standards, but also teachers who can not teach what they do not understand. With the current shortage of

10x

qualified mathematics teachers and the current state of the mathematics standards in New Jersey, one has to ask the following question: if K-12 education now results in little development of the skills that lead to an understanding of basic mathematics, where will future teachers acquire the skills needed to teach future generations? We have already had a generation of students who have passed through mathematics curricula in New Jersey who are not mathematically literate. Some of these same students become the teachers of future K-12 students and the degradation of mathematics knowledge continues. Courses for prospective teachers do not create robust mathematical knowledge. Whatever standards, texts, and written curricula are proposed is only a resource: it is the teachers' understanding of the subject that matters most in the teaching of mathematics. The training of prospective teachers of mathematics needs to be reviewed by both mathematics departments and schools of education. As one high school teacher, who took a course from George Polya, put it: "The mathematics department offers us tough steak which we cannot chew and the school of education vapid soup with no meat in it."[5] That statement is still meaningful, even though it was written fifty years ago. We cannot continue to ill prepare teachers and then send them into the classroom with the expectation that they will teach for understanding. This is asking them to do the impossible.

Let's stop the blame game, for we know that college remediation is a serious education issue facing our state, and is a direct result of the failed mathematics curricula used in the state. So how do we solve the problem? This will require great effort and concentrated political push. New Jersey is known for its high property taxes, the high cost of car insurance, and in addition for the highest per pupil spending in the nation. It would seem a logical conclusion that throwing more money at the problem is not the answer. College readiness starts in kindergarten and, if the state standards are to be a guide, they must be aligned to the demands of college work. High standards improve teaching and learning. The time has come to stop treating standards, assessments, teacher recruitment, and accountability as separate silos, to stop taking a triage approach to education, to stop clamoring for more money as THE solution, and to work toward a response that provides a lasting solution. Why can't New Jersey be noted for something positive by creating a plan that can become a national model? This can only be accomplished if all the stakeholders (K-12, community colleges, four year institutions, parents and politicians) are called to the table to form a committee that will explore all aspects of creating a solid set of standards that provide for mastery. There is a need to review pre-service programs, especially in the area of math courses and professional development criteria, and to explore best practices. A teacher needs to provide clear and exact explanations, to be "an instructor, one who imparts knowledge, a director of learning."[4] To deskill teachers, to claim that they are facilitators only who will guide students to "discover" facts, is a denial of responsibility and accountability. The result of the existing mathematics programs is that students entering college do not have mastery of basic facts, have not learned study skills, and are confounded by the demands now being made of them.

So where do we start? The current state mathematics standards do not recognize the link between skills and application of math facts. "Facts versus higher-order thinking" or "basic skills versus conceptual understanding", part of the debate we hear these days, is a

false choice. In mathematics, skills and understanding are completely intertwined. It is an understanding of theory and technique that allows students to solve "real-world" problems. If there are gaps in students' knowledge, this process breaks down. Basic skills are absolutely indispensable for understanding more sophisticated processes. There has been a flurry of activity involving writing new mathematics standards: first within the state and then the move to join the national common standards movement. Much of this activity has been done without input from all stakeholders involved. The community college representation has been especially lacking.

Any new mathematics standards, besides being rigorous and coherent, should:

- require that students learn specific facts and skills, including estimating an answer;
- be teachable and make teachers responsible for directing learning;
- be taught through an organized sequence that uses mathematical language, symbols, and algorithms;
- support learning more complex mathematics by first developing mastery of basic components;
- develop a skill set that allows the possibility for development of more abstract thought and sophisticated problem solving; and
- establish a base of knowledge that, unlike technology, never becomes obsolete.

Another avenue is to have the community colleges work with local school districts. One such example: Middlesex County College is piloting a program to test seniors with ACCUPLACER and develop a program to remediate before entering college. The time is now to start using our educational funds more wisely.

Yvonne Greenbaun, Mercer County College
Maria DeLucia, Middlesex County College

---

1. The Press of Atlantic City, Friday, August 18, 2006

2. Breneman, D.W. and Harlow, W.N. (1998, July). *Fordham Report: Remediation in Higher Education: Costs and Consequences, 2*(9). Washington, D.C.: Thomas B. Fordham Foundation

3. http://www.deltacostproject.org

4. Webster's Unabridged Dictionary, Copyright 1979, Simon & Schuster, p.1871

5. George Polya, "Ten Commandments for Teachers", *Journal of Education of the Faculty and College of Education of the University of British Columbia,* (3) 1959, pp. 61-69.

NJIT
New Jersey's Science & Technology University

New Jersey Institute of Technology
University Heights
Newark, NJ 07102-1982
973.596.5782
973.596.5591 fax

COLLEGE OF SCIENCE & LIBERAL ARTS

Department of Mathematical Sciences

December 7, 2009

Mr. Chairman and Members of the New Jersey Senate Education Committee,

The Department of Mathematical Sciences at New Jersey Institute of Technology has been engaged in a number of activities to improve the quality of math education in our State. One of our faculty members, Professor John Bechtold, participated in the New Jersey Department of Education Math Task Force last spring. Another member, Professor Bruce Bukiet, has an NSF-supported grant to foster Teacher Education Collaboration for High-Need Schools in New Jersey. Our faculty's passion for mathematics has led to ongoing discussions within our department on teaching and learning of mathematics at all levels.

Thus, on behalf of the members of the Department of Mathematical Sciences at New Jersey Institute of Technology, I am writing in regards to the pending adoption of a new set of K-12 math standards.

As mathematics professors, we are very concerned with the state of K-12 math education in New Jersey. Two recent developments, in particular, have served to emphasize the magnitude of problems that currently exist.

1. The study conducted by the New Jersey High School Redesign Steering Committee two years ago found that 80% of students in our Community Colleges, and 40% of students in 4-year colleges, require math remediation.
2. More than 86% of NJ students who took the National end-of-course Algebra II exam last year failed, and are therefore not ready to do college-level math. Furthermore, only 4% of students were deemed to be well-prepared.

These numbers are shocking and, quite frankly, embarrassing. We are in the midst of a crisis that threatens to cripple New Jersey's ability to compete in our technology-driven society.

The draft of Common Core Math Standards under consideration is far superior to what currently exists in New Jersey. To that extent, we support the State's decision to partner with a consortium that includes balanced representation from all stakeholder groups to produce a set of high-quality standards. However, there are still urgent matters that need your consideration.

Though presented as College- and Career-Readiness Standards, there is an obvious omission in the draft, in that it does not describe a pathway for students to pursue careers

in STEM fields. Presumably, each State will have to define such a pathway for its students. In addition, each State that adopts these standards has the opportunity to modify them by 15%. It is imperative that, if New Jersey decides to adopt these standards, we need to articulate a strategy for how standards are reviewed, written and edited.

We urge you to consider formulating a clear plan for writing, reviewing and editing state standards. Furthermore, that formal process needs to include the perspective and expertise of our State's mathematicians.

Please do not hesitate to contact us if we can be of assistance in this endeavor. We look forward to working with you to help make New Jersey a leader in mathematical literacy.

Respectfully,

Daljit S. Ahluwalia
Chair, Department of Mathematical Sciences
New Jersey Institute of Technology