An Update on TPSE Math Activities and Plans

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Council Meeting of the Conference Board for the Mathematical Sciences  
ASA Headquarters—Alexandria, VA  
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TPSE Math aims to effect constructive change in mathematics education at community colleges, 4-year colleges and research universities. The goal of the first phase of the project is to identify scalable solutions for implementation.

Consensus-Building Meetings Held Across the Country

- June 2014—National meeting held at UT Austin
- October 2014—Regional meetings held at UMBC
- February 2015—Regional meeting held at UCLA

TPSE report summarizes recommendations on 5 critical issues identified at the national meeting in 2014:

1. Curriculum reform
2. Removing barriers and opening pathways
3. Teaching and the economic model of math depts.
4. Enriching the undergraduate experience
5. Enhancing graduate training

For more information, visit www.tpsemath.org
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Immediate Next Steps

• Working with a major consulting firm to establish a strategic plan for TPSE
• Planning next regional meeting to take place at the University of Chicago
• Developing a plan for learning from exemplary practices in the math community
• Preliminary discussions with associations of higher education to explore potential collaborations

For more information, visit www.tpsemath.org
FORCES SHAPING POST-SECONDARY MATHEMATICS
PERFORMANCE FUNDING AND THE COMPLETION AGENDA
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<tbody>
<tr>
<td>College Algebra and below</td>
<td>57%</td>
<td>58%</td>
<td>56%</td>
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<tr>
<td>Calculus</td>
<td>37%</td>
<td>35%</td>
<td>37%</td>
<td>38%</td>
<td>10%</td>
<td>8%</td>
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<td>Advanced Courses</td>
<td>7%</td>
<td>6%</td>
<td>7%</td>
<td>8%</td>
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<td>Other Courses (2 Year)</td>
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<td>TOTAL Enrollment (in thousands)</td>
<td>1469</td>
<td>1614</td>
<td>1607</td>
<td>1971</td>
<td>1348</td>
<td>1273</td>
<td>1580</td>
<td>1887</td>
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Source: Adapted from the CBMS 2010 Census Report, Table S.2
High Rates of Failure in Gateway Courses

Students Passing a Math Course that Counts Toward an Associate’s Degree

Fall 2010 enrollments in math courses that students could apply toward a degree

- About 17,600 African American students
- About 108,700 Hispanic/Latino students
- About 98,600 White students

Students who remained enrolled until the end of the term

- 70% of 12,300 students
- 75% of 81,900 students
- 80% of 78,500 students

Students who received a passing grade

- 41% of 7300 students
- 49% of 53,500 students
- 60% of 58,900 students

source: Passing when it counts. EdSource Issue Brief, February 2012
www.edsource.org/pub12-passing-when-it-counts.html
CALLS TO ACTION
Pivotal reports serve as “calls to action” for two collective efforts to reform undergraduate mathematics education: TPSE Math and Common Vision 2025.
CHANGING ENROLLMENT PATTERNS
Percentage of Students Completing Degrees at Four-Year Institutions Who Previously Enrolled at Two-Year Institutions*

*Students were considered enrolled at two-year institutions if they had at least one full-time or part-time enrollment at a two-year institution prior to the four-year institution prior to the four-year completion date.

Note: The state shown is the state in which the degree was awarded. The prior two-year enrollments may have occurred in any state. The institution levels are based on 2013 IPEDS institutional characteristics, with the Florida College System being the only exception. The 28 schools in that system offer four-year degrees, but all are categorized as two-year institutions for this analysis, meaning their enrollments are counted as contributing to four-year awards elsewhere, but their own awards are not counted in the denominator. This is in keeping with their traditional role as a primary point of access to higher education.
Many state financial aid programs were designed over 30 years ago to benefit full-time, 4-year college students who enroll immediately after high school. This is no longer the norm.

Today’s students are:

- In 2012, 4.6 million undergraduate students were enrolled in distance education.
- 1/3 of all students change institutions at some time before earning a degree.
- Only 19% of full-time students earn a bachelor’s degree in four years.
- From 2000 to 2011, enrollment of students 25 and older increased 41%.

Projected % increases in student enrollment from 2011–2022:*

- +27% Hispanic
- +26% Black
- +7% Asian/Pacific Islander
- +7% White

38.3% of students were enrolled part time in 2012.

21.76% of American adults have some college credits but no college degree.
Over 600,000 students are studying calculus in high school this year, roughly 1/3 of the 1.8 million who will go directly from HS to college.
THE COMMON CORE STATE STANDARDS AND THE UNDERSUPPLY OF TEACHERS OF MATHEMATICS
TEACHER-PREP ENROLLMENT TRENDS BY STATE

Enrollments in teacher-preparation programs (including alternative-route options) have fallen dramatically in some states in recent years, while holding steady in others.

**NEW YORK**
- 2008–09: 74,348
- 2009–10: 79,225
- 2010–11: 70,128
- 2011–12: 61,821

**TEXAS**
- 2008–09: 62,461
- 2009–10: 67,361
- 2010–11: 55,911
- 2011–12: 50,658

**CALIFORNIA**
- 2008–09: 44,692
- 2009–10: 35,499
- 2010–11: 33,069
- 2011–12: 26,231

**FLORIDA**
- 2008–09: 21,111
- 2009–10: 15,680
- 2010–11: 15,230
- 2011–12: 20,138

**MISSISSIPPI**
- 2008–09: 4,277
- 2009–10: 4,247
- 2010–11: 5,200
- 2011–12: 4,901

*Source:* U.S. Department of Education, Higher Education Act Title II Data Collection
THE EMERGENCE OF STATE MATH TASK FORCES
The NMP’s State Math Task Force Initiative

The math task force initiative is designed to connect senior math faculty with governance officials who shape their state’s systems of post-secondary education.

The task forces typically operate under the aegis of the system chancellor or state coordinating board. The focus is most commonly structured math pathways, transfer agreements, and curricular modernization.
“...charged with determining how the System’s colleges could dramatically improve success rates in gateway mathematics courses without compromising the disciplinary integrity of these courses.”

—From University System of Georgia: Transforming College Mathematics
Recommendations from the University System of Georgia Mathematics Task Force

1. Focus on supporting success in college credit-bearing, gateway mathematics courses for all students.
2. Aligning gateway mathematics course sequences with academic programs of study. In particular, College Algebra should not be the default class for non-STEM majors.
3. Implement a co-requisite approach to support student success in gateway mathematics courses.
4. Develop year-long mathematics pathways for students with significant gaps in preparation.
5. Use multiple measures to place students in gateway courses and appropriate supports.
6. Terminate use of COMPASS as an exit examination.
7. Align the outcomes of gateway mathematics courses with the Common Core Georgia Performance Standards (CCGPS) for Mathematics.
8. Develop advising systems and protocols for placing students in gateway mathematics courses and co-requisite supports that align with their intended programs of study.
Ohio Board of Regents’ Charge to the Mathematics Steering Committee

To develop expectations and processes that result in each campus offering pathways in mathematics that yield
(1) increased success for students in the study of mathematics;
(2) a higher percentage of students completing degree programs; and
(3) effective transferability of credits for students moving from one institution to another.
Recommendations from the Ohio State Math Task Force

1. Improve student success in entry-level courses by aligning mathematics to academic programs of study and by improving instructional delivery mechanisms
2. Develop, implement, and evaluate co-requisite strategies to support underprepared students
3. Redesign OTM course criteria and processes to focus on student learning outcomes
4. Establish a statewide network of mathematics chairpersons
5. Improve communication among mathematics faculty and stakeholders across institutions
6. Develop quality measures for improving student success in mathematics; then collect, analyze, and share relevant data
7. Strengthen collaboration and communication between K12 and higher education on mathematics curriculum and instruction
SELECTED TPSE THEMES
HONOR AND BUILD ON THE PROFESSION’S STRENGTHS

Rather than obsess about its perceived weaknesses
MODERATION AND MODERNIZATION
COHERENCE WITHOUT UNIFORMITY

One size does not fit all
SCALING

Changing normative practice
TPSE Math aims to effect constructive change in mathematics education at community colleges, 4-year colleges and research universities. The goal of the first phase of the project is to identify scalable solutions for implementation.

Potential Collaborations with CBMS

1. CBMS selects what the presidents see as their highest priorities from the TPSE agenda and sanctions a TPSE team to work on them under CBMS aegis. (classic CBMS)

2. A joint TPSE/CBMS-commissioned study of the capacity of the math profession (and especially its leadership vehicles (CBMS, JPBM, ...)) to enact the changes in postsecondary math on which there is deep agreement.

3. A curricular modernization symposium and monograph series building on TPSE’S and CV2025’s interest in Math 2025.

4. A CBMS policy fellows program led perhaps by TPSE Math and CV2025 leaders, plus AMS, SIAM, and ASA policy leads—with a focus on state and federal policy and working with governing boards.

5. TPSE Math/CBMS sponsorship of the growing number of state math task forces (composed of influential chairs from 2-and 4-yr institutions, key system administrators, and governance officials).
CHANGING THE ROLES OF MATHEMATICS IN POST-SECONDARY EDUCATION
High-level goals for post-secondary mathematics

1. Math can become a partner discipline, rather than a service discipline.

2. Math can become the discipline best at curricular modernization and relevance, which requires working with peer disciplines.

3. Math can be seen as the most responsible discipline in supporting student success—and the easiest to work with.

4. Mathematics can become the exemplar among disciplines in improvement, in identifying areas of consensus in a highly heterogeneous higher education landscape, and in developing and scaling innovation.