

BOARD OF HIGHER EDUCATION

REQUEST FOR COMMITTEE AND BOARD ACTION

COMMITTEE: Academic Affairs

NO.: AAC 14-12

COMMITTEE DATE: October 22, 2013

BOARD DATE: October 29, 2013

**RECEIPT OF THE REPORT FROM COMMISSIONER'S TASK FORCE ON
TRANSFORMING DEVELOPMENTAL MATH EDUCATION**

MOVED: The Board of Higher Education has received the final report of the Commissioner's Task Force on Transforming Developmental Math Education and thanks the members of the Task Force for their diligent and excellent work.

The Board hereby revises the 1998 Common Assessment policy by authorizing new criteria for placement in developmental education and college-level courses, consistent with Recommendation 1 of the Report. The implementation date of these changes will be extended to Fall 2015.

Academic year 2014-2015 will serve as a time to pilot these new criteria, allowing institutions to either replace their current placement standards with the new recommendations or to introduce pilot projects in conjunction with current placement standards. During 2014-2015, the BHE and DHE authorize campuses to allow for limited variations in the GPA placement standard as part of the pilot projects. Campuses will report results to DHE, and the BHE will review the results of these initiatives and modify policies as necessary prior to full implementation in Fall 2015.

The Board will be reviewing additional recommendations in the Report for action at the December 10, 2013 Board meeting.

Authority: Massachusetts General Laws Chapter 15A, Section 6 and 9

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**Final Report from the
Task Force on Transforming
Developmental Math
Education**

October 2013

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The Task Force would like to thank Achieving the Dream, Jobs for the Future, Complete College America and the Boston Foundation for their support. The Task Force is more fully informed and connected to the national discussion of developmental math education reform as a result of the involvement of these groups.

Background

A major obstacle to the timely completion of an academic degree program is lack of preparedness of students, particularly in the area of math education. The remediation needed to overcome this deficit can be substantial and often leads to a delay or interruption of college completion. In addition, the absolute numbers of students requiring some degree of remediation can be significant and often stretches the capacity of campuses to effectively address the problem.

The need to ensure students are adequately prepared for college-level courses is a national challenge. As reported by the National Center for Educational Statistics, 50% of students entering college for the first time in Fall 2003 took a developmental course¹. The numbers are higher for students pursuing an Associate of Arts or Associate of Science degree (69.4%) than for those in baccalaureate programs (35.5%). There is also a marked difference in the numbers requiring developmental math (42%) as opposed to English (12%). Fewer than 25% of those who begin postsecondary education in developmental coursework ever acquire a degree.²

One might reach the conclusion that more extensive remediation and/or more sophisticated placement techniques would help better prepare students to succeed in their gateway courses.³ In fact, the research suggests that if we minimize the obstacles to placement in gateway courses and the faster we can get students through their remedial work (often occurring simultaneously with gateway courses), the greater the likelihood of better outcomes. As a report from the New Jersey Council of County Colleges states, “Data make it increasingly apparent that multiple levels of remediation over multiple semesters are not the solution, although that has long been our paradigm in higher education.”⁴ It is time to revisit the current paradigm for development education in Massachusetts and to make changes that allow us to better prepare our students for the knowledge-based society in which we live.

States have been addressing the developmental education challenge in a variety of ways. It is important to note that there is great variation across states in terms of remedial assessment and placement policies. Appendix 1 indicates whether a particular state has a statewide placement policy, a common set of placement tests, and mandated cut scores on common tests. There is no common practice across the states and only eleven other states have a similar configuration to Massachusetts in that they have a statewide placement policy, a common set of placement tests, and mandated cut scores. The 1998 Common Assessment Policy of Massachusetts set the state’s standards.

¹ NCES 2003-2004 transcript study

² Complete College America (CCA) calls remediation or developmental education “the bridge to nowhere.” See, Complete College America, *Remediation: Higher Education’s Road to Nowhere*. (2012). CCA believes that developmental education presents too many obstacles or exit points for students who begin with developmental coursework rather than college level courses.

³ A gateway course is defined as the first math course taken by a student required for their program of study.

⁴New Jersey Council of County Colleges, *Student Success Summit: Revisioning Developmental Education*, November 2012

Perhaps the most radical approach to developmental education is that taken by Florida. SB-1720, which was signed into law in May 2013, gives authority to the student as to whether they want to participate in development education, thus making it entirely voluntary. Institutions are required to provide remediation but students determine individually whether they wish to participate in the non-credit programs. Connecticut's Public Act No. 12-40, effective July 2012, only allows remediation if it is 'embedded' in a gateway course, thus converting a pre-requisite to a co-requisite. Colorado's approach is somewhat similar to that of Connecticut in that multiple measures of assessment are used to determine whether a student should participate in developmental education. Likewise, acceleration is promoted through the use of co-requisite courses and specific pathways have been established that lead directly to a student's intended course of study. In many instances, these approaches are linked to greater coherence between high school education and the competencies required to succeed in college, often utilizing the Common Core State Standards (CCSS) as the unifying principle.

Massachusetts context

Historically, 38% of students enrolling in Massachusetts public higher education are enrolled in developmental coursework. The figures vary by sector but mirror the national data: Community colleges typically average 60% of students requiring developmental work, state universities in the 22% -23% range and the University of Massachusetts is lower at approximately 10%.

The differences across sectors can be attributed to the alternative missions of the institutions. In particular, the need for developmental education is, as one would expect, higher in the community college system where open admissions results in the enrollment of students with varied academic preparation. Differences are also apparent by race/ethnicity as African-American and Latino students in Massachusetts require developmental education coursework at a significantly higher rate (20 percentage point differential) than white students. This gap is a reflection of the disadvantaged educational background of students that originate from relatively underfunded and underperforming schools.⁵

Both national and Massachusetts data support the contention that students who enroll in developmental coursework—particularly those who may need developmental coursework in more than one area or who require more than one developmental course level—are less likely to graduate. These students often become discouraged and never reach a point where they even attempt an entry-level course. In Massachusetts, 20.6% of full-time first-time students who entered community college in Fall 2004 and did not take developmental coursework finished in three years compared to 10.3% of those who did take developmental coursework.⁶ For the four year institutions, the figures are 59.1% and 51.2%, respectively.

While developmental education (predominantly writing, reading, and mathematics) as a whole is a worthwhile subject of review, it is developmental math education that requires the greatest attention at this time. In Massachusetts more students require developmental math education than they do remedial support in writing and reading—

⁵ It is interesting to note that the need for developmental education is greatest among those students that most recently completed secondary education.

⁶ Complete College America, 2001.

three times as many community college students require math developmental education than remedial English, and five times as many in the state universities.

If we examine the student cohort that entered our institutions in Fall 2010, the progression pattern is disconcerting: 11,064 (53%) incoming community college students required developmental math education; 7,902 (71%) of those students completed the developmental coursework but only 2,190 (20%) of those who completed developmental math completed a college level math course within two years. Somewhere along the line, almost 9,000 students who required developmental math were “lost”—that is, they did not complete a college level math class, effectively ending their higher education aspirations. These results speak to the ‘failure’ that has been developmental math education in the Commonwealth of Massachusetts.

The pattern is not much different for the state universities. In Fall 2010, 1,559 (23%) students enrolled in developmental math at the state universities; 1,354 (87%) completed developmental math, but only 879 (56%) students who completed developmental math also completed a college level math course. Slightly under half of the students failed to reach that bench mark. If the data is disaggregated by race, ethnicity, or income, the results show that the successful completion of developmental math education is a major obstacle to academic achievement for African-American, Latino, or low-income students. For the State to compete effectively and provide the prepared citizenry for the knowledge-based economy, these outcomes are simply unacceptable by any standard.

Charge to the Task Force on Transforming Developmental Math Education

In March 2012, the Commissioner of Higher Education charged the Task Force on Transforming Developmental Math Education to recommend steps to systematically improve the percentage of students that complete developmental math education and pass the first college-level math course required for their program of study.

To accomplish this charge, the committee focused its efforts in four key areas that were highlighted in the June 2011 Final Report of the Working Group on Graduation and Student Success Rates:

1. Research and Education

- Review the growing body of literature focused on developmental education;
- Review innovative practices currently in place at colleges within and outside of Massachusetts and creative initiatives which successfully scale up best practices across multiple campuses;
- Collect and analyze Massachusetts developmental education student progression data.

2. Developmental Math Assessment and Placement

- Review the 1998 Board of Higher Education Common Assessment Policy and recommend modifications regarding the instrument, cut-off score, exemptions, and retest requirements to provide improved diagnostic information and guidance for individual student placement;
- Review campus placement levels for students testing into developmental education and make recommendations to ensure comparability.

3. Developmental Math Structure

- Explore and make recommendations on redesigned and accelerated approaches to developmental math education;
- Develop a strategic plan for scaling proven models for the effective delivery of developmental education.

4. Developmental Math Content

- Investigate and make recommendations on expanding developmental math education to encompass multiple pathways, including statistics and quantitative reasoning, to college-level math. Pathways should be appropriate to the student's academic area of focus.

The four key areas described above serve as a long-term agenda to understand the causes of the math developmental education bottleneck and ultimate outflow of students from the academic pipeline. They also serve as a framework upon which to build policies that accelerate students through the developmental phase to successful completion of gateway courses. The Task Force met continually from March 2012 to June 2013 in substantive meetings discussing research findings with national experts, learning more of the work of the campuses in Massachusetts and across the nation, and debating the value of alternative policies to meet the goal of improving the percentage of students that complete developmental math education and pass the first college-level math course required for their program of study.⁷

Review of our Understanding of Developmental Math Education

Why do so many students require developmental education? Why do so many fail to complete developmental coursework? Why do so many fail to successfully complete entry level college math courses? There are several possible answers to these questions:

- Misalignment of high school standards with entry-level college skills;
- Inadequate high school preparation/length of time out of high school;
- Quality of assessment for college level skills; determination of cut score used in assessment;
- Assessments not aligned with competencies needed for entry-level college courses;
- Content of developmental courses not aligned with competencies students will need for entry-level math courses other than algebra;

⁷ Appendix ? lists the meetings of the Task Force.

- Students placed in multiple levels of developmental courses to ensure their preparation for college algebra even though they may not require those competencies to pass entry-level math courses.

Inadequate high school preparation has been the traditional explanation as to why large numbers of students require developmental coursework. It has been argued that if students acquired stronger content and skills in high school, they would not require developmental coursework. It has also been assumed that students entering college for the first time several years after graduating from high school may need developmental education due to loss of knowledge or skills while away from an academic setting.⁸

Strengthening high school preparation has been a focus in many states for several years now. Massachusetts initiated education reform in 1993 and began requiring a proficient score on the Massachusetts Comprehensive Assessment System (MCAS) as a graduation requirement in 2003. In spite of these past educational reforms activities, there has not been a significant decrease in the numbers enrolled in developmental education over the past ten years.

Massachusetts has also raised minimum admission standards for its four-year public higher education institutions effective with the entering Fall class of 2016. Students will be required to have had four years of mathematics, and to have taken math in their senior year of high school. It is anticipated that requiring math in the senior year will assist the student in retaining math knowledge and skills and result in fewer students placed in developmental math education.

The continuing focus on stronger high school preparation most recently resulted in the development of the Common Core State Standards (CCSS – academic standards that are designed to ensure students are college and career ready upon high school graduation). These new standards were developed using benchmarks from performing states and countries and involved higher education faculty to ensure that the skills and knowledge embedded in the standards reflected what was necessary for college success. 45 states, including Massachusetts and the District of Columbia have adopted the CCSS.⁹ While the CCSS were not designed specifically to reduce the number of students requiring developmental education, the presumption is that they will lead to more students graduating from high school, college ready and prepared for college level coursework.

Assessment and Placement

⁸ The data actually show that time out of high school does not increase the likelihood of a student being placed in developmental education; adequacy of high school preparation seems to be the more significant contributory factor.

⁹ The CCSS differ from many previous state standards in that emphasis was on creating fewer standards, but ones that would allow students to go deeper in depth on a subject and gain a more complex grasp of material. College and university faculty participating in the development of the CCSS focused on the skills and knowledge that were the most necessary for postsecondary success. To determine those skills, the developers of the CCSS used scholarly research, input from business, assessment data from Program of International Student Assessment (PISA), Trends in International Math and Science Study (TIMSS) and National Assessment of Educational Progress (NAEP), standards from high-performing states and countries and input from higher education faculty. See, the *Common Core State Standards: a Vital Tool for Higher Education*. Young, Alison and King, Jacqueline. *Change*, November/December, 2012.

The most common approach in determining a student's preparedness for college-level courses is through placement exams. The placement exam should, in theory, reflect the standards that the institution has determined as necessary for success in college work. Individual institutions determine not only which placement exam to be used to assess student's proficiency; they also establish the cut-off scores for placement in developmental education. In Massachusetts, prior to 1998, these decisions were campus-based. This created a situation whereby a student might be placed in developmental coursework at one public higher education institution but not at another, depending on the assessments and cut scores used. Seeking consistency across the system, in 1998 the Massachusetts Board of Higher Education enacted a Policy on Common Assessment. This led to the use of Accuplacer, a suite of tests developed by the College Board to assess entry level reading, writing and math skills and to establish cut-off scores for placement in developmental education.

While consistency across institutions may appear to be a universally reasonable goal, it limits the flexibility to use other factors in placement decisions for students who score close to the cut-off and who present other indicators that they are college ready. The 1998 Common Assessment Policy was developed to provide consistency and constancy in results for students. But a survey conducted in Spring 2013 by the Board of Higher Education revealed that among the fifteen community colleges, other factors were influencing the placement decision. These included using cut scores other than those defined in the policy, the use of calculators in the exam, exemptions for students who do not take the placement exam, allowance for re-testing and expiration of test scores. Thus, despite the intent to standardize the placement of students across the colleges, different institutional practices mediated the results.

Placement standards are only useful if they are good predictors of the likelihood of student success in the gateway courses. All of the public institutions that responded to a DHE survey indicated that they use Accuplacer as the primary assessment instrument for first-time students. Most of the campuses use the Elementary Algebra test as the first test; if the results indicate that the student is not ready for college-level math, the Arithmetic test may be used to further determine the student's placement. If the Elementary Algebra test indicates college math readiness, the College Algebra test may be used to determine if the student is ready for placement into Calculus.

With all of the focus on testing to determine a student's math proficiency, it is rather surprising that traditional placement methods, such as those used by Massachusetts' public institutions, are not the best predictors of success in math gateway courses. Recent research at Teacher's College (Columbia University)¹⁰, CUNY¹¹, and the North

¹⁰The Task Force heard from Judy Scott-Clayton, Teachers College, Columbia University (*How Well High-Stakes Exams Predict College Success*) at one of its meetings. Her criterion for success was student performance in the first college level course in a relevant subject, such as Statistics. Her findings concluded that high school background – course-taking and GPAs- may be as accurate a measure as an assessment test. She also recommended that institutions consider allowing students to test out of remediation based on a “best of” either high school GPA or test score cut-off.

¹¹ CUNY's placement policy uses a variety of measures other than placement tests to determine if a student is ready for college-level math. Scores from SAT Math or ACT Math may be used as well as a score on the Regents' Exam. Proficiency levels are established by the local college rather than there being a uniform policy for all institutions.

Carolina Community College System¹² suggest that high school grade point average is just as accurate, if not a better predictor, of student success in gateway courses.

Course Content and Structure

This focus on consistency and standardization in the 1998 Common Assessment Policy was also reflected in the belief that proficiency was measured by competency in college level algebra to the exclusion of other areas of math proficiency. This led to a restricted focus on college algebra in the content of most developmental math courses, ignoring the fact that quantitative skills vary depending upon a student's area of intended specialization. Thus, the content of developmental courses was not especially well aligned with actual entry-level courses. Students had to traverse multiple levels of developmental courses with little alignment with the necessary competencies to pass entry-level courses.

Research suggests that developmental math education needs to be revised in such a way that the content reflects the different academic pathways that students pursue.¹³ This realization led to the creation of Quantway™ and Statway™ which are modular developmental math courses that prepare students for success in specific entry-level college math and statistics courses. Quantway™ was launched in 2012 in eight community colleges across three states while Statway™ was first implemented in 2011 in 19 community colleges in five states.¹⁴

Major foundations have funded a number of different projects in which courses are designed in such a way that students complete their developmental math coursework and earn college-level math credit within one year rather than spending a year or more in developmental coursework before entering college-level math.¹⁵ The results have been quite striking and show a marked improvement in performance for students in the new course structure as compared to students following the traditional pathway of developmental math courses prior to college-level coursework. Baseline data for 2008 showed that only 5.9% of the students enrolled in developmental math received credit for college-level mathematics in one year. Additionally, only 15.1% had achieved this goal

¹² The North Carolina Community College (NCCS) system recently adopted a new assessment policy in which HS GPA is used to exempt students from the assessment test if the student has a grade point average equal to or greater than 2.6 as well as a Future Ready Core code of 1-4. North Carolina's Future Ready Core codes 1-4 indicate that a student has taken Algebra I, Algebra II, Geometry and a fourth math suitable for postsecondary admission. The North Carolina Community College System worked with the Community College Research Center (CCRC) at Teacher's College, Columbia University in setting the grade point average used for placement decisions. CCRC research using data obtained from North Carolina community college students showed that HS GPA was a stronger predictor of success than either SAT or ACT both in terms of NCCS GPA and/or number of credits earned. To address the concern that high schools vary in quality and therefore HS GPAs are not comparable, CCRC looked at the effect of high school quality on the predictive value of the GPA. CCRC determined that neither the district or high school which the student attended made a significant difference to the predictive value of the HS GPA.

¹³ The Carnegie Foundation for the Advancement of Teaching is implementing programs titled QuantWay™ and StatWay™ which prepare students specifically for the areas of statistics and quantitative reasoning that students will need to take within their majors rather than preparing everyone for college algebra. This is just one example of how to structure the content of development math courses to support student's pathways.

¹⁴ http://www.carnegiefoundation.org/sites/default/files/CCP_Descriptive_Report_Year_1.pdf

¹⁵ The Carnegie Foundation in 2009, with funding from the Bill and Melinda Gates Foundation, William and Flora Hewlett Foundation, Kresge Foundation, Carnegie Corporation of New York, and Lumina Foundation formed a network of community colleges which created pathways for students based on Quantway™ and Statway™.

after two years, 20.4% after three years, and 23.5% after four years. After one year of Statway™, 51% of students in the community college network had successfully completed the full Pathway, that is, the students had earned college-level math credit with a grade of at least C- or better by the end of the first year of college enrollment.¹⁶ Likewise, 56% of all students enrolled in Quantway™ successfully completed the first sequence of the course with a grade of C or higher. As a comparison, only 20.6% of students in the community college network were able to successfully complete the developmental math sequence within a full year; 28.5% achieved this goal after two years, 31.6 percent after three years, and 33.3% after four years.¹⁷

The traditional developmental math sequence designed to prepare students for college algebra may require multiple levels to ensure that students move from the starting point to possession of required competencies. Students may become discouraged taking two or three semesters of developmental work which is reflected in the numbers who fail to complete developmental coursework. If the student is not going to need competency in college algebra, then the pathway may be shortened by preparing him/her for only the skills that will be required. This focuses the discussion on the length of time that developmental coursework requires and how the time can be shortened. A related issue that delays students' progression through developmental coursework is the lack of recognition of this developmental work by other institutions. An institution that a student is transferring to might not accept developmental work taken at a previous institution. Thus, a student may complete part or all of a required developmental course sequence, only to be asked to retake it if he/she transfers before taking a college level credit bearing course. A change in transfer policy to allow for recognition of completed developmental coursework would directly address this issue.

Acceleration

It is now generally accepted that students who traverse their developmental education in a shorter or compressed period of time tend to have higher persistence rates than those who take a longer time to complete their developmental math requirements. An emerging proven model for transforming the structure of developmental math education is known as acceleration.¹⁸

Acceleration can be promoted in a number of modalities:

- Through compression models that combine existing levels; that is, collapsing one or more courses into smaller units;

¹⁶ Strother, Scott; Van Campen, Janis; and Grunow, Alicia. Community College Pathways:2011-2012 Descriptive Report. (2013) Carnegie Foundation for the Advancement of Teaching.

¹⁷ Strother, Scott; Van Campen, Janis; and Grunow, Alicia. Community College Pathways:2011-2012 Descriptive Report. (2013) Carnegie Foundation for the Advancement of Teaching.

¹⁸ The MA Department of Higher Education sponsored a workshop on acceleration models of developmental education in December 2011 at Greenfield College. Participants in the workshop heard of the latest research in developmental education from Nikki Edgecombe, Community College Research Center at Teachers College, Columbia University. Peter Adams, Director of the Accelerated Learning Project at the Community College of Baltimore County presented an overview of accelerated developmental education.

- Through mechanisms for bypassing remedial levels, perhaps by allowing re-testing after a short period of preparation or practice;
- By placing students into regular college-level courses with co-requisite enrollment in a developmental course or other simultaneous support;
- Through contextualized instruction in career-technical programs, which embed remedial content in project-based courses where information is obtained and applied at the moment when needed.

Each of these strategies has a goal of shortening the time a student must spend on developmental math coursework.¹⁹ The compression model typically operates by taking a course and breaking it into smaller units of content. In some instances, students can then take only the units which they need or, in other versions, the student can move through at his/her own pace to master all units. The student determines the amount of time necessary rather than being confined to the structure of a semester, trimester or quarter.

Co-requisite models of acceleration pair a college level math course with additional support, either in a lab format or through supplemental instruction from a tutor specifically assigned to assist students in the class. Additional information and opportunity for practice is provided to students beyond that which is taught in the college-level math course so that students can strengthen and deepen their knowledge while completing a course that will count toward graduation. This can be an important step for students who sometimes acquire significant numbers of developmental credits which do not count toward graduation. In a co-requisite model, the student is earning graduation credit while receiving necessary assistance.

The U.S. Department of Labor training grant, a \$20M competitive grant through the Trade Adjustment Assistance Community College Training Grant competition, received by the 15 Massachusetts Community Colleges has provided the opportunity to develop contextualized forms of developmental math education. Contextualized curriculum modules for the key industry sectors of healthcare, advanced manufacturing, and information technology have been developed and can be utilized for Adult Basic Education (ABE) and campus-based developmental education programs. Faculty teams from across the Commonwealth were engaged alongside colleagues from the state's ABE system as well industry partners to assist with the development of the modules; housed on a portal accessible through the Massachusetts Community Colleges Executive Office (MCCEO) website. Faculty and ABE educators are encouraged to add/share their own contextualized curriculum modules via this web site as well.

A number of Massachusetts' public institutions have already begun to reform developmental math education based on national research, models, and new approaches. For example, Bristol Community College implemented technology-assisted modules in developmental math as well as designing and piloting accelerated models in math and English. English and writing developmental courses have been combined to

¹⁹ Following on the success of the conference at Greenfield, the Task Force sponsored a second conference on Accelerated Developmental Education models at Mt. Wachusett in April 2012. Representatives from the California Acceleration Project, Katie Hern and Myra Snell, presented their work on reducing the length of the sequence of developmental work and eliminating exit points for students in the developmental track.

accelerate a student's progress through both courses. In another pilot, college-level English has been paired with developmental writing so that students are earning college credit while also fulfilling their developmental course requirements.

Massachusetts Bay Community College created learning opportunities for students in which courses in reading, writing and mathematics are contextualized for the chosen field of study. Students may also participate in pre-enrollment transitional "boot camp" delivered online and on site to boost preparation in reading, writing and mathematics. Mass Bay's Mathematics Department conducted a pilot of an accelerated developmental mathematics course, which was designed as a self-paced modular approach to the traditional face-to-face developmental sequence. This pilot has an initial success rate with 76% of the students progressing successfully.

Middlesex Community College revised its developmental education into a series of technology-assisted modules which allow students to take only the modules necessary to prepare them for college level math and to move through at their own pace. Their RAMP-Up (Review, Achieve, Master, Progress) initiative has completely redesigned its developmental math sequence from a traditionally delivered course-based model to one that is modular, mastery-based, and technologically-driven. Overall, college persistence increased from 70% from Fall 2010 to Spring 2011 to 75% from Fall 2012 to Spring 2013. Overall persistence in any math course increased from 52% from Fall 2010 to Spring 2011, to 62% from Fall 2012 to Spring 2013.

Quinsigamond Community College developed a project entitled Emporium Math which highlights computer-based learning in the quantitative sciences. It is a student centered, flexible learning environment that is supported in real-time by individualized instruction, one-on-one interaction and engagement in a computerized math classroom.

Four-year campuses are also beginning to address developmental math issues. For example, Fitchburg State University changed its institutional policy to require that students take their first math course in the first year; if the student begins in developmental math, he/she is required to remain continuously enrolled in math courses until completion of the first college level math course. The institution also piloted a self-paced modular developmental math course and initiated an automated messaging system that provides at-risk students with timely advice and notification of support services that can help them to succeed.

Some Massachusetts institutions are also collaborating with the K-12 sector to ensure college readiness. For example, Berkshire Community College has partnered with local high school teachers to design a fourth year high school course that would increase the ability of high school graduates to place directly into college-level math. In addition, Springfield Tech is working with local school districts in a rather unique way. They are testing eleventh grade high school students to determine whether they are prepared for college-level mathematics courses and, if not, the students are remediating in their senior year. This collaborative model is one that needs to be watched carefully as early results appear quite positive. Mass Bay Community College has taken a similar approach by partnering with six local high schools and administering Accuplacer to high school students. This has been supplemented with summer bridge programs and test preparation initiatives.

Other noteworthy examples include Cape Cod Community College's collaboration with six local schools to improve college going rates and decrease developmental education needs. Extensive test preparation and math refresher workshops have coincided with declines in student's enrollment in developmental education. From 2011 to 2013 the percentage of first-time students enrolled in developmental education declined from 57% to 46%. Quinsigamond Community College has also partnered with the Worcester Public Schools (WPS) to develop math curriculum and pre-assessment workshops for high school students.

All of these initiatives point to the need to establish a set of reasonable standards that promote moving into a gateway math sequence as expeditiously as possible. This cannot be accomplished by simply changing standards without providing well-aligned support structures and faculty-driven course revisions that reinforce the need to have focused content with clearly defined avenues for students to progress through their intended course of study.

Task Force Recommendations

Four national organizations – Charles A. Dana Center, Complete College America, Education Commission of the States, and Jobs for the Future – released *Seven Core Principles for Transforming Remediation: A Joint Statement* on December 12, 2012. The statement articulated seven principles aimed at improving developmental education and increasing student success. These seven principles guide reform efforts to change developmental education, resulting in fewer students being placed in developmental education, shortening the time needed for its completion, changing the content of such coursework, and ultimately increasing the number of students who successfully complete a college level math course within the first year of enrollment.

The seven principles are:

1. Completion of a set of gateway courses for a program of study is a critical measure of success toward college completion.
2. The content in required gateway courses should align with a student's academic program of study – particularly in math.
3. Enrollment in a gateway college-level course should be the default placement for many more students.
4. Additional academic support should be integrated with gateway college-level course content – as a co-requisite, not as a pre-requisite.
5. Students who are significantly underprepared for college-level academic work need accelerated routes into programs of study.
6. Multiple measures should be used to provide guidance in the placement of students in gateway courses and programs of study.
7. Students should enter in a *meta-major* when they enroll in college and start a program of study in their first year, in order to maximize their prospects of earning a college degree.²⁰

²⁰ Core Principles for Transforming Remedial Education: A Joint Statement. (2012). The Charles A. Dana Center, Complete College America, Inc.; Education Commission of the States; and Jobs for the Future.

The term “meta-major” as used by these national groups refers to a broad content area of study (such as social sciences and human services, STEM, health careers and life sciences, or arts, humanities, and design) that would start students along a pathway to a credential of their choosing. A meta-major includes a set of courses that meet academic requirements that are common across several disciplines and specific programs of study. Once started on the pathway, students should ultimately enter a more specific program of study by the end of the first year. Remediation in any area should be aligned with the academic needs of the pathway. Evidence suggests that students who enter a clear pathway upon enrollment are more likely to complete and receive a degree; too many choices and lack of direction in the first year of study may actually hinder student progression toward a degree.

The Task Force, based on its review of national research and best practices, as well as meetings with internal campus constituency groups, offers the following four primary and comprehensive recommendations for the Board of Higher Education’s review and adoption:

1. BY 2014 THE BOARD OF HIGHER EDUCATION WILL APPROVE REVISIONS TO THE 1998 COMMON ASSESSMENT POLICY BY ESTABLISHING NEW CRITERIA FOR PLACEMENT IN DEVELOPMENTAL EDUCATION AND COLLEGE-LEVEL COURSES

The current 1998 Board of Higher Education Common Assessment Policy will be revised such that placement for a first-time student into an appropriate math course is determined using multiple measures including high school grade point average, information about the courses taken during high school, and Accuplacer. The new policy will stipulate:

- a) Recent high school graduates (and/or those who graduated within the last three years) and whose high school GPA is a 2.70 or higher are exempt from the initial placement exam and should be placed directly into the lowest college-level math course appropriate for their chosen pathway of study; institutions may use a placement exam to determine if a student is prepared for a course more advanced than the gateway course;
- b) Recent high school graduates whose high school GPA is lower than 2.7 but higher than 2.40, and who have successfully passed four math courses including math in their senior year are exempt from the initial placement exam and should be placed directly into the college level math course appropriate for their chosen pathway of study. Those students with a GPA between 2.4 and 2.7 that don’t meet this criterion will be required to take the placement exam. Institutions may use a placement exam to determine if a student is prepared for a course more advanced than the gateway course. These students will have access to additional academic support if they so desire;
- c) Recent high school graduates whose high school GPA is lower than 2.40 will be required to take the Accuplacer exam and its score will determine placement into the math course appropriate for their career pathway;

- d) Students who do not have a high school GPA or whose high school GPA is older than three years will be required to take the Accuplacer exam and its score will determine a student's placement into math courses.

Timeline for implementation:

- Academic year 2013-2014 / institutional process development and pilot implementation
- Fall 2014 - full implementation

Definition: A "recent" high school graduate is one who has graduated from a Massachusetts high school within the last three years.

2. THE BOARD OF HIGHER EDUCATION WILL REQUIRE PUBLIC HIGHER EDUCATION INSTITUTIONS TO ESTABLISH GENERAL ACADEMIC PATHWAYS AND REQUIRE STUDENTS TO SELECT A PATHWAY EARLY IN THEIR EDUCATIONAL CAREER.

Public Higher Education Institutions will establish a set of broad content areas of study (such as social sciences and human services, STEM, health careers and life sciences, or arts and humanities, etc.) and identify both required courses and a potential sequence of courses to create clearly defined pathways for students to enter and succeed in college.

- a) Students will choose a pathway by the end of the first semester or upon accumulation of 12-15 credits at a postsecondary institution and enroll in the appropriate math course no later than the second semester or upon accumulation of 12 credits.

Timeline for implementation:

- Academic year 2013-2014 / identification of existing pathways; development of new pathways; institutional process development; and develop new strategies for providing academic and other support services to students
- Fall 2014 – initial implementation/Fall 2015 - full implementation of pathways approach included in campus marketing materials and catalogues, and full implementation of new student support strategies that align efforts across campus departments and offices. .

3. THE BOARD OF HIGHER EDUCATION WILL REQUIRE PUBLIC HIGHER EDUCATION INSTITUTIONS TO REVISE THE CONTENT, SEQUENCING, AND TIMEFRAME OF DEVELOPMENTAL EDUCATION.

Public higher education institutions will revise the content and sequences of developmental math courses to better reflect the knowledge and skills necessary for students to enter into and successfully complete the gateway course for specific pathways and also ensure that students will enter into college-level, credit bearing courses in no more than one year after enrollment. In addition, revision of developmental math courses will seek to address issues such as math anxiety and habits of mind which also bear on student success.

- a) Institutions will develop learning outcomes necessary for success in each college level math course and establish multiple sequences within

developmental education such that the content of the sequence aligns with the learning outcomes necessary for success in a particular gateway math course. Students will be placed into the appropriate sequence that leads to the gateway math course for the broad academic pathway area students select;

- b) Institutions will create policies and practices to ensure that students, both native and transfer, enroll in required developmental math coursework within the first year of matriculation and/or after the accumulation of 6 credits and remain continuously enrolled in math coursework until the completion of the appropriate gateway math course;
- c) Institutions will develop an approach for each developmental math sequence that allows a student to complete the sequence in one year or less. Institutions should consider the current national research and models on ways to structure developmental courses such as acceleration through modularization, acceleration through targeted interventions, contextualized delivery and co-requisite support models;
- d) As appropriate and necessary, institutions will ensure that additional support is provided to students in developmental and gateway courses;
- e) The Department of Higher Education will bring representatives from public higher education institutions together to compare learning outcomes for gateway courses to increase the likelihood of student success for students who transfer after taking math developmental coursework and prior to entering a gateway math course;
- f) The Department of Education will work with our public institutions to ensure that innovative new approaches to improving developmental education, such as the use of Quantway™ and Statway™, are fully transferable and accepted across institutions.

Timeline for implementation:

- *Academic year 2013-2014 / identification of existing pathways; development of new pathways; institutional process development*
- *Fall 2014 – initial implementation/Fall 2015 - full implementation of pathways approach; with implementation of new developmental education content, sequencing, and timeframe in place.*

4. THE DEPARTMENT OF HIGHER EDUCATION WILL PROVIDE ONGOING SUPPORT FOR THE IMPLEMENTATION OF THESE RECOMMENDATIONS BY EXECUTING THE FOLLOWING RESPONSIBILITIES:

- a) Seek sources of grant and other types of funding to support math education reform and faculty professional development;
- b) Refine and/or expand data points currently gathered from campuses to provide more detailed information regarding the progression of students

in and through developmental math courses and gateway courses with a goal of identifying and supporting best practices among the institutions. While our systems do not have these capabilities as yet, it would be important to identify Gateway courses by institution and students' performance in those courses. In addition, any information about a student's progression through developmental and subsequently Gateway courses would be useful.

- c) Explore opportunities with the Department of Elementary and Secondary Education for DHE to acquire critical data points such as GPA and disseminate directly to the Public Higher Education Institutions (e.g. Colorado's Department of Higher Education currently disseminates GPA directly to community colleges within the state). DHE should work with DESE to establish common definitions of high school GPA;
- d) Explore the creation of a web portal which would allow for early assessment of readiness for college-level and provide opportunities for students to address deficiencies; and seek ways to provide timely appropriate information to students regarding the need for and use of assessment testing;
- e) Work with DESE to encourage continued interaction between K-12 school districts and higher education institutions to better prepare and effectively place students in appropriate levels of developmental education as necessary. To the extent possible, promote outreach to local schools so that early testing and interventions can occur while students are in high school;
- f) Offer conferences and workshops on a regular basis to identify specific strategies to enhance pedagogy, content, and the sequence of mathematics courses;
- g) Monitor and evaluate the implementation of PARCC and, in consultation with the statewide PARCC Coordinating Council, assess any implications for higher education institutions' assessment policy and practice;
- h) Monitor and evaluate revisions to the GED and determine if said revisions provide implications for inclusion of GED results in higher education institutions' assessment policy and practice;
- i) Allow institutions to request authorization from DHE to conduct and report on pilot studies utilizing nationally proven assessment instruments other than Accuplacer to assess implications for further revisions to 1998 Common Assessment Policy;

GOAL: If the policies above are enacted, the number and rate of students successfully progressing through entry-level math courses should increase significantly, leading to:

5. **A GOAL BY FALL 2018 OF INCREASING BY 20% (USING THE 2009 RATE AS THE BASELINE) THE RATE OF STUDENTS COMPLETING A FIRST GATEWAY COLLEGE-LEVEL MATH COURSE WITHIN TWO YEARS OF ENROLLMENT. THE DEPARTMENT OF HIGHER EDUCATION IS RESPONSIBLE FOR MONITORING PROGRESS TOWARD THIS GOAL.**

APPENDIX A

Task Force Meetings

March 23, 2012

May 3, 2012

June 1, 2012

June 22, 2012

September 14, 2012

October 19, 2012

November 15, 2012

January 18, 2013

March 1, 2013

April 26, 2013

May 24, 2013

June 21, 2013

APPENDIX B

RESOURCES

DEVELOPMENTAL EDUCATION OVERVIEW

Core Principles for Transforming Remedial Education: A Joint Statement.

Charles A. Dana Center, Complete College America, Education Commission of the States, JFF. (2012) Jobs for the Future, Boston, MA.

<http://www.jff.org/publications/education/core-principles-transforming-remedial-ed/1494>

This statement offers a set of clear and actionable principles that, although not the final word on dev ed reform, sets a new course that can dramatically improve the postsecondary success of millions of students across the nation.

Remediation: The Road to Nowhere. (August 2012). Complete College America, Indiana, IN. <http://www.completecollege.org/docs/CCA-Remediation-final.pdf>

Presents national data on student progression through and performance in remedial course. Offers suggestions for improving remedial education through revisions to structure and content.

Development, Discouragement, or Diversion? New Evidence on the Effects of College Remediation (NBER Working Paper No. 18328). (2012). Judith Scott-Clayton & Olga Rodríguez. Community College Research Center, Teacher's College, Columbia University. <http://ccrc.tc.columbia.edu/publications/development-discouragement-diversion.html>

This NBER working paper articulates three alternative models of remediation to help guide interpretation of sometimes conflicting results in the literature. The report shows that remediation does little to improve students' skills, that there is relatively little evidence to suggest that it discourages initial enrolment or persistence and is primarily a diversion for students who take developmental coursework instead of college-level courses.

Characterizing the Effectiveness of Developmental Education: A Response to Recent Criticism. Thomas Bailey, Shanna Smith Jaggars & Judith Scott-

Clayton. (2013). Community College Research Center, Teacher's College, Columbia University.

<http://ccrc.tc.columbia.edu/publications/characterizing-effectiveness-of-developmental-education.html>

Over the past several years, CCRC has conducted several research studies on developmental education and has produced reviews synthesizing the results of our own work together with that of colleagues from other research organizations. In a recent issue of the Journal of Developmental Education, Alexandros Goudas and Hunter Boylan (2012) aimed several criticisms at this body of work, with the key claims being that: (1) we unfairly portray developmental education as ineffective because it does not lead to outcomes better than those of college-ready students; (2) we ignore several studies showing positive results; and (3) we overgeneralize from results that are only valid for students near the developmental cut off scores. This essay addresses each of these claims in detail and shows that they do not stand up to scrutiny.

Developmental Education in Community Colleges. Thomas Bailey & Sung-Woo Cho (2010). College Research Center, Teacher's College, Columbia University. <http://ccrc.tc.columbia.edu/publications/developmental-education-in-community-colleges.html><http://ccrc.tc.columbia.edu/publications/developmental-education-in-community-colleges.html>

In this brief, the authors review evidence about the effectiveness of developmental education and provide information about the progression of students through developmental sequences. The authors then discuss problems associated with the assessments used to assign students to developmental courses, and briefly review costs. Finally, they describe three initiatives designed to improve the performance of remedial services.

The Opposing Forces That Shape Developmental Education: Assessment, Placement, and Progression at CUNY Community Colleges. Shanna Smith Jaggars & Michelle Hodara. (2013). Community College Research Center, Teacher's College, Columbia University. <http://ccrc.tc.columbia.edu/publications/opposing-forces-developmental-education.html>

The authors identify three sets of opposing forces that shape developmental policy and practice: system-wide consistency versus institutional autonomy, efficient versus effective assessment, and promotion of student progression versus enforcement of academic standards. While the two goals within each set may not be entirely irreconcilable, they tend to work in opposition to one another, resulting in poor outcomes for students.

The authors outline the opposing forces framework and discuss how the tensions inherent in the framework are apparent at the national level. They then use CUNY to demonstrate how the tensions shape developmental policies, practices, and student progression patterns.

INSTITUTIONAL AND STATE POLICY

From Innovation to Transformation: Texas Moves to Reform Developmental Education. M. Colleen Clancy and Michael L. Collins. (2013) Jobs for the Future, Boston, MA. <http://www.jff.org/publications/education/innovation-transformation-texas-moves-re/1517>

From Innovation to Transformation tells the short story of how Texas community colleges decided to implement the New Mathways Project in every college in the state. The decision grew out of many years of collaboration among partners, statewide experimentation with developmental education redesign, and a maturation of student success initiatives and demonstration projects designed to help students succeed and advance toward degrees.

Ahead of the Curve: State Success in the Developmental Education Initiative. David Altstadt. (2012). Jobs for the Future, Boston, MA. <http://www.jff.org/publications/education/ahead-curve-state-success-developmental-/1493>

Ahead of the Curve is the success story of these states—Connecticut, Florida, North Carolina, Ohio, Texas, and Virginia. Their reform agendas, captured in this latest JFF report, are designed to help more students who are placed in to developmental education accelerate into credit-bearing college courses—and continue their momentum through to credentials with value. Working in concert, this dynamic network of states undertook bold reforms such as redesigning the delivery of remediation, improving the collection and use of student data to guide priorities and investment, and enacting outcomes-based funding to provide incentives for colleges to encourage innovative solutions to long-standing performance challenges.

How States Can Accelerate Community College Innovation by Supporting Faculty Leadership. David Altstad (2012). Jobs for the Future, Boston, MA. <http://www.jff.org/publications/education/how-states-can-accelerate-community-coll/1419>

States wrestling with the challenge of increasing community college student completion rates recognize that a critical next step is building support among faculty for reform efforts. Empowering faculty to take a substantive role in informing policy decisions, while also supporting

pedagogical and curricular changes in their classroom, has proven to be a successful strategy employed by several states.

ASSESSMENT AND PLACEMENT

Improving Developmental Education Assessment and Placement: Lessons From Community Colleges Across the Country. Michelle Hodara, Shanna Smith Jaggars & Melinda Mechur Karp. (2012) Community College Research Center, Teacher's College, Columbia University.

<http://ccrc.tc.columbia.edu/publications/developmental-education-assessment-placement-scan.html>

To understand current approaches that seek to improve the traditional assessment and placement process at open-access, two-year public colleges, the authors conducted a scan of assessment and placement policies and practices at open-access two-year colleges in Georgia, New Jersey, North Carolina, Oregon, Texas, Virginia, and Wisconsin. This paper describes the variety of approaches that systems and colleges employed to ameliorate poor course placement accuracy and inconsistent standards associated with the traditional process.

Predicting Success in College: The Importance of Placement Tests and High School Transcripts. Clive Belfield & Peter M. Crosta. (2012) Community College Research Center, Teacher's College, Columbia University.

<http://ccrc.tc.columbia.edu/publications/predicting-success-placement-tests-transcripts.html>

This paper uses student data from a statewide community college system to examine the validity of placement tests and high school information in predicting course grades and colleges performance. The authors find that placement tests do not yield strong prediction of how students will perform in college. In contrast, high school GPAs are useful for predicting many aspects of students' college performance.

Do High-Stakes Placement Exams Predict College Success? Judith Scott-Clayton. (2012). Community College Research Center, Teacher's College, Columbia University

<http://ccrc.tc.columbia.edu/publications/high-stakes-placement-exams-predict.html>

This paper analyzes the predictive validity of one of the most commonly used assessments, using data on over 42,000 first-time entrants to a large, urban community college system. The author finds that placement exams are more predictive of success in math than in English, and more predictive of who is likely to do well in college-level coursework than who is likely to fail.

Utilizing multiple measures to make placement decisions could reduce severe misplacements by about 15 percent without changing the

remediation rate, or could reduce the remediation rate by 8 to 12 percentage points while maintaining or increasing success rates in college-level courses.

Where to Begin? The Evolving Role of Placement Exams for Students Starting College. Pamela Burdman. (2012). Jobs for the Future, Boston, MA. <http://www.jff.org/publications/education/where-begin-evolving-role-placement-exam/1452>

For years, colleges have used placement exams to determine whether to deem incoming students “college ready” or assign them to developmental education. But emerging research has cast doubt on the practice, sparking national debates over whether the tests are fair and if their traditional use constitutes a barrier to college completion.

DEVELOPMENTAL EDUCATION STRUCTURE AND CONTENT

Guided Pathways to Success: Boosting College Completion. (2013). Complete College America, Indiana IN. <http://www.completecollege.org/docs/GPS%20BOOKLET%2006-14%20FINAL.pdf>

This publication defines and describes the strategy of Guided Pathways to Success and offers data and information for implementation.

Bringing Developmental Education to Scale: Lessons From the Developmental Education Initiative. Janet Quint, Shanna Smith Jaggars, D. Crystal Byndloss & Asya Magazinnik. (2013). Community College Research Center, Teacher’s College, Columbia University <http://ccrc.tc.columbia.edu/publications/lessons-from-developmental-education-initiative.html>

Several colleges participating in Achieving the Dream piloted small-scale developmental education reforms with promising results. Fifteen such colleges were selected to participate in the Developmental Education Initiative (DEI) with the goal of expanding innovative strategies to a large scale across a three-year period. This report uses qualitative and quantitative data to examine the implementation of these strategies. The authors also identify factors that facilitated or hindered scale-up and assess the broader impact of the DEI on participating institutions.

Designing Meaningful Developmental Reform. (2013).Community College Research Center, Teacher’s College, Columbia University. <http://ccrc.tc.columbia.edu/publications/designing-meaningful-developmental-reform.html>

This practitioner packet is designed to help community college administrators implement reforms to developmental education at their colleges. It reviews common impediments to developmental reform and presents data that supports directions colleges can take to create a system of developmental education that might serve students more effectively.

Pathways to Faculty Learning and Pedagogical Improvement. Nikki Edgecombe & Susan Bickerstaff. (2013) Community College Research Center, Teacher's College, Columbia University.

<http://ccrc.tc.columbia.edu/publications/pathways-to-faculty-learning.html>

The authors present a case study at Fullerton College, where the process of redesigning a developmental English course influenced instructors' everyday work of classroom teaching. Based on their observations across the Scaling Innovation partner sites, the authors outline a three-part framework for designing effective professional learning opportunities.

APPENDIX C

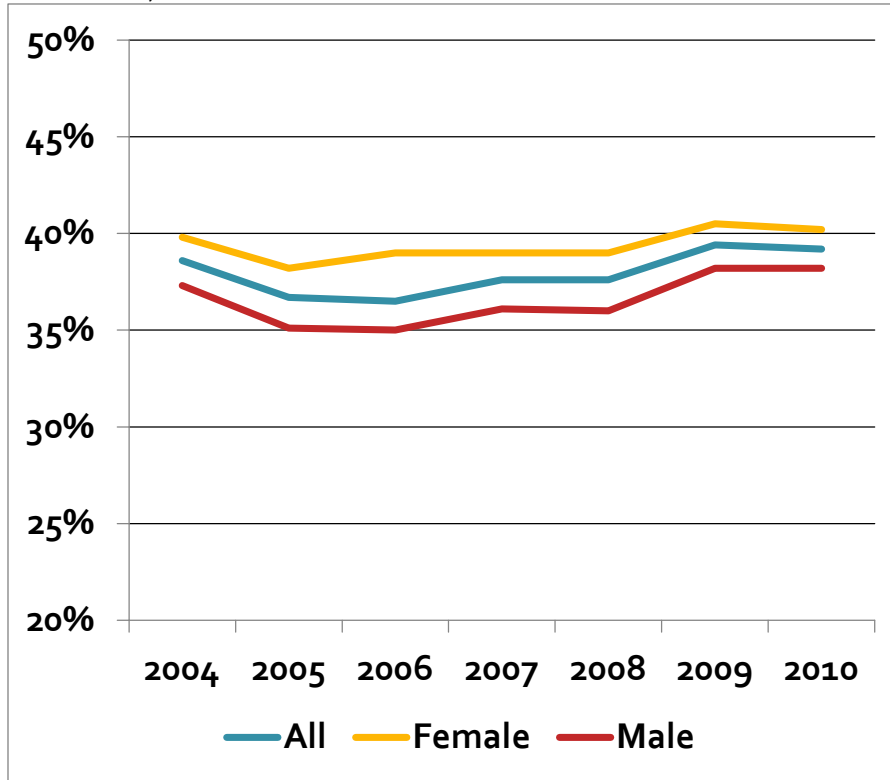
MASSACHUSETTS DEVELOPMENTAL EDUCATION DATA

In Fall 2012, approximately 200,000 students attended one of Massachusetts' 15 community colleges, 9 state universities and the University of Massachusetts.

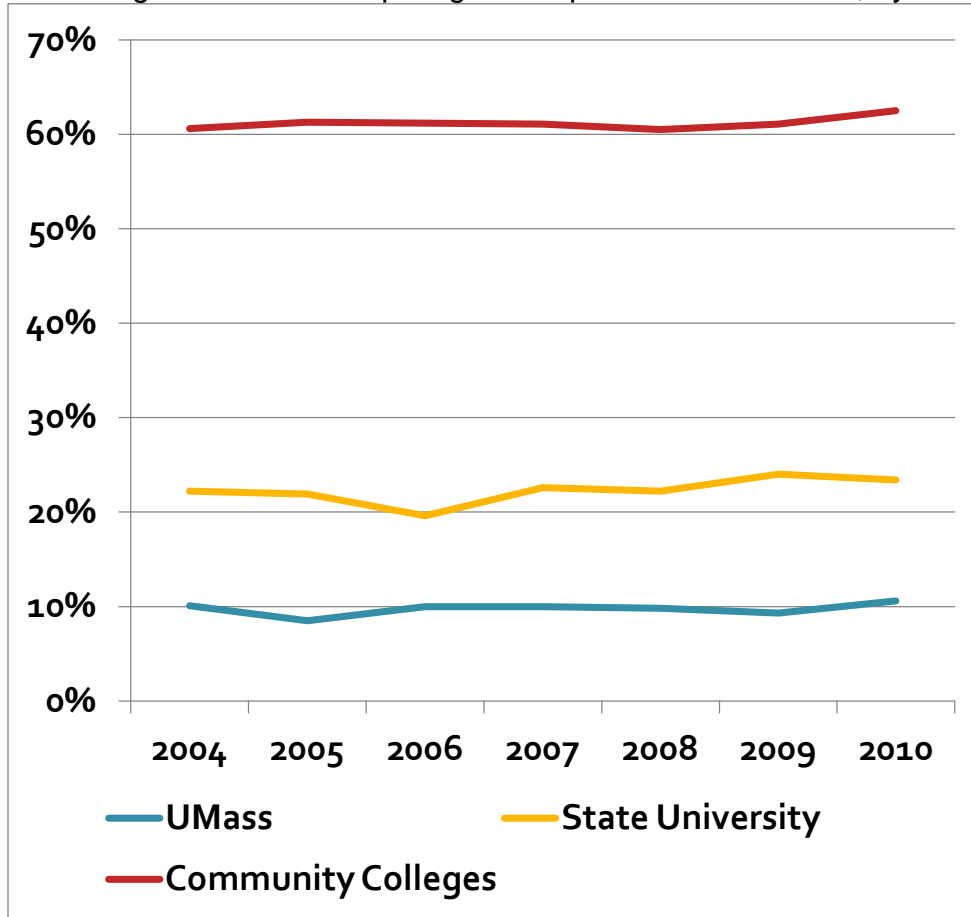
Disaggregating the data by sector, nearly half (100,000) of the students attended a community college, just over forty thousand enrolled at the state universities (42,126) and 53,943 the University of Massachusetts. There has been a twenty-three percent growth in undergraduate enrollment in Massachusetts public higher education over the last ten years although growth has slowed in recent years.

Historically, 38% of students enrolling in Massachusetts public higher education are enrolled in developmental coursework. The figures vary by sector: Community colleges typically average 60% of students requiring developmental work, state universities in the 22% -23% range and the University of Massachusetts is slightly lower at approximately 10%.

First-time Student Fall Enrollment in Developmental Education in Public Higher Education, Mass Residents

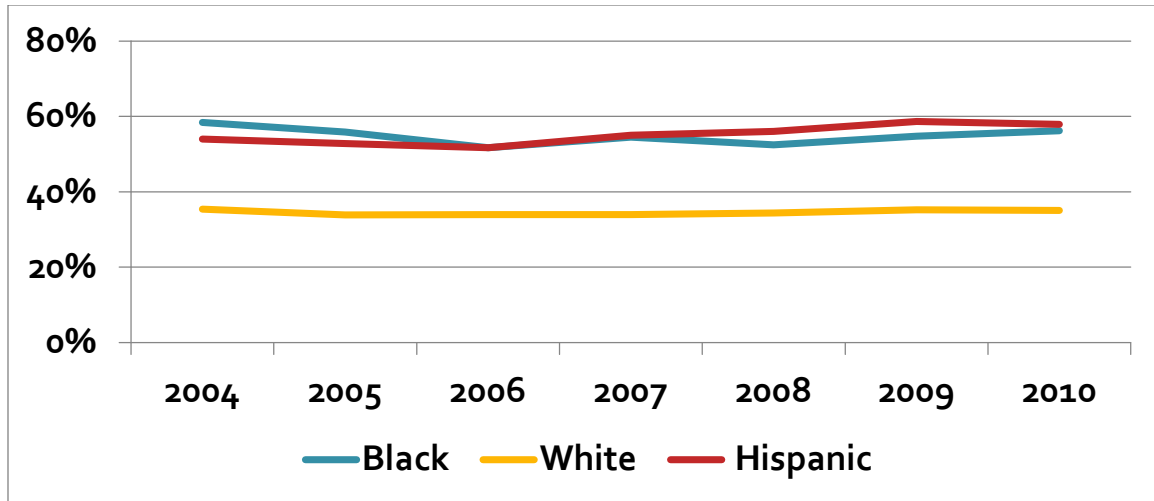


Percentage of students requiring developmental coursework, by sector



Not only is there variation in the percentage of students requiring developmental coursework by sector, there is variation by race as well. The Vision Project has as one of its goals the closing of the attainment gap, a gap which starts with developmental education.

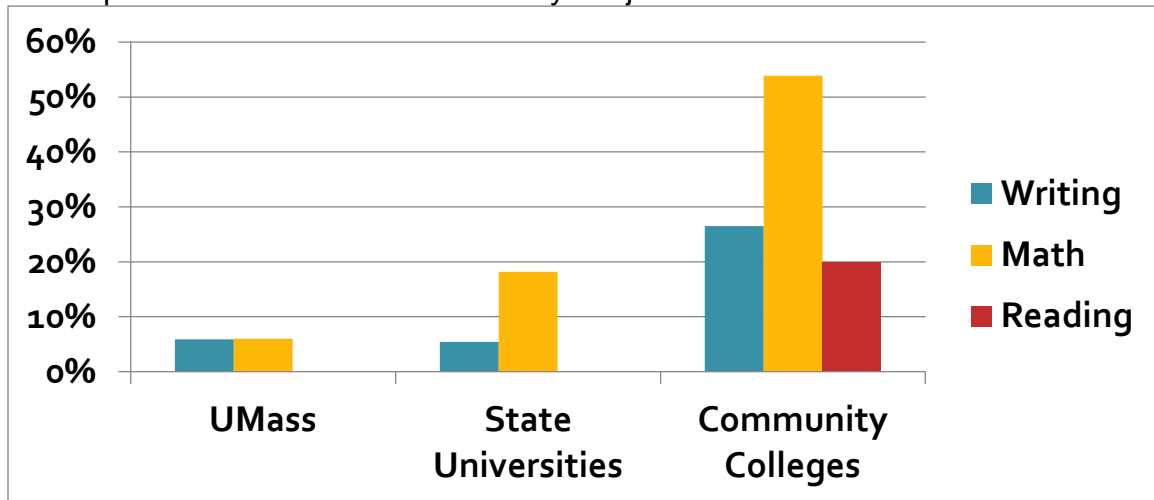
Percentage of students requiring developmental coursework, by race



Massachusetts Developmental math data

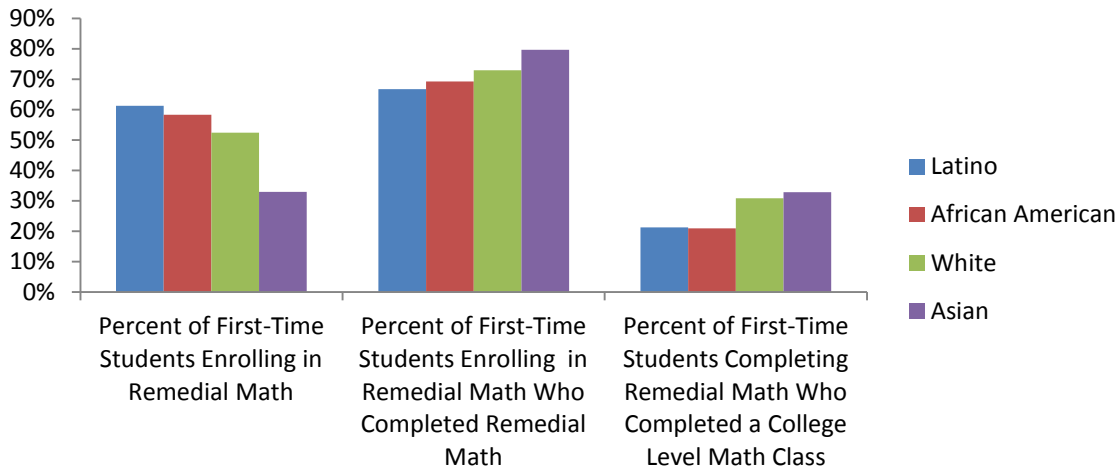
Massachusetts public higher education institutions offer developmental education in writing, reading and mathematics; a significantly higher number of students require assistance in math.

Developmental education enrollment by subject



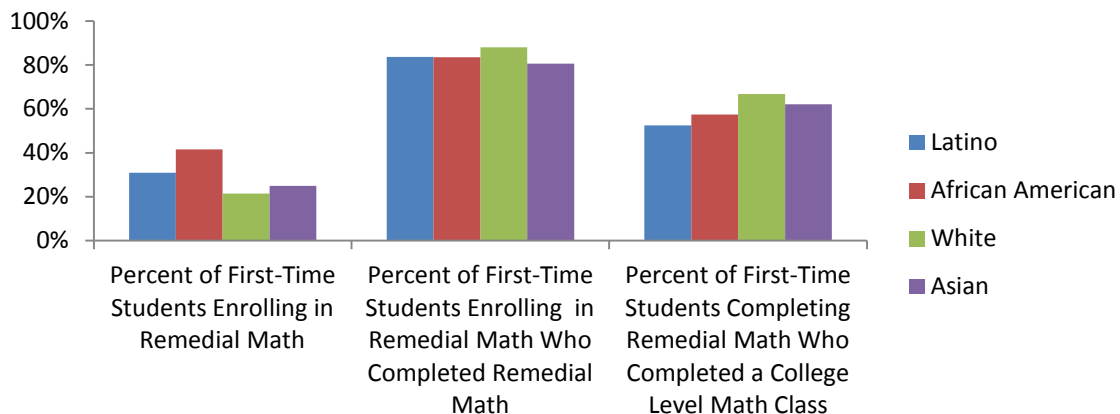
For Fall 2006, 8,879 (53%) incoming community college students required developmental math education; 5,996 (68%) of those students completed the developmental coursework. 1,840 (31%) of those who completed developmental math completed a college level math course within two years. Somewhere along the line, over 7,000 students who entered requiring developmental math were “lost”, that is, they did not reach the success marker of completing a college level math class.

Math Progression of First Time Students Enrolling in Remedial Math in the First Year in a Community College in Fall 2010



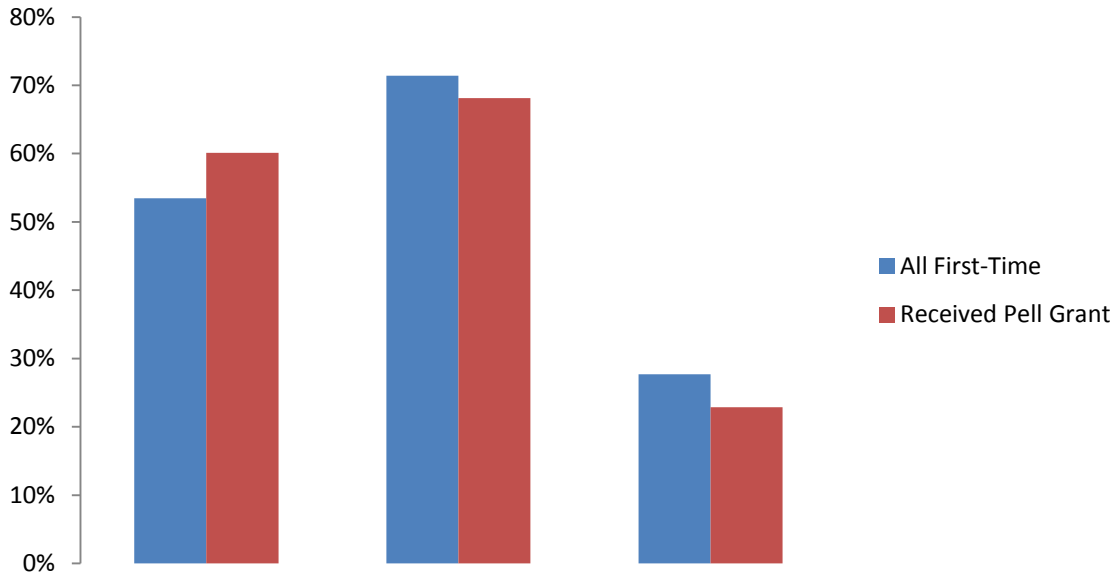
In Fall 2006, 1,490 (23%) students enrolled in developmental math at the state universities; 1,251 (84%) completed developmental math but only 693 (55%) students who completed developmental math also completed a college level math course. Slightly under half of the students failed to reach that bench mark.

Math Progression of First Time Students Enrolling in Remedial Math in the First Year in a State University in Fall 2010



Low-income students receiving Pell grants show little progression through developmental math into first college level math courses:

Math Progression of First Time Students Enrolling in Remedial Math in the First Year in a Community College in Fall 2010



Math Progression of First Time Students Enrolling in Remedial Math in the First Year in a State University in Fall 2010

