Developmental Education at Montgomery College

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OLOFFICE OF LEGISLATIVE OVERSIGHT

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Most students at Montgomery College are required to complete one or more developmental/remedial courses before they can enroll in college-level courses required for a degree. The County Council tasked the Office of Legislative Oversight to undertake this project to improve their understanding and oversight of developmental education at Montgomery College.

What is Developmental Education at Montgomery College?

Students entering college are either assessed as college-ready in English, reading, and math and can enroll in college-level classes or are considered non-college ready and must enroll in developmental courses to pursue a degree. Depending on their placement, non-college ready students may need to complete up to 21 non-credit hours of remedial coursework before they can enroll in credit-bearing, college-level courses. Most students never advance beyond developmental coursework at the College.

In recent years, the College has undertaken a number of efforts aimed at revamping its developmental education programs and improving student outcomes. These include:

- Redesigning its developmental Pre-Algebra and Elementary Algebra I courses into a single course – Math Preparation I and II (MATH 094) – that utilizes a mastery-based, module approach to instruction that provides numerous opportunities for acceleration.

- Providing accelerated paths in developmental reading and English and combining both departments into one to better integrate developmental courses in both subjects.

- Offering a number of additional services for developmental students including test preparation tools, post-assessment advising, student development seminars, and academic supports.

Demand and Enrollment in Developmental Education at Montgomery College

New Non-AELP Students Requiring Remediation, 2011			
Student Groups	**Reading**	**English**	**Math**
All Students	29%	35%	73%
Recent Grads	32%	38%	79%
All Others	22%	28%	60%
Asian	25%	29%	56%
Black	37%	42%	82%
Latino	43%	50%	87%
White	15%	21%	59%

Demand. In 2011, 4,021 new non-American English Language Program (AELP/non-ESOL) students enrolled in Montgomery College. As noted above, nearly three-quarters of new students (73%) were non-college ready in math compared to about a third of students (29-35%) in reading or English. Rates of remediation were also higher among recent high school graduates and Black and Latino students compared to other student groups. And 2009 data suggests that half of new students placed into developmental math were placed into the lowest level math course - Pre-Algebra. Thus, these students were typically required to complete three non-credit math courses (Pre-, Elementary and Intermediate Algebra) before they could enroll in the gateway math course required for their degree.

Enrollment. Students requiring developmental education are placed into either lower or intermediate level remedial courses. Course enrollment data below shows that a majority of developmental students were enrolled in the lowest level English and math courses in 2013.

Developmental Courses and Enrollment, 2013	Course Enrollment	Share of Enrollment
College Reading Skills I (RD 095)	810	35%
College Reading Skills II (RD 099)	1,479	65%
Basic English I (EN 001)	1,429	55%
Basic English II (EN 002)	1,165	45%
Math Prep I/II (Pre-Algebra & Algebra I) (MATH 094)	6,042	57%
Intermediate Algebra (Algebra II) (MATH 097/099)	4,459	43%

Developmental Education Assessment Practices at Montgomery College

Montgomery College uses scores on the Accuplacer or other standardized exams (SAT or ACT) to determine the college-readiness of most incoming students. Like other community colleges in Maryland, scores on these assessments are used to place students into pre-developmental, developmental, and college-level courses. As a result of these state mandated course placement processes, the vast majority of new students at the College are placed into developmental English, reading, or math courses.

A review of promising practices, however, suggests that the College's remediation rates may overstate the actual need for remediation. Researchers have found that test scores alone overstate the need for remediation and that the developmental placement process should rely on multiple measures of student performance, such as grade point averages and transcripts, to assess students' college readiness.

A review of graduation requirements and course taking trends within Montgomery County Public Schools (MCPS) suggests that most new students enrolling at the College completed a college-prep curriculum and while in high school, many passed Algebra II. Thus, the use of multiple measures beyond test scores to discern students' readiness for college-level courses would likely lower the demand for developmental courses at the College, particularly lower-level remedial courses.

Cost of Developmental Education at Montgomery College

Montgomery College staff estimated the 2013 cost of developmental education at $14.9 million for instruction, academic support and student services for developmental students. The County funded about half of this cost ($6.5 million) followed by $5.6 million in tuition and related charges and $2.1 million in State aid. One cost which is difficult to calculate is the student's cost: in addition to tuition and fees, students forego wages and delay their progress through college because of remediation.

Developmental Education Performance at Montgomery College

Performance outcomes in developmental education at Montgomery College are low, especially in math:

- Although the percent of students requiring English and reading remediation that completed their developmental coursework within two years increased between 2006 and 2011, less than half of such students completed their first gateway college-credit course within two years of enrollment;

- Less than half of students requiring math remediation completed their developmental coursework within two years between 2006 and 2011, and less than a quarter completed their first gateway college-credit course (e.g. college level algebra) within two years of enrollment.

OLO's review found that the College implements in whole or in part 13 of 14 promising practices in developmental education identified in the research literature and listed below. OLO also found that as the College implements the Maryland College and Career Readiness Completion Act (Senate Bill 740), its alignment with developmental education promising practices will increase.

- Align high school benchmarks with college expectations of readiness (partially aligned)
- Dual enrollment and early college programs (not aligned)
- Early assessments and transitional courses (partially aligned)
- Summer bridge programs (partially aligned)
- Multiple measure assessments (partially aligned)
- Preparation for placement tests (aligned)
- Accelerated courses (aligned)
- Modularized courses and mastery learning (aligned)
- Mainstreaming into college-level courses (aligned)
- Contextualized instruction (partially aligned)
- Learning communities (aligned)
- Tutoring (aligned)
- Advising (aligned)
- Student success courses (aligned)

The research suggests, however, that the collective implementation of these promising practices will not dramatically increase outcomes in developmental education.

OLO Recommendations

OLO found that while developmental education at the College aligns with promising practices, outcomes in remedial courses remain low. OLO also found that the primary reliance on testing data to determine remediation need may overstate the demand. Therefore, OLO offers the following recommendations.

#1: Pilot the Use of Multiple Measures to Assess Remediation Need.

The College has recently piloted the use of multiple measures to assess the need for math remediation; the College has also asked its newly combined Reading and English department to consider piloting a multiple measures approach to determine the need for remediation in these subject areas. OLO endorses these pilot measures and recommends that the College expand and evaluate its efforts to determine the appropriate use of high school grade point averages and transcripts in course placements.

#2: Align MCPS Coursework and the College's Expectations for Proficiency in Math.

OLO recommends that the College partner with MCPS to pilot the development of end-of-course exams that are recognized by both institutions as markers of math proficiency and college-readiness. OLO recommends that this partnership initially focus on the courses covered in developmental math: Pre-Algebra, Algebra I, and Algebra II. If these assessments are effective at improving student outcomes, then OLO recommends the development of joint assessments beyond Algebra II.

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A.   Authority

Council Resolution 17-830, *FY 2014 Work Program for the Office of Legislative Oversight*, adopted July 30, 2013.

B.   Scope, Purpose, and Methodology

An increasingly common marker of college-readiness is the ability to enroll in college-level rather than remedial or developmental courses in college. Among students new to Montgomery College that did not require American English Language Program services in 2011, about three-quarters were placed into developmental math courses and another third were placed into developmental reading and/or English courses. Thus, a majority of new students enrolling at Montgomery College were deemed as "non-college" ready based on the College's course placement process.

Developmental education is designed to offer second chance courses for students to help prepare them for college-level work and achieve their higher education goals. Yet, in reality, the prospect of needing to complete up to 21 hours of non-credit bearing classes before being able to enroll in credit-level courses required for a degree creates a significant burden for students seeking post secondary credentials. The deterrent effects of developmental education can be particularly frustrating for students who test into the lowest levels of developmental education and for students that completed a college-prep curriculum in high school.

The financial costs of remediation for both students and taxpayers are also high, especially when considering that developmental education often repeats the tax-funded, public school curriculum that could have been mastered in high school. And while the benefits of higher education credentials benefit both students and society, there is little benefit to developmental education if the students served do not complete their coursework, matriculate to credit-bearing courses, and eventually earn college degrees or other recognized credentials.

The County Council tasked OLO to undertake this project to improve their understanding and oversight of developmental education programs at Montgomery College. Towards this end, this report describes the demand for developmental education at Montgomery College; the policy drivers of remediation demand; the College's programs, costs, and program outcomes; and the alignment between local practices and promising practices for improving outcomes in developmental education.

C.   Methodology

OLO staffers Elaine Bonner-Tompkins and Kristen Latham prepared this report with editorial and production assistance from Kelli Robinson. OLO conducted this study using a variety of information and data collection methods, including: meetings with Montgomery College staff; a review of the research literature on developmental education promising practices; a synthesis of documents describing local and state policies and practices in developmental education; and an analysis of enrollment, performance, and budget data for developmental education provided by Montgomery College staff.

D.   Organization of Report

Chapter 2, Demand for Developmental Education, describes placement and enrollment data at Montgomery College across three dimensions – student age, subject matter, and race and ethnicity. This chapter also describes assessment and placement processes that drive local demand for remediation.

Chapter 3, Policy Context for Developmental Education, describes the policy background that shapes the College's administration of its developmental education programs including high school graduation requirements, higher education placement and course requirements, and programming costs and finances.

Chapter 4, Developmental Education Programs and Outcomes, summarizes the screening and placement process for newly enrolled students at the College; the programs, enrollment, and outcomes of developmental education at the College; and other student services and supports available for developmental students.

Chapter 5, Promising Practices in Developmental Education and Local Practices, provides a review of developmental education promising practices and their alignment with Montgomery College practices.

Chapter 6, Summary of Findings and Recommendations, presents OLO's key findings and offers two recommendations aimed at improving student outcomes and the delivery of developmental education programs at Montgomery College.

Chapter 7, Agency Comments, will be added to this report online when they are received from Montgomery College.

E.   Acknowledgements

OLO received a high level of cooperation from many Montgomery College staff members. In particular, OLO appreciates the assistance of our project liaison, Susan Madden, Chief Government Relations Officer. In addition, OLO would like to acknowledge the following College staff:

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- Tonya Mason, Interim Dean of Students at Rockville and College-wide Dean for Advising
- Robert Lynch, Director, Office of Institutional Research and Analysis
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- Kristin O'Keefe, Special Assistant for Strategic Communications and Intergovernmental Relations
- George Payne, Vice President of Workforce Development and Continuing Education
- Sanjay Rai, Senior Vice President for Academic Affairs
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- Karen Roseberry, Dean of Students at Germantown and College-wide Dean for Access
- Elena Saenz, Director of Academic Initiatives and MC/MCPS Partnerships

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- Kathleen Wessman, Vice President for Planning and Institutional Effectiveness

Chapter 2:   The Demand for Developmental Education

The demand for developmental education usually reflects a mixture of the actual need for remediation and some error that results from the developmental education assessment process. If the assessment process over-identifies the need for remediation with a positive error term that generates false positives, data describing the demand for remediation exceeds the actual demand.   But if the assessment process under-identifies the need for remediation with a negative error term, data describing the demand for remediation under states the actual demand for developmental education.

Given that data on developmental education demand describe both the need for remediation and artifacts in the placement process that over- and/or under-identify the actual need for remediation, this chapter describes the demand for developmental education at Montgomery College in two ways:

  A. **Placement Data,** reviews, at face value, developmental education placement data at Montgomery College compared to state and national rates of college remediation, including placement data by subject area.

  B. **Assessment and Placement Processes,** reviews information on the assessment and placement processes at the College and promising practices to consider whether placement data at the College under or over-estimates the actual need for remediation locally.

This chapter's review of remediation placement data at face value identifies three significant drivers of local demand for developmental education: the higher need for remediation among recent high school graduates compared to older students, the higher need for mathematics remediation compared to English and reading remediation, and the higher demand for remediation among Black and Latino students compared to their White and Asian peers.

This chapter's review of Montgomery County's developmental education assessment process and promising practices for assessing college-readiness, however, suggests that the College's current college remediation data may overstate the actual demand for remediation because it relies on only one measure of college-readiness: standardized text scores. Prior research has found that the use of high school grade point averages alone or in combination with placement tests may result in a diminished and more accurate assessment of the need for remediation among first year students.

A.   Placement Data

This section is presented in three parts to describe the drivers of Montgomery College's developmental education placement trends: high school graduates, mathematics remediation, and the achievement gap by race and ethnicity.

  1.   Demand by Student Age

Montgomery College's open admissions policy means that any person with a high school diploma or equivalent, or any person 16 years or older who has left secondary school, can enroll at the College. In turn, the College enrolls students across the age span – recent high school graduates, other young adults, and older adults.

According to the Montgomery College's 2012 Performance Accountability Report, more than half (56%) of recent college-bound high school graduates from Montgomery County Public Schools (MCPS) who attended any college in Maryland enrolled at Montgomery College in fall 2011. Recent high school graduates accounted for 59% of the College's new enrollment in 2011 and for 67% of the College's non-AELP enrollment (i.e. enrollment among native English speakers).

Both the research and local data show that recent high school graduates require remedial coursework at higher rates than other students**.** Data provided by Montgomery College noted in Table 2-1 below shows similar trends over time: recent graduates are about twice as likely to be placed into remedial English and reading than other students; and are about 30 percentage points more likely to be placed into remedial math.[1]

Table 2-1: New Montgomery College Students Developmental Education Placement Rates by Age and Subject, 2008-2011

	Reading	**English**	**Math**
2008			
Recent Grads	33%	34%	70%
All Others	13%	16%	39%
2009			
Recent Grads	31%	33%	73%
All Others	17%	21%	46%
2010			
Recent Grads	30%	32%	70%
All Others	14%	19%	42%
2011			
Recent Grads	29%	34%	71%
All Others	14%	18%	38%

How does college-readiness at Montgomery College among recent high school graduates compare to state and national norms? Maryland Higher Education Commission (MHEC) data on the next chart shows that fewer students required remediation in Montgomery College than Maryland Community Colleges overall in 2011 (66% vs. 71%). National estimates suggest that 58-68% of recent graduates in community colleges are not college-ready and require some remediation. However, since definitions of college-readiness vary by jurisdiction, Maryland's relatively higher rates of remediation may reflect higher expectations for college-readiness than national norms (e.g. Algebra II proficiency rather than Algebra I).

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[1] The Montgomery College new student data referenced in this chapter describes remediation rates for all students – English language learners referred to as AELP (American English Language Program) students and non-AELP (non-ESOL) students. Alternatively, Chapter 4 and this report's Appendix exclusively describe enrollment and remediation rates among new non-AELP students.   Generally, the higher rates of remediation among non-AELP students compared to AELP students are reflected in the higher remediation rates among new non-AELP students compared to all students.   For example, among recent graduates, 79% of new non-AELP students were placed into developmental math in 2011 compared to 71% of all new students (AELP and non-AELP).

Chart 2-1: Local, State, and National Estimates of Remediation Rates among Recent High School Grads
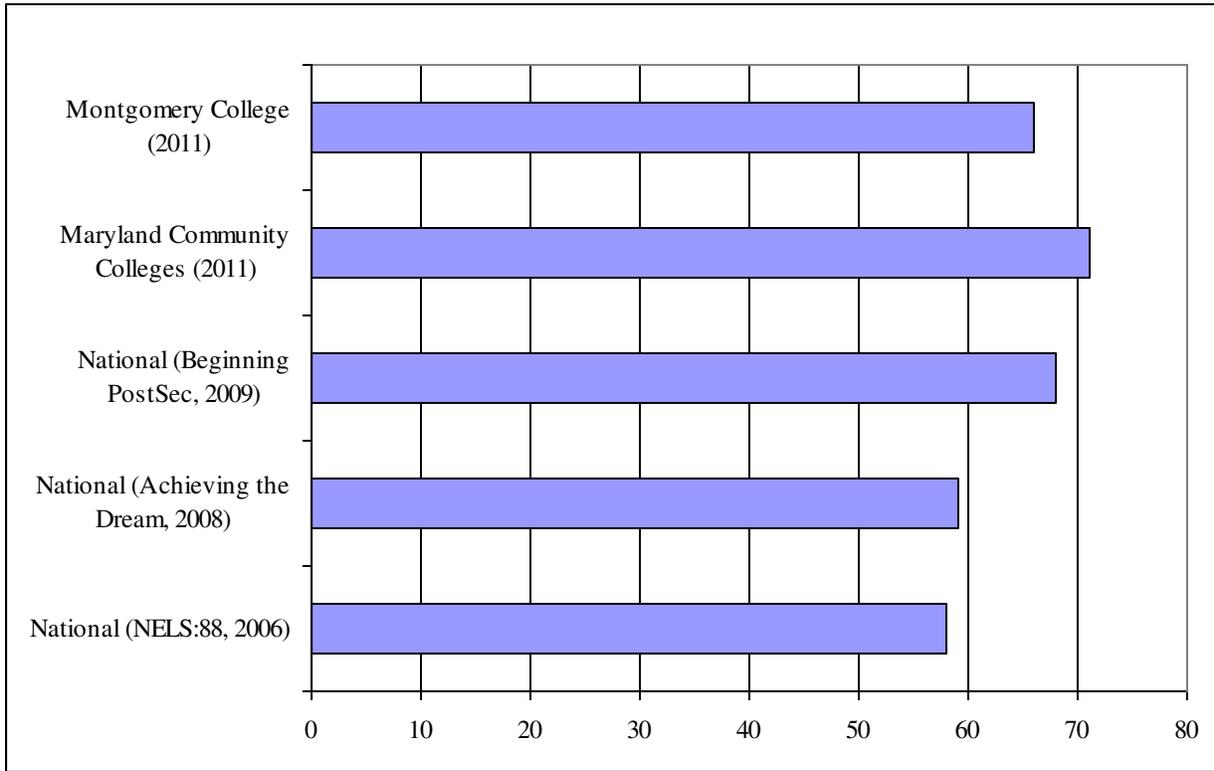
What does the makeup of recent MCPS graduates look like at Montgomery College? In the fall of 2013, one in four (25%) MCPS graduates enrolled at the College (2,592 of 10,350 graduates).[2] More specifically:

- Montgomery Blair (n=166), Northwest (n=152), Gaithersburg (n=148), and Magruder (n=134) were the high schools that sent the largest number of their Class of 2013 graduates to the College. As a proportion of their individual graduating classes, Seneca Valley sent the largest share of its graduates to the College (41%) followed by Kennedy (36%), Einstein (36%), Gaithersburg (36%) and Magruder (35%). Only seven of MCPS' 25 high schools sent fewer than one in five of their graduates to the College in the fall semester.

- Among recent high school graduates enrolling in the College in the Fall of 2013, 79% (2,592) were from MCPS, 3% (92) were from private schools in Montgomery County, 2% (56) had earned their GED, 1% (44) has been home schooled, 8% (249) were from other counties in Maryland, 6% (191) were from out of state, and 2% (76) were international students.

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[2] See 2013 Montgomery College Enrollment Report, Page 17
(http://www.montgomerycollege.edu/research/OIRA%20Other%20Files/Student%20Data/MC%20Fall%20Profile.pdf)

Are rates of remediation for recent high school graduates increasing or decreasing? Local and state data suggest that the demand for developmental education is decreasing based on data compiled by MHEC. As noted in the chart below, the percentage of recent graduates requiring remediation at the College declined from 68% in 2008 to 66% in 2011. And for Maryland community colleges, remediation rates among recent graduates also declined from 74% in 2008 to 71% in 2011.[3]

Chart 2-2: Remediation Rates of Recent High School Graduates, 2008-2011
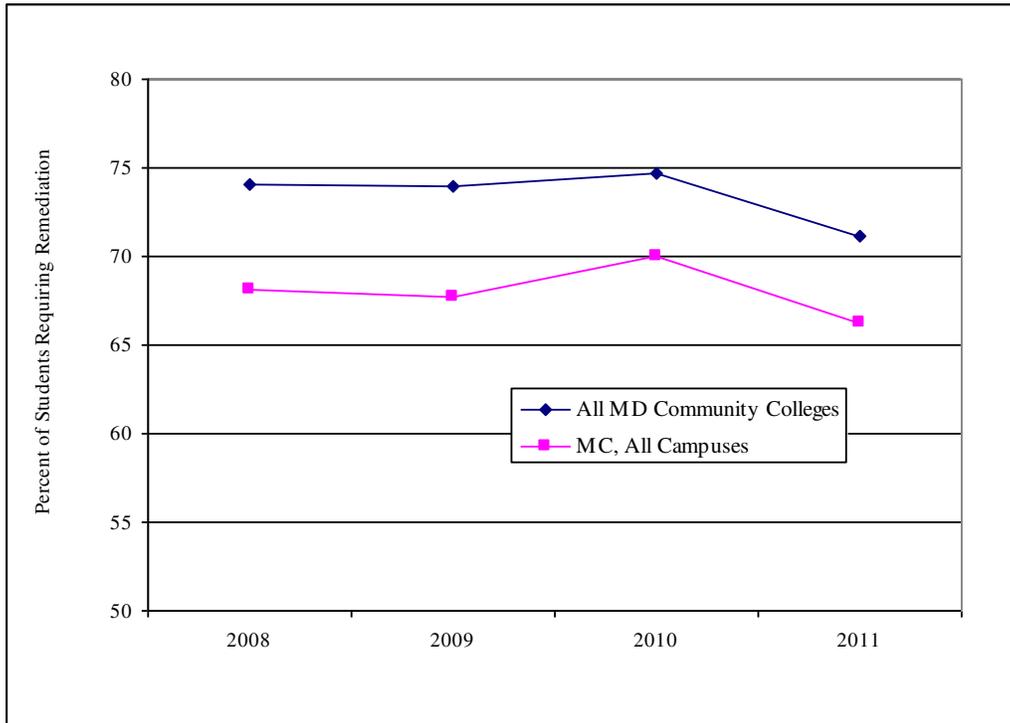
Further, as noted in the chart on the next page, the proportion of all first-time entrants to Montgomery College requiring remediation – both recent high school graduates and older students – has diminished from a high of 62% in 2008 to 50% in 2012.[4] Yet, the overall percentage of first-time students needing developmental education courses has increased from 39% in 2005 to 50% in 2012.[5]

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[3] Of note, these and the other MHEC data referenced in this chapter on recent graduates include both AELP (English language learner) and non-AELP students.

[4] See page 188 of http://www.mhec.state.md.us/publications/research/annualreports/2009perfacct-vol2.pdf for 2005 – 2008 data; see link for PAR-Montgomery College Accountability Report 2013 at http://cms.montgomerycollege.edu/EDU/Department4.aspx?id=54390 for 2009 – 2012 data.

[5] Ibid

Chart 2-3: Montgomery College Students with Developmental Education Needs, 2005-2012
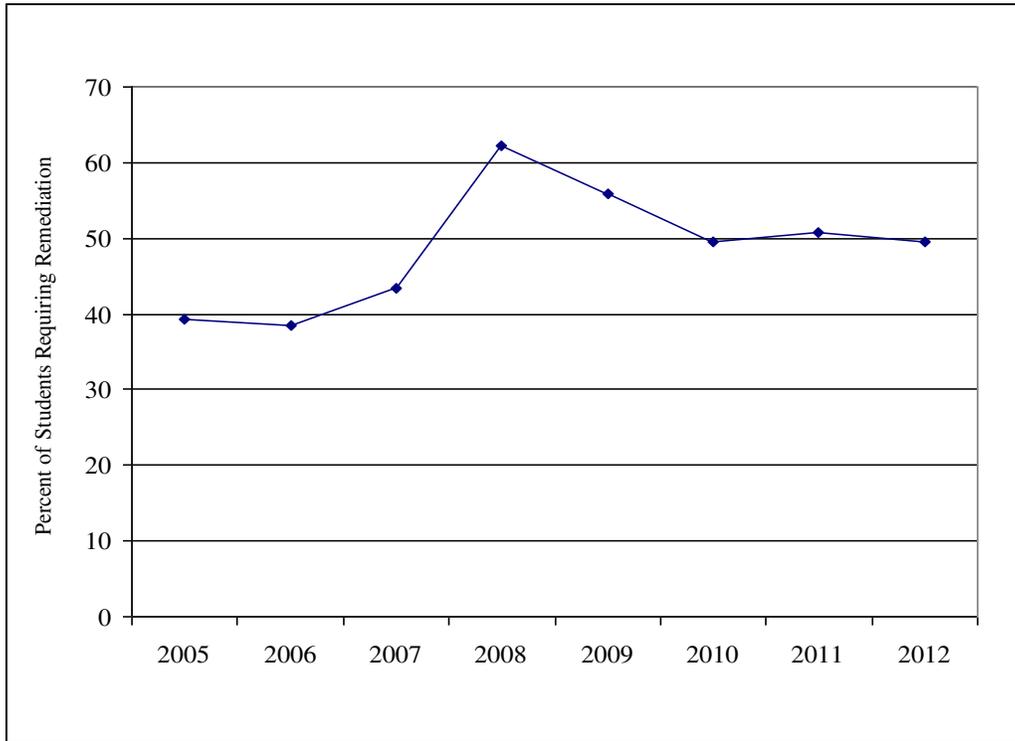
2. Demand by Subject

National, state, and local data also indicate a greater demand for mathematics remediation among community college students than for English or reading. As noted in the chart on the next page, data from Montgomery College on new students shows that rates of remediation were about twice as high in math than in English or reading. National data also suggest that community college students are about twice as likely to require remedial math as English (59% vs. 33%).[6]

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[6] See estimates from the Achieving the Dream Initiative cited by Thomas Bailey, Dong Wook Jeong and Sung-Woo Cho (December 2009) in http://ccrc.tc.columbia.edu/media/k2/attachments/referral-enrollment-completion-developmental.pdf

Chart 2-4: Montgomery College Demand for Remediation by Subject, 2008-2011
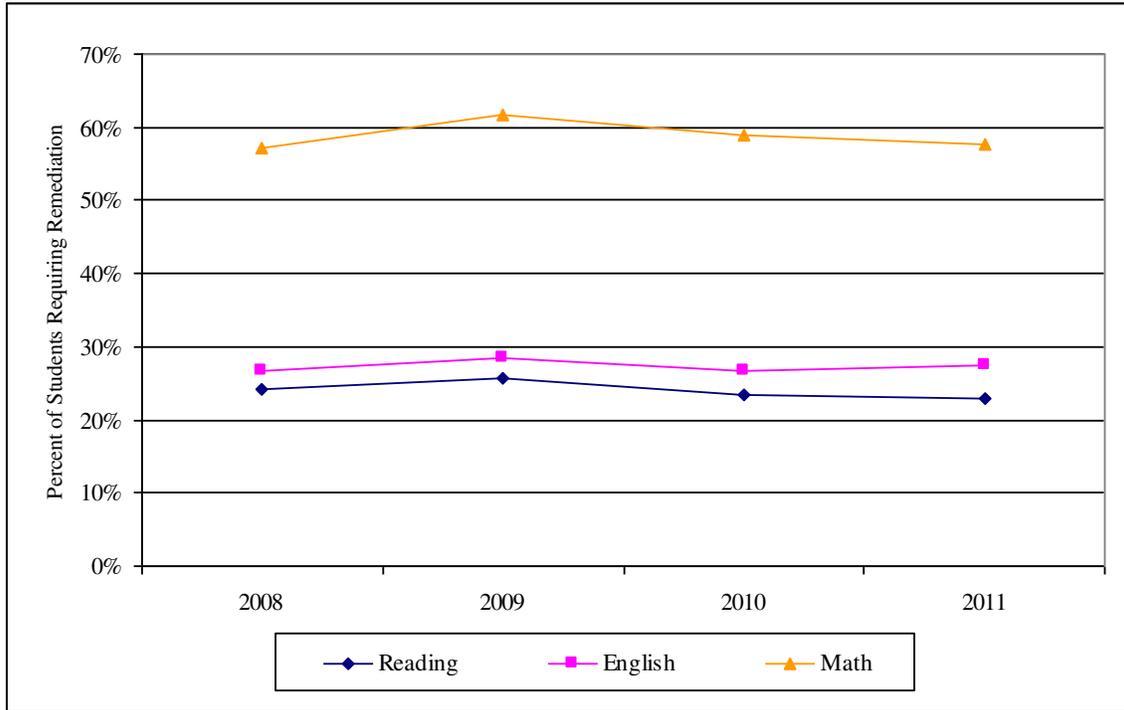
A review of the College's data suggests that nearly half of the students testing into remedial math test at the lowest level – Pre-Algebra. As noted in their 2010 College-wide Developmental Math Task Force Year One Report,[7] of the 4,000 students new to Montgomery College in 2009, two-thirds placed into developmental math with 32% placing into Pre-Algebra, 20% placing into Elementary Algebra (Algebra I) and 15% placing into Intermediate Algebra (Algebra II). Students placing into Pre-Algebra had to complete the equivalent of three developmental math courses (9 non-credit hours) before they were able to enroll in a college credit math course required for graduation.

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[7] See page 4 of http://www.montgomerycollege.edu/~jhamman/Dev%20Math%20-%20Year%20One%20Report.pdf

Chart 2-5: Montgomery College Students Placed into Developmental Math, 2009
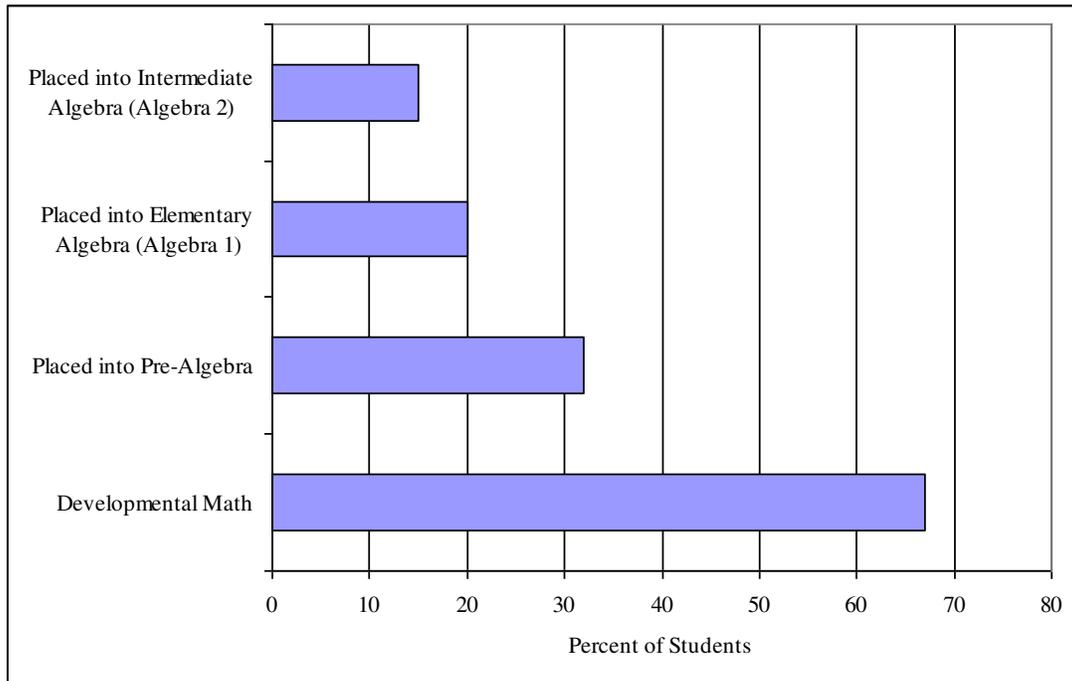
3.   Demand by Race and Ethnicity

Montgomery College data cited in their 2013 Achievement Gap Task Force Report notes a higher demand for developmental education among Black and Latino students compared to White and Asian students.[8] As noted in the chart on the next page, among students entering Montgomery College for the first-time in 2008, 80% or more of Black and Latino students needed developmental education compared to 62% of White students and 58% of Asian students.

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[8] See Closing the Achievement Gap Task Force Final Report and Recommendations Dec 2013

Chart 2-6: Students Assessed as Not College-ready by Race and Ethnicity, 2008
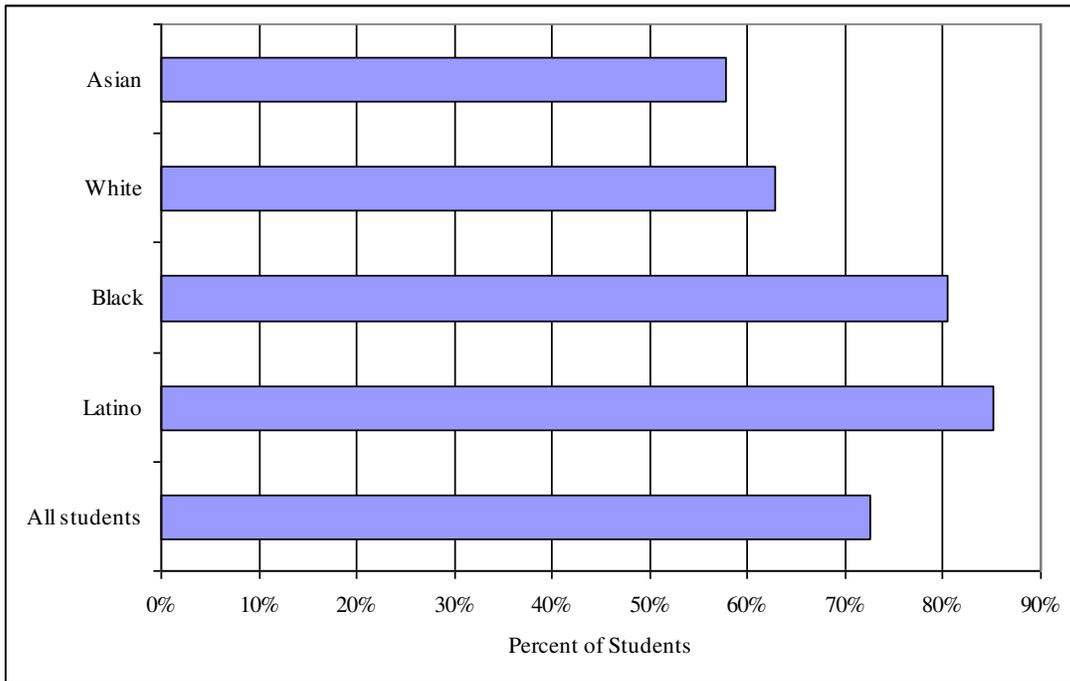
Montgomery College also provided remediation demand data by race and ethnicity from 2008 to 2011. As the next three charts show, the percent of Latino and Black students requiring remediation, particularly in English and Reading, has been consistently higher than the percent of White and Asian students requiring remediation.

Chart 2-7: Students Needing Reading Remediation by Race and Ethnicity, 2008-2011
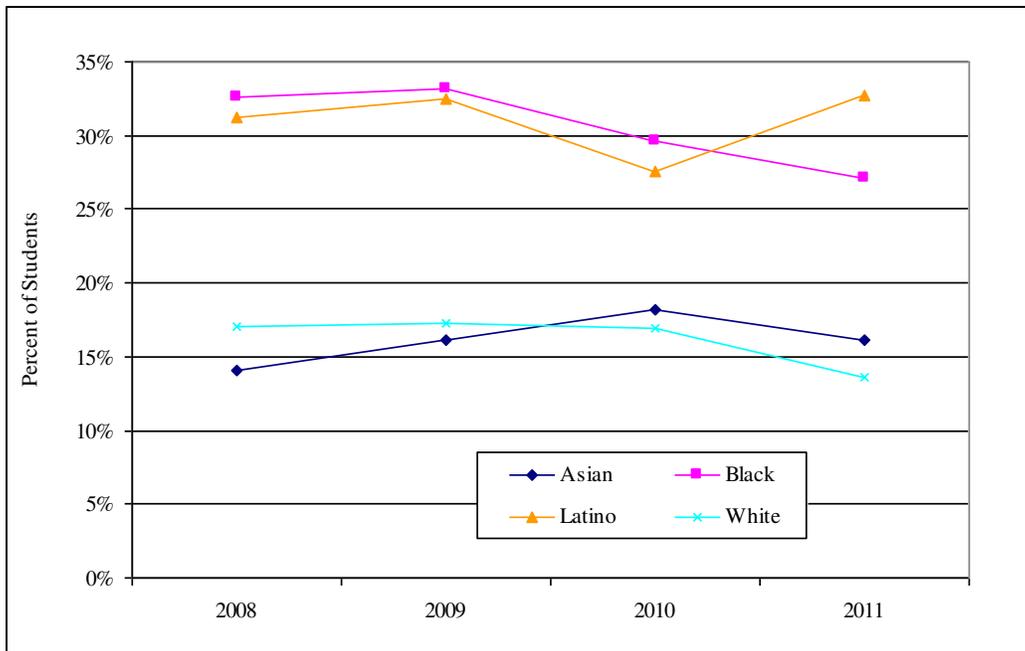
Chart 2-8: Students Needing English Remediation by Race and Ethnicity, 2008-2011
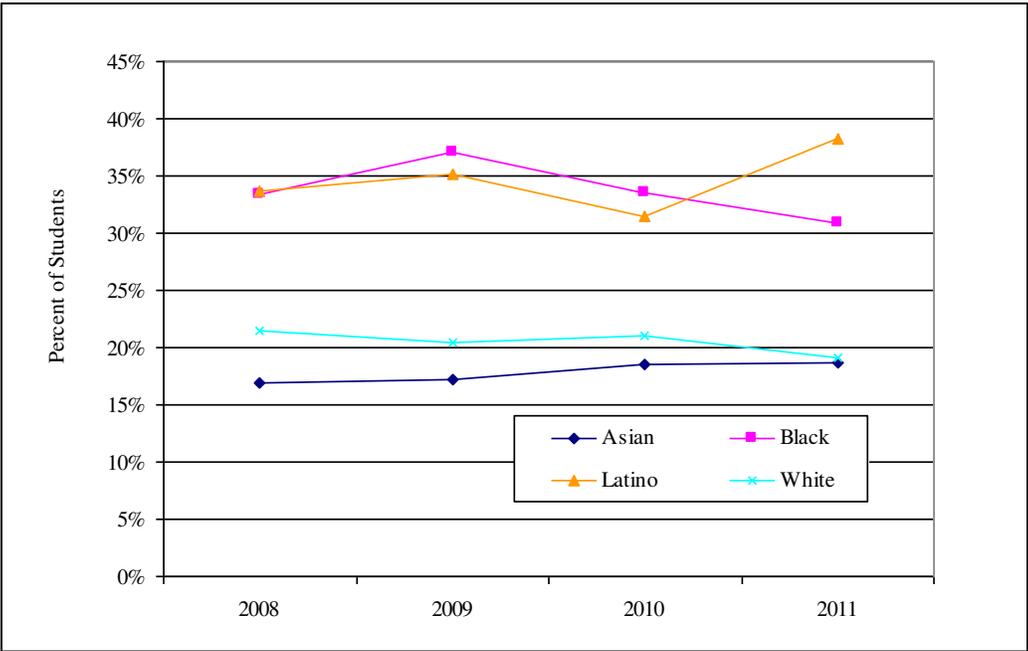
Chart 2-9: Students Needing Math Remediation by Race and Ethnicity, 2008-2011
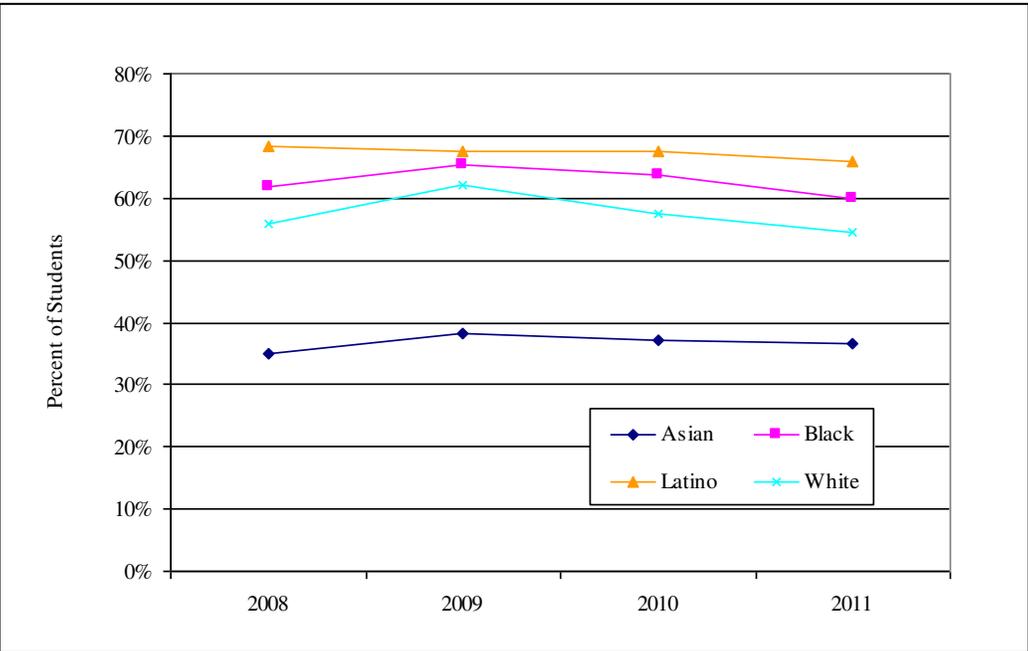
B.   **Assessment and Placement Processes**

The demand for remediation at Montgomery College and all community colleges in Maryland is determined by standardized test scores. All students who enroll in Montgomery College as their first college must undergo an assessment process to determine readiness for college-level courses.

If students do not have standardized test scores that demonstrate college-readiness (such as qualifying SAT or ACT scores), they must complete the Accuplacer. Results on the test can place students into college-level courses, developmental education, or pre-developmental classes offered by Workforce Development and Continuing Education (WDCE) known as the Bridge program. Students who have completed college-level coursework in English, math, and/or reading at other institutions of higher education do not have to take the Accuplacer.

How well do placement exam scores reflect students' college-readiness? Two 2012 Community College Research Center (CCRC) studies of a statewide community college system and large urban community college system found that a quarter to a third of students assigned to remedial classes based on standardized assessments such as the Accuplacer could have passed college-level courses with a grade of B or better.[9]   In one of the studies, use of students' high school grade point averages and transcripts instead of placement tests was predicted to reduce placement error rates by half. In the other study, using the best of either placement test scores or high school GPA reduced placement errors and also increased college-level coursework completion rates.    In addition, a prior CCRC study found that students who ignored remedial placements and instead directly enrolled in college-level courses had higher success rates than those who complied with their remedial placement.[10] Overall, research suggests that evaluating grades from high school transcripts along with standardized tests can improve remedial placement decisions.

Research also suggests that using standardized test scores as the exclusive measure of college-readiness can be troublesome because community college students often inadequately prepare for these assessments. For example, a 2010 West Ed study of community colleges in California found that students often do not review key math and reading concepts before taking placement tests.[11] This study also found that students often "just show up" at community colleges and are processed immediately. In turn, this study recommended that colleges use assessments as part of the placement process rather than as the sole determinant of remediation need.

Wyner reports that colleges across the country are trying to figure out how to amass the staff resources to implement more comprehensive approaches to determining college-readiness. This is especially challenging when so many students register for classes at the last minute and about a quarter of students has been out of high school for many years.[12] But while community colleges in several states are working to remedy weaknesses in remedial assessments, most community colleges including Montgomery College, continue to use the old system. Thus, both national and local estimates of remediation need likely overstate the actual need for developmental coursework.

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[9] Belfield and Costa, 2012 - http://ccrc.tc.columbia.edu/media/k2/attachments/predicting-success-placement-tests-transcripts.pdf and Scott-Clayton, 2012 **-** http://ccrc.tc.columbia.edu/media/k2/attachments/high-stakes-predict-success.pdf

[10] http://ccrc.tc.columbia.edu/media/k2/attachments/student-progression-through-developmental-sequences-brief.pdf

[11] Venezia, A., Bracco, K. R., & Nodine, T. (2010).
http://www.wested.org/online_pubs/oneshotdeal_execsummary.pdf

[12] Wyner, 2014 - What Excellent Community Colleges Do.

Chapter 3:   Policy Context for Developmental Education

Many, if not most, students experience frustration when they are assessed and placed into remedial courses in college.[13] Placement in developmental education can be especially frustrating for recent high school graduates who have completed a college preparatory curriculum and earned A's and B's in tested subjects.[14] Understanding the policy context for developmental education is essential to understanding the drivers of developmental education demand and access that are within the domain of community colleges or beyond their control.

Both laws and regulations at the federal, state, and local levels shape the policy context for how developmental education programs operate in Montgomery County. For example, state mandated coursework and assessment requirements for high school graduation shape the supply of future students who are college-ready. State mandates for how community colleges determine college-readiness also impact the demand for developmental education.

This chapter is presented in three sections to describe the policy context for how developmental education programs are administered by Montgomery College:

A. **High School Graduation Requirements,** describes state requirements for high school graduation, including new mandates enacted under the Maryland College- and career-readiness and College Completion Act of 2013 (Senate Bill 740) and proposed regulations. This section also describes local course taking trends aimed at increasing the college-readiness of graduates.

B. **Higher Education Placement and Course Requirements,** describes state requirements for community colleges and students pursuing college degrees, including new higher education requirements enacted as a result of Senate Bill 740 and proposed regulations.

C. **Developmental Education Costs and Finances,** provides an estimate of the costs of developmental education programs at Montgomery College and their revenue sources.

The information described in this chapter shows that most MCPS graduates complete a curriculum that meets the University System of Maryland's college admission requirements. Most MCPS students also complete at least one honors, Advanced Placement, International Baccalaureate, or other college-level courses while in high school and a majority of MCPS students successfully complete Algebra II by the end of 11th grade. On standardized assessments such as the SAT and ACT, however, less than half of MCPS graduates demonstrate college-ready levels of performance.

Thus, the rigorous course taking of MCPS graduates does not translate into high test scores on standardized assessments of college-readiness. Yet, the Maryland Higher Education Commission requires that all Maryland community colleges rely on the Accuplacer or scores from similar standardized tests to determine whether students place into remedial reading, English, and math before they are allowed to enroll in the core credit-bearing courses required for most post secondary credentials. Students' high school grade point averages and transcripts are not routinely considered when assessing students' college-readiness.

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[13] See Merck and Gandy, The Stanford Bridge Project: Maryland Community College Extension, 2002 http://www.gpo.gov/fdsys/pkg/ERIC-ED464675/pdf/ERIC-ED464675.pdf
[14] Maryland's SOAR Reports noted high remediation rates among graduates who had not completed a curriculum aligned to the University System of Maryland requirements and among those who completed a core curriculum.

The information reviewed in this chapter also shows that of the $15 million expended on developmental education at the College in 2013, local taxpayers are the primary funders of these programs followed by students and their families with state aid accounting for less than 15% of total funding. This finding suggests that increased oversight by the County Council over Montgomery College's developmental education programs is warranted, particularly since more than half of recent MCPS graduates who pursue higher education in-state enroll at Montgomery College.

A.   High School Graduation Requirements

Two sets of high school graduation requirements administered by the Maryland State Department of Education (MSDE) impact the demand for developmental education: coursework and assessment requirements for graduation. Each of these drivers are described and then followed by a discussion that describes the disconnect between rigorous course taking within MCPS and the persistent need for developmental education among MCPS graduates enrolling in Montgomery College.

1.   Coursework Requirements and Trends

Coursework Requirements for Graduation: MSDE specifies the courses that students must pass to earn a Maryland High School Diploma. Local school systems can extend these requirements. The combined state and local course requirements for graduation from MCPS follow:

- English – 4 credits
- Mathematics – 4 credits
- Social Studies – 3 credits
- Science – 3 credits
- Fine arts – 1 credit
- Physical education – 1 credit
- Technology education – 1 credit
- Health education – 0.5 credit
- Electives – 4.5 credits

New Math Coursework Requirements: Beginning with this year's 9th grade class, all students in Maryland must enroll in math in each year of high school. This new mandate aligns with MCPS' prior requirement that graduates complete four math credits. This new mandate, however, requires that students in advanced level math courses continue to enroll in rigorous math courses such as Trigonometry, Pre-calculus and Calculus for the entirety of their high school tenure. The goal of this mandate, enacted under the Maryland College- and career-readiness and College Completion Act of 2013 (SB 740), is to enhance Algebra II competency among students and reduce the demand for math remediation in the state.

University of Maryland System (USM) Coursework Requirements: MCPS' coursework requirements for graduation generally align with USM course requirements for college admittance. USM requirements for admission are set by their Board of Regents and, at minimum, include a cumulative grade point average of a C or better, accumulated course credits in English (4 credits), social studies (3 credits), biological and physical sciences (3 credits), mathematics (4 credits), foreign language or advanced technology (2 credits), and a high school diploma.[15]

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[15] See http://www.montgomeryschoolsmd.org/uploadedFiles/about/strategicplan/annualreport/AR2013_EGPS_Final.pdf

In 2009, USM also enacted a change to its math coursework requirements that impacts the first set of graduates this school year: students in the Class of 2015 and beyond who successfully complete Algebra II before their senior year must enroll in and complete additional mathematics courses in high school that include "non-trivial" algebra.[16] Thus, this USM math requirement aligns with the new math coursework requirement under SB 740.

Data Trends: Between 2010 and 2013, the percentage of MCPS graduates meeting USM benchmarks increased from 76% to 78%. The proportion of low-income, Black, and Latino MCPS graduates reaching this benchmark was also fairly high, ranging from 62%-67% in 2013. Thus, the vast majority of MCPS graduates, including students among subgroups that disproportionately enroll at Montgomery College, have completed a college preparatory (core) curriculum in high school.

Honors, AP, IB, and Other College-Level Course Enrollment Trends: For more than a decade, MCPS has encouraged high school students to take more rigorous courses. Toward this end, MCPS has opened enrollment in higher-level courses and encouraged more diverse student participation in honors, Advanced Placement (AP), International Baccalaureate (IB), and college-level courses.

Data Trends: Between 2010 and 2013, the percentage of Grade 9-12 students enrolling in at least one honors, AP, IB, or other college-level course has increased from 79% to 84%. The percentage of Black, Latino, and low-income high school students meeting this benchmark has also increased from a range of 59-66% in 2010 to a range of 68-75% in 2013.

Algebra II Completion Trends: Completion of Algebra II (Intermediate Algebra) prepares students for college-level algebra in higher education and thus reduces the need remediation in college. Since 2011, MCPS has tracked the percentage of students who complete Algebra II with a Grade of C or higher by the end of 11th Grade.

Data Trends: Between 2011 and 2013, the percentage of MCPS 11th graders meeting this benchmark increased from 60% to 63%. The percentage of Black, Latino, and low-income students meeting this benchmark has also increased from a range of 33-39% in 2011 to a range of 42-46% in 2013. *If a sizable share of students that miss the Algebra II benchmark by the end of the 11th grade successfully complete this course by the end of 12th grade, then perhaps three-quarters of all MCPS graduates and more than half of Black, Latino, and low-income graduates, complete Algebra II in high school.*

2. Assessment Requirements and Trends

High School Assessment Requirements: MSDE specifies the assessment requirements that high school students must meet in order to graduate. Beginning with the Class of 2009, MSDE has required that all high school students pass standardized state assessments, known as the High School Assessments or HSAs across four subjects to earn a Maryland High School Diploma: English, Algebra/Data Analysis, Biology, and American Government.

From 2005 to 2013, MSDE administered the HSAs in each of these subjects after students completed their related coursework. Students had four ways to fulfill the HSA requirement: pass each exam, earn high enough combined scores across all four exams, complete a "Bridge Plan" demonstrating proficiency in tested subject matter, or receive a waiver from the state if a student met all of the requirements for graduation but was unable to pass the HSAs due to extenuating circumstances.

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[16] See page 2 of http://www.president.umd.edu/policies/docs/III-400.doc

Data Trends: According to MSDE officials, only a handful of students have been prevented from graduating in the state each year since the high school exams were instituted.[17] Thus for the most part, very few students have been denied graduation due to failing the HSAs. More specifically, between 2010 and 2013, the share of MCPS graduates meeting the HSA requirements by:

- Passing each assessment increased from 82% to 85%;
- Earning high enough combined scores decreased from 13% to 9%;
- Completing Bridge Projects increased from 5% to 6%; and
- Receiving waivers decreased from 0.7% to 0.6%.

New Testing and Performance Requirements: With Maryland's implementation of the Common Core State Standards, MSDE will roll out six new assessments in math and English that have been developed by the Partnership for Assessment of Readiness for College and Careers (PARCC): Algebra I, Geometry, Algebra II, English 9, English 10, and English 11.[18]

MSDE will use two of these PARCC assessments – the Algebra I and English 10 exams – as replacements of the HSA English and Algebra/Data Analysis exams beginning with this years 9th and 10th grade classes. Students will need to be able to pass these exams in order to graduate as well as the HSAs in Biology and American Government.

With the implementation of SB 740, MSDE has proposed the use of two other PARCC assessments – the Algebra II and not yet developed English 11 exam – to assess the college-readiness of students by the end of Grade 11 beginning in 2015-16. Beginning with the 2016-17 school year, school systems will have to enroll students deemed non-college-ready into "transitional courses" aimed at improving their college-readiness during their senior year.

It is envisioned that students who pass the PARCC Algebra II exam with either a 4 or 5 will be deemed college-ready and will be able to directly enroll in entry-level credit-bearing math courses in Maryland public colleges.[19] Similarly, it is envisioned that students who pass the PARCC English 11 assessment with a 4 or 5 will also be deemed college-ready and will be able to directly enroll in entry-level English courses at Maryland two- and four-year public colleges.[20]

State and local officials anticipate that the proportion of students passing the new PARCC assessments by achieving college-ready levels of performance will likely be lower than the proportion of students deemed proficient on the HSA.[21] This assumption makes sense when considering trends in student performance on two current sets of standardized assessments that indicate that half or less of all MCPS graduates are college-ready.

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[17] Bowie, L., The Baltimore Sun, July 22, 2014 - http://www.baltimoresun.com/news/maryland/education/blog/bs-md-high-school-tests-20140722,0,1560120,print.story

[18] See MSDE Assessment Requirements for High Schools http://www.msde.maryland.gov/NR/rdonlyres/BFEA29B2-D63D-4C52-8D8D-C43C5D20BAA3/35945/TabB3AssessmentRequirementsforHighSchool.pdf

[19] See Department of Legislative Services presentation on "The Status of College Readiness in Maryland," February 11, 2013 http://mgaleg.maryland.gov/Pubs/BudgetFiscal/2013-Policy-Briefing-College-Readiness.pdf

[20] Ibid

[21] Ibid.

Performance on College-Readiness Assessments: The percentage of MCPS graduates earning at least one qualifying score on an Advanced Placement or International Baccalaureate exam was 53% in 2013. The percentage of MCPS graduates achieving a score of 1,650 or above on the SAT or a score of 24 or above on the ACT in 2013 was even lower at 41%.[22]

The achievement gaps on both of these measures were also large with 70-72% of White and Asian graduates achieving the AP/IB benchmark compared to 24-38% of Black, low-income, and Latino graduates; and 61-63% of White and Asian graduates achieving the SAT/ACT benchmark compared to 10-14% of low-income, Black, and Latino graduates.

B.   Higher Education Course and Placement Requirements

Two sets of higher education requirements administered by the Maryland Higher Education Commission (MHEC) also impact the demand for developmental education: general education requirements for college degrees and developmental education placement regulations. Each of these MHEC drivers is described in this section.

1.   General Education Requirements for Degrees

MHEC specifies the general education requirements for any degrees earned among Maryland's public colleges. These include general education requirements for two-year degrees whose credits can transfer to four-year colleges (A.A, A.S. and A.A.T. degrees) and for degrees not designed for transfer (A.A.S. degrees).

Montgomery College's General Education Program meets MHEC's guidelines and includes the following requirements for all associate degree programs: [23]

- Two College-Level English courses (6 credits) – English 101/101A as a prerequisite and English 102 (Critical Reading, Writing, Research) or 103 (Reading, Writing, Research Workplace). Through transfer credit or qualifying scores on college-readiness assessment (e.g. SAT or Accuplacer), students can directly place into English 102 or 103.

- One College-Level Mathematics Foundation Course (3-4 credits) – Specific foundational math courses vary according to student majors. Courses that can complete this requirement include Math 110 (Survey of College Mathematics), Math 113 (Intro Probability), Math 115/115A (Mathematical Ideas), Math 117-/117A (Elements of Statistics), Math 130, 131, 132 (Elements of Mathematics), Math 150 (Elementary Applied Calculus), Math 165 (Pre-calculus), Math 181 (Calculus I), and Math 182 (Calculus II).

Students assessed as college-ready can enroll in aforementioned courses to complete their general education course requirements when they begin at Montgomery College. Students assessed as in need of developmental education may need to complete up to two remedial reading courses, two remedial English courses and two to three remedial mathematics courses before they can enroll in credit-bearing general education courses in English or math.

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[22] For AP/IB data see © 18-19 of analyst packet for Education Committee on July 14, 2014
http://www.montgomerycountymd.gov/council/Resources/Files/agenda/cm/2014/140714/20140714_ED1.pdf
[23] See http://www.dsd.state.md.us/comar/comarhtml/13b/13b.06.01.03.htm for math requirement.

Thus, students deemed as needing remediation may need to complete up to 21 non-credit hours of coursework before they can enroll and complete the 9-10 credits of college-level English and math that count toward their associate's degree.

2.   Developmental Education Placement Requirements

MHEC also specifies the placement process that Maryland's 16 community colleges use to determine which students must complete developmental coursework in reading, English, and/or math prior to enrolling in credit-bearing English and mathematics courses.   More specifically, unlike four-year public universities in the state, community colleges in Maryland must use the Accuplacer or other standardized measures of college-readiness to determine students' placements in college-level courses, developmental courses, or pre-developmental courses.[24] In 1998, MHEC standardized the testing and placement policies of Maryland's community colleges.

To comply with SB740's requirement that the college-readiness of high school students is assessed by the end of grade 11, MSDE envisions that Maryland community colleges will also be able to use scores on the PARCC Algebra II and English 11 assessments to determine college-readiness by 2017.[25] MSDE also envisions that students with sufficient PARCC scores will not need to pass the Accuplacer to be placed directly into credit-bearing coursework.

The table below lists the current developmental courses at Montgomery College and the Accuplacer score cut points that determine course placement.

Table 3-1: Developmental Courses at Montgomery College and Accuplacer Cut Scores

Name of Course	Old Number	New Number	Accuplacer Score
Reading			
• College Reading Skills I	RD 095	READ 095	53-65
• College Reading Skills II	RD 099	READ 099	66-78
English			
• Basic English I	EN 001	ENGL 001	0-79
• Basic English II	EN 002	ENGL 002	80-89
Mathematics			
• Mathematics Prep I/II (Pre-Algebra and Algebra I)	MATH 094	MATH 080	0-61*
• Intermediate Algebra for ○ Liberal Arts	MATH 097	MATH 093	62-120*
○ Business, Elementary Education, & STEM majors	MATH 099	MATH 096	
* Refers to Accuplacer scores on the Algebra portion of the exam.			

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[24] See pages 43-44 of https://web.stanford.edu/group/bridgeproject/MD_phase1.pdf. Maryland's four year public colleges have the discretion to use a variety of measures to determine students' college-readiness. Unlike the community colleges, however, their course placement process often occurs after a selective admissions process.
[25] See http://www.msde.maryland.gov/NR/rdonlyres/BFEA29B2-D63D-4C52-8D8D-C43C5D20BAA3/35945/TabB3AssessmentRequirementsforHighSchool.pdf

As noted in the prior chapter (and repeated again in Chapter 5), researchers find the reliance on standardized exams alone to determine developmental education placements to be problematic for two main reasons. First, standardized tests tend to over-identify students as needing remediation who could have successfully completed a college-level course without remediation. Second, standardized tests alone ignore the diverse factors that shape student achievement beyond assessment scores.

As noted by Bailey and Sung-Woo, there is no obvious point of discontinuity in the distribution of cutoff scores that might provide a meaningful point to distinguish between "remedial" and "college-ready" students.[26] They also note that students who are referred to developmental courses through the assessments often face many different challenges.

Taking math as an example, some students identified as needing math remediation via standardized exams may have had difficulty learning math in high school, some may have taken very little math, some older students may have done well in math but forgotten much of what they learned, and others may have language problems and may experience trouble understanding the placement tests. These different groups of students need different types of services, but the assessments do not differentiate among them. Moreover, most colleges do not provide different classes or other interventions to address the varied reasons for the skill deficiencies.

Research suggests that evaluating grades from high school transcripts along with standardized tests can improve remedial placement decisions. Consideration of non-cognitive factors (e.g. academic behaviors, perseverance, and mindsets) can also reduce error rates in the remedial placement process. As noted by researchers at the Consortium on Chicago School Research via their literature review on the non-cognitive factors that shape school performance, "(s)tudents' course grades, grade point averages, or class rank are vastly better predictors of high school and college performance and graduation, as well as a host of longer-term life outcomes, than their standardized test scores."[27]

C.   Developmental Education Costs and Finances

The true costs of developmental education nationally remain unknown.[28] Developmental education is costly with states spending tens of millions of dollars on remediation, and very rough national estimates suggesting that well over $1 billion a year are spent on these services.[29] But it is students who probably have to bear the most significant costs. They must not only pay for the classes but they must also delay their progress through college. Many students are discouraged when they find out that they are not eligible for college-level courses.

The cost of a student's higher education, including developmental education costs, is generally funded from one or more of three primary sources: (1) state allocations, (2) family contributions including tuition, student employment and loans, and (3) financial aid. In the case of community colleges, counties usually represent another source of contribution.

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[26] See http://www2.ed.gov/PDFDocs/college-completion/07-developmental-education-in-community-colleges.pdf
[27] See https://ccsr.uchicago.edu/sites/default/files/publications/Noncognitive%20Report.pdf, p. 3 or
https://ccsr.uchicago.edu/sites/default/files/publications/VUE%20Noncognitive%20Factors.pdf for reference
[28] See page 7 of
http://www.aei.org/files/2011/02/15/Remediation%20%20The%20Challenges%20of%20Helping%20Underprepare
d%20Students%20by%20Bridget%20Terry%20Long.pdf
[29] See Thomas Bailey and Sung-Woo, Issue Brief: Developmental Education in Community Colleges Prepared for the White House Summit on Community College, Community College Research Center, Teachers College – Columbia University, September 2010.

This section describes the costs of developmental education programming at Montgomery College inclusive of instruction, academic support, and student services. This section also describes the revenue sources for developmental education in Montgomery County and restrictions on the amount of federal financial aid that can be spent on developmental education.

1. Program Costs

At the request of OLO, Montgomery College staff estimated and calculated the annual cost of developmental education between 2007 and 2013, shown in the tables below.[30] Based on an estimate that developmental education comprised 10.7% of total hours of enrollment (billable hours), the cost of remediation was $14.9 million at Montgomery College in 2013. Instruction and academic support accounted for 82% of total costs and student services the remaining 18%.

Total developmental education costs at the College have varied with enrollment. A review of trend data shows that the cost of developmental education has varied from a low of $13.5 million in 2007 to a high of $16.9 million in 2009. Overall, the unit costs of developmental education have declined by 5.8% over the past seven years from $276 per hour in 2007 to $260 per hour in 2013.

Table 3-2: Computing "Cost of Developmental Education" at Montgomery College

Fiscal Year	Hours of Enrollment			Expenditures by Category			Pro-Rated Costs
	Total Hours	Dev. Ed. Hours	Dev. Ed. % of Hours	Instruction	Academic Support	Student Services	Dev. Ed. Share
2007	453,285	48,964	10.8%	$77,078,188	$24,851,600	$22,967,251	$13,491,421
2008	472,984	53,623	11.3%	$82,301,089	$25,817,667	$23,713,036	$14,945,994
2009	491,193	57,662	11.7%	$89,823,920	$28,787,687	$25,316,099	$16,895,924
2010	532,097	62,456	11.7%	$90,511,017	$27,372,356	$25,202,246	$16,794,974
2011	532,196	62,523	11.7%	$91,175,811	$27,035,644	$24,215,508	$16,732,484
2012	539,543	59,478	11.0%	$96,621,636	$25,334,849	$27,192,613	$16,441,859
2013	539,961	57,530	10.7%	$77,979,817	$36,835,908	$25,373,790	$14,936,454

Notes: Total hours are "billable hours" the number of hours students are billed tuition for their courses. For FY 2013, the College changed their expense classification criteria to better align with best practices. Changes between FY12 and FY13 among expenditure categories may reflect these changes in classifications rather than costs.

Table 3-3: Montgomery College Course Hours and Cost of Developmental Education, FY 2007 – FY 2013

	2007	2008	2009	2010	2011	2012	2013	2007-13 Change	
								#	%
Bill Hours	48,964	53,623	57,662	62,456	62,523	59,478	57,530	8,566	17.5%
Costs $ (in thousands)									
Program Costs	$13,491	$14,946	$16,896	$16,795	$16,732	$16,442	$14,936	$1,445	10.7%
Costs per Hour	$ 276	$ 279	$ 293	$269	$268	$276	$260	$(16)	-5.8%

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[30] The College's estimates are based on the share of total enrollment hours allocated to developmental education.

2. Program Revenue

Developmental education at Montgomery College is supported through the Current Fund. So, the sources of funding for the Current Fund can be used to calculate the sources of revenue for developmental education.

The table below provides an estimate of revenue sources for developmental education in 2013 based on sources of funding for the College's FY14 Operating Budget. The $6.5 million in County funding in 2013 accounted for the largest share of revenue for developmental education followed by $5.6 million in tuition and related charges and $2.1 million in State aid.

Table 3-4: Estimated Revenue Sources for Developmental Education, FY 2013

Sources of Funds	FY 2014 Budget	% of All Revenue	If revenue for DE split same way, then …
Tuition and Related Charges	$85,555,492	38%	$5,611,508
Other Student Fees	$1,697,759	1%	$111,354
County Contribution	$98,933,727	43%	$6,488,974
State Aid	$31,688,491	14%	$2,078,420
Fed. State and Priv. Gifts and Grants	$325,000	0%	$21,316
Other Revenues	$1,325,000	1%	$86,906
Revenue Transfers	$0	0%	$0
Use of Fund Balance	$8,202,226	4%	$537,977
Total Sources of Funds	$227,727,695	100%	$14,936,454

The relatively small share of developmental education funded by the state is a function of the lower amount of state aid given to Maryland's community colleges compared to its public four-year universities. More specifically, Maryland provides formula aid to 15 of its community colleges that is roughly equivalent to one-fourth of the aid per student provided to public four-year universities. In 2014, this amounted to $2,636 per FTEs among Maryland's community colleges compared to $9,877 per FTEs among Maryland's state-operated institutions.[31] Yet a majority of Maryland graduates who pursue higher education attend the state's community colleges rather than in-state four-year colleges or universities, public or private.

3. Financial Aid

Financial aid is an important tool in ensuring that students who require developmental courses can enroll in needed coursework. Although Maryland's community colleges are much more affordable than the State's public four-year institutions, according to the Department of Legislative Services, they were about $300 more expensive than the national average in fall 2013 ($3,799 vs. $3,499).[32] Among Maryland community colleges, Montgomery College charged the highest tuition and fees combined for full-time in-county students at $4,452 in fall 2013.

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[31] FY14 funded FTES among Community Colleges totaled 108,736; FY14 funded FTES among state operated institutions (University System of Maryland, Morgan State University, St Mary's College, and Baltimore City Community College) totaled 135,605.

[32] http://mgaleg.maryland.gov/pubs/budgetfiscal/2015fy-budget-docs-operating-R62I0005-Aid-to-Community-Colleges.pdf

According to Montgomery College's 2012 Performance Report, financial aid applications have increased 80% in four years.[33] The percent of credit students that received some form of financial aid increased from 28% in 2008 to 43% in 2011. Moreover, nearly 23% of Montgomery College students were awarded federal Pell Grants in 2011 compared to 15% in 2008.

Although financial aid and federal financial assistance in particular are not available for auditing courses or taking non-credit courses offered by the College's Workforce Development and Continuing Education division, students may use financial aid to pay for developmental course work. However, there are several restrictions on how financial aid may be used to finance remediation.

As stated by the Montgomery College Office of Student Financial Aid Award Conditions brochure, a student may be eligible for financial aid if they are achieving "satisfactory academic progress toward completion of an associate degree or a one-year certificate program." There are four standards of satisfactory academic progress:

- Minimum cumulative grade point average of 1.25 for a total of 1-11 total credits attempted; 1.75 for 12-59 total credits attempted, and 2.0 for 60 or more total credits attempted.

- For total credits billed, a 50% semester completion rate if between 0-30 credits billed; a 67% semester completion rate if 31 or above credits billed.

- Students must complete their degree or certificate program at Montgomery College within a timeframe that is no longer than 150% of the published length of the program. This calculation includes all attempted credit work at Montgomery College and other courses accepted at the College for transfer but does not include any developmental or AELP courses.

- A student cannot receive financial aid for more than the equivalent of one year (30 hours) of non-credit developmental courses. This one-year limit, however, does not include AELP courses.

Also, the College does not allow a student to attempt a failed course for a third time, including developmental courses. And developmental coursework funded with Pell grants reduces students' lifetime eligibility for these grants and funding available for the final years of a bachelor's degree.

Taken together, students enrolled in developmental courses at the College must make judicious use of their financial assistance to ensure that they: (1) do not exhaust their assistance before completing their remedial coursework and program requirements and (2) if desired, have Pell grant funds available to complete a bachelor's degree. For students with multiple developmental courses to complete, this can be a difficult task.

Finally, students enrolled in the Bridge/Pathways to Success Program at the College - a pre-developmental education program administered by WDCE - are not eligible for federal financial assistance. These students score below 8th grade reading proficiency on the Accuplacer (i.e. score between 32 and 52 on the Reading Test). However, as noted in OLO's December 2013 Youth and Work in Montgomery County report (OLO Report 2014-3), Pathways students who have graduated from MCPS and are in-county students are eligible to apply for needs-based Pathway Grants.[34]

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[33] See page 221 of https://www.mhec.state.md.us/publications/research/AnnualReports/2012PerfAcctRepVol2.pdf
[34] See page 67 of http://www.montgomerycountymd.gov/OLO/Resources/Files/FullOLOReport2014-3.pdf

Chapter 4: Developmental Education Programs and Outcomes

The fundamental goals of developmental education are enabling students to successfully enter college-level credit courses, complete college-level coursework and achieve higher education credentials and goals. This chapter describes the developmental coursework delivered at Montgomery College aimed at increasing the college-readiness of students identified as needing remediation. This chapter also describes student outcomes in developmental education, including the proportions of students who complete their developmental sequences and gateway courses.

As noted in the previous chapter, developmental education programs and services are administered across three budget categories within Montgomery College: student services, instructional programs, and academic supports. This chapter describes the College's developmental education programs across these three budget categories as follows:

A. **Assessment and Placement** describes student services in the developmental education screening and placement process for newly enrolled students;

B. **Instructional Programs and Outcomes** describes the College's administration of instructional programs in developmental education including courses, enrollment, and student outcomes across three subject areas: reading, English, and mathematics; and

C. **Other Student Services and Academic Supports** describes additional student services and academic supports for developmental students including counseling services and new requirements under Senate Bill 740.

The information reviewed in this chapter suggests that the College has undertaken a number of efforts aimed at improving outcomes among students requiring remediation. These include enhancing counseling and test preparation opportunities to reduce the demand for remediation, restructuring coursework and offering tutoring to improve student success, and providing accelerated coursework to enable students to complete their developmental sequences more quickly.

Yet, student outcomes in developmental education remain modest at best because a majority of students requiring remediation neither complete their developmental sequence or first gateway courses required for graduation within two years. More specifically:

- A third of new, non-AELP students at the College required remediation in English or Reading in 2011, 70% completed their developmental sequence within two years and 40-43% completed their first gateway course.

- Nearly three-quarters of new, non AELP students at the College required remediation in math in 2011, only a third completed their math sequence within two years, and less than a fifth completed their gateway course.

Thus developmental education at Montgomery College as a lever for increasing the college-readiness of current students is not working as intended, particularly in math.

A.   Assessment and Placement

Montgomery College's Division of Student Services bears primary responsibility for assessing and placing students into developmental education and delivering counseling and advising services to students enrolled in remedial coursework. This section describes the following services delivered to newly enrolled students at Montgomery College: assessments, test preparation, post-test advising, re-testing options, reading and English placement, math placement, and review of placement.

Assessments. When a student enrolls at the College and does not have qualifying scores for college-level English or math (such as qualifying SAT or ACT scores) or proof of required general education coursework in English and/or math completed at another college, they are required to take the Accuplacer to determine whether or not they are ready for college-level courses. Results from the Accuplacer (or other tests) are used to place students into college-level courses, developmental education, or pre-developmental classes offered by WDCE known as the Bridge program.

The Accuplacer is an untimed exam of learning skills rather than aptitude; it is typically completed within two hours. The Accuplacer includes three subsections:

- Reading Comprehension (20 questions) measures reading skills, such as identifying the main idea and making inferences through the comprehension of short passages.

- Sentence Skills (20 questions) measures understanding of sentence structure and grammar.

- Mathematics (questions that range from Pre-Algebra to college-level mathematics) measures a range of math skills from basic concepts and operations to college-level math concepts.

Depending on English language proficiency and prior participation in English for Speakers of Other Language (ESOL) programs, students select whether they will take the English Accuplacer which is used to place students into developmental education courses or the ESL Accuplacer which is used to place students in AELP (American English Language Program) classes. Both developmental education and AELP course pathways are intended to prepare students for college-level coursework in English. The AELP pathway, however, requires completion of up to four writing courses compared to up to two courses in developmental English.

The English, Reading and Writing Accuplacer assessment is delivered in two parts.

- The Reading Comprehension exam measures students' analytical and comprehensive reading skills and the ability to apply what they have read.

- The Sentence Skills exam measures students' ability to correct sentences by substituting a word or phrase underlined in a sentence. This part of the Accuplacer exam also asks students to rewrite sentences without changing their meaning.

English and Reading Accuplacer scores are good for two years. Students who are placed in developmental English must complete this developmental sequence before accessing most other college-level courses, because most college-level courses require English 101 proficiency.

The Math Accuplacer is also delivered in two of the three parts described below depending on student test performance of the first part:

- The Elementary Algebra Test is administered to every student and covers three major areas:

  - Positive and negative numbers, absolute value, and square roots;
  - Operations and algebraic expressions, including polynomials, roots, exponents, factoring, and simplifying algebraic fractions; and
  - Factoring quadratic equations, and solving equations and inequalities.

- The College Mathematics Test is administered as the secondary math exam if a student does well on the Elementary Algebra Test. This part of the test focuses on:

  - Intermediate algebra, solving equations and inequalities;
  - Graphing, functions, and trigonometry; and
  - Other topics such as complex numbers, sequence and series, factorials.

- Alternatively, a Pre-Algebra Test is administered as the secondary math exam if a student does not do well on the Elementary Algebra Test. This part of the test focuses on:

  - Place value, arithmetic and word problems for whole numbers;
  - Decimals, fractions, integers, and percents;
  - Solving linear equations and collecting like terms; and
  - Area and perimeter of rectangles.

Unlike English and Reading scores, Math Accuplacer scores are only good for up to one year.

Test Preparation. The College offers four resources for students to prepare for the Accuplacer exam:

- Online Resources where the College posts online preparatory material for the Accuplacer, including study guides, tips, and helpful links to prepare for the exam.

- High School Accuplacer Program at 11 MCPS high schools that offers the Accuplacer Diagnostic to participating students and then offers follow up intervention to students who score below college-readiness levels. After the interventions, students are given a second Accuplacer assessment after graduation.

- The Accuplacer Advancer that provides an online tutorial program to improve students' scores across Accuplacer subjects. The Advancer can be used to help students prepare for the exam or to re-take the exam. The Advancer course cost $55 and is administered by WDCE. The exam associated with passing the Advancer is offered several times a year.

- Fast Track Math Review Courses that offer 20 hour intensive review courses for students seeking a higher test score on their Accuplacer Mathematics Subtest. Two courses are offered: Basic Fast Track that covers Pre-Algebra and Algebra I; and Advanced Fast Track that covers Algebra I and Algebra II. These courses are offered prior to the start of the each semester and are designed for students who have passed at least one year of high school algebra with a B or A and need a review of basic concepts.

According to College staff, students completing the Advancer or a Fast Track Math Course typically test into higher level remedial math courses after completing these test preparation options.

Post-Accuplacer Advising. After a student has taken the Accuplacer, he/she schedules an academic orientation session with a College staff advisor via the Montgomery Advisory Program (MAP) to obtain test results and talk about recommendations for classes and a college pathway. If a student cannot attend the two hour session in person, they can do it electronically via eMAP. There is also an International MAP (iMAP) for advising international students. Staff recommendations for course pathways, college-level courses, or remedial education, are primarily based on Accuplacer results.

Accuplacer Retesting. Students may take the Accuplacer twice within a given time-frame. For MCPS graduates, however, results taken at MCPS for a Montgomery College program such as the College Institute count as the first Accuplacer attempt. Before authorizing students to re-take the Accuplacer, the College usually recommends that students review example problems and get rest.

There are no third attempts of the Accuplacer allowed; students who want to appeal their placement can request a "review of placement" with the appropriate departmental chair as described at the end of this section on the next page.

Reading and English Placement. Table 4-1 below lists the developmental education courses offered in Reading and English and the Accuplacer cut scores used to place students into these courses. The table also lists 2013 enrollment data by course.

Table 4-1: Montgomery College Developmental Reading and English Courses, Cut Scores and Enrollment, 2013

Name of Course	Course Numbers	Accuplacer Cut Scores	2013 Enrollment[35]
Reading (Old/New Course Numbers)			
College Reading Skills I	RD 095/READ 095	53-65	810
College Reading Skills II	RD 099/READ 099	66-78	1,479
English (Old/New Course Numbers)			
Basic English I	EN 001/ENGL 001	0-79	1,429
Basic English II	EN 002/ENGL 002	80-89	1,165

The enrollment data suggests that students enrolled in developmental reading courses are more likely to take the intermediate level reading course rather than the lowest level course (65% were enrolled in RD 099 compared to 35% in RD 095). This suggests that most students enrolled in developmental reading had only one course to finish in their developmental sequence before they could enroll in college-level coursework.

Alternatively, enrollment data for developmental English suggests that students are more likely to enroll in the lowest level course rather than the intermediate level course (55% were enrolled in EN 001 compared to 45% in EN 002). This suggests that most students enrolled in developmental English had two courses to finish in their developmental sequence.

Math Placement. Table 4-2 on the next page lists the developmental courses offered in math, the cut scores from the Accuplacer Algebra test used to place students into these courses and 2013 enrollment data by course.

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[35] http://www.montgomerycollege.edu/research/OIRA%20Other%20Files/Student%20Data/MC%20Factbook/Current/FY3_Top_Enrollment.pdf

The enrollment data suggests that students enrolled in developmental math courses are more likely to take the lower level math course rather than the intermediate level course (58% were enrolled in MATH 094 compared to 42% in MATH 097/099). Since MATH 094 can be a year-long sequence if students test into Pre-Algebra, this suggests that most students enrolled in developmental math have two to three semesters worth of math coursework to complete in their developmental sequence.

Table 4-2: Montgomery College Developmental Math Courses, Cut Scores, and Enrollment, 2013

Name of Course	Course Numbers	Accuplacer Cut Scores	2013 Enrollment[36]
Math (Old/New Course Numbers)			
Mathematics Prep I/II (Pre-Algebra and Algebra I)	MATH 094/080	0-61*	6,042
Intermediate Algebra for - Liberal Arts majors	MATH 097/093	62-120*	1,290
- Business, Elementary Education, and STEM majors	MATH 099/096		3,169
* Refers to Accuplacer scores on the Algebra portion of the exam.			

Review of Placement: Students who have attempted the Accuplacer twice and are dissatisfied with their score can appeal their placement by requesting a "review of placement" with the appropriate departmental chair. As part of this review, the departmental chair can consider other evidence of students' college-readiness that may include high school transcripts and samples of prior coursework. College staff notes that this review process occurs as an informal practice at the College and is not codified in the College's Handbook.

B.   Instructional Programs

Montgomery College's developmental education courses are administered by academic departments rather than by a separate division for developmental education. More specifically, the Reading Department has administered developmental coursework in reading, the English Department has administered developmental coursework in English, and the Math Department has administered developmental coursework in math. And given the high rate rates of remediation at the College, developmental courses often comprised the largest number of courses offered by these departments.

Following last year's College Area Review of its developmental education programs, the College recently reorganized the administration of its academic departments that deliver developmental instruction across its campuses. First, the College created academic dean positions across the system such that common departments across campuses report to the same dean rather than separate deans for each campus. Second, the College combined the English and Reading Departments for each campus into a single combined department. These two organizational changes should facilitate improved coordination in scaling up best practices for improving developmental education across the College's three campuses.

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[36] Ibid

As noted in Chapter 2 and the data reviewed in this chapter, the majority of students new to Montgomery College begin their coursework in developmental education and, in particular, developmental math. The College recognizes that developmental education serves as both an opportunity and a potential stumbling block for students pursuing their higher education goals. Thus, the College is focused both on improving the efficacy of its developmental education programs and ensuring that remedial coursework does not become a revolving ladder for some students. To address the later risk, the College limits student attempts to pass developmental courses to three. Given this context, a detailed description of the College's instructional programs in developmental education and student outcomes by subject area follows.

1.   English and Reading Developmental Education

In July 2014, Montgomery College combined the administration and faculty of its Reading and English programs into one department at each of its campuses. Currently, the College is looking at developing integrated Reading and English developmental courses to teach students how to identify and develop patterns in both reading and writing. Because the programs were separated when OLO began this project, this section provides summaries of each program separately.

English. College staff report that some of the markers that indicate that a student requires English remediation include needing assistance with grammar, organization, and developing a thesis; and also needing assistance with structuring sentences, paragraphs, and essays.

At the end of English remediation, students are expected to be able to:

- Write a multi-paragraph essay with a clear thesis;
- Utilize the writing process (e.g. outlining, drafting, revising, and editing);
- Identify the thesis statement and supporting evidence;
- Write sentences that have the conventions of standard English; and
- Use rhetorical strategies, based on audience and purpose.

Course Descriptions: Two developmental English courses intended for native speakers of English are offered, based on student skill levels:

- **EN 001/ENGL 001 (Basic English I)** is the first-level course designed to improve writing skills. This course emphasizes writing well-developed paragraphs and multi-paragraph essays, including the appropriate use of grammar, mechanics, and punctuation.

  Hours and Sections: This course is 3 non-credit hours. In 2013, there were 79 sections of EN 001, making it the third most popular English class (followed by EN 101 and EN 102).

- **EN 002/ENGL 002 (Basic English II)** is the second-level course designed to improve writing skills. This course emphasizes writing multi-paragraph essays and the study of grammar, mechanics, punctuation, and usage.

  Hours and Sections*:* This course is 3 non-credit hours. In 2013, there were 64 sections of EN 002, making it the fourth most popular English class at the College.

Some English developmental courses are taught in computer classrooms; others are taught in regular classrooms with students having access to computers in the Writing Center.

Assessment, Enrollment, and Outcome Trends. The College provided OLO student cohort data from 2006 to 2011 to describe developmental education enrollment and outcomes among new, non-AELP students needing English remediation. This data, detailed in the appendix, describes trends on remediation need, course enrollment, and course completion. It also describes trends by student race, ethnicity, and age (recent graduation status). A review of the data shows that from 2006 to 2011:

- The percentage of students requiring English remediation increased from 28% to 35%.

- The percentage of students requiring English remediation that enrolled in developmental English courses within two years of enrollment increased from 84% to 91%.

- The percentage of students completing their developmental English sequence within two years of enrollment increased from 59% to 70%.

- The percentage of students that completed their first gateway course (EN 101) within two years of enrollment increased from 37% to 46%.

A review of the English remediation data by student age (recent graduation status) also shows that:

- Recent graduates were assessed as having a higher need for English remediation than older students (38% v. 28% in 2011).

- If assessed as needing English remediation, recent graduates also had higher rates of enrolling in developmental English than older students (95% v. 82% in 2011).

- Recent graduates achieved better outcomes than older students in achieving the English developmental sequence completion benchmark within two years (75% v. 56% in 2011).

- Recent graduates also achieved better outcomes than older students in achieving the English gateway course completion benchmark within two years (51% v. 33% in 2011).

Acceleration Options. The College allows students who have passed EN 001 at a high enough level to skip EN 002 and enroll directly into EN 101. More specifically, if a student earns a B or better for his/her final grade in EN 001 and does not require developmental reading, he/she can directly enroll in the gateway course EN 101A.[37]

Two year ago, the College also created the accelerated PACE program for developmental English students who do not need developmental reading. The PACE program co-enrolls developmental and credit students into the same English course (EN 101). Unlike the typical three hour long EN 101 class, the PACE class is a 5 hour class that provides both developmental and credit students access to tutors and smaller classes (18 rather than 22 students per class). The PACE program is modeled after the highly recognized Accelerated Learning Program (ALP) at the Community College of Baltimore County.

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[37] Excluding students who withdrew, 40% of students enrolled in EN 001 do well enough to skip EN 002 according to Montgomery College staff in the Office of Institutional Research and Analysis.

In interviews with OLO staff, Montgomery College instructors remarked that it's difficult to discern the developmental from the credit students in the PACE classes. They also noted that developmental students enrolled in PACE are doing as well as credit students placed into EN 101 and tend to have a higher retention rate than their developmental peers the following semester.

The College does not yet know whether the developmental students in PACE are completing the English sequence for graduation faster (i.e. two semesters of college-level English). But according to College staff, the higher cost of the PACE model is likely warranted because it increases the first-time success of developmental English students and reduces the need for re-taking developmental coursework in English.

Other Program Enhancements. With the merging of the English and Reading Departments into one, Montgomery College will reduce the student-to-staff ratios for all developmental English courses from 22 students per class to 20.

Reading. College staff report that the profile of developmental reading students varies: former ESOL students who recently graduated from MCPS, students who have never read an entire book, students with disabilities, returning adults, and returning veterans. Developmental reading enables students to access college-level textbooks that are typically written at the 10th grade reading level.

According to College staff, the Accuplacer assesses whether students can infer the tone, main points, differing points of view, and what the author is trying to convey. Staff report that there are two primary goals for developmental reading:

- To teach the students how to pull out main ideas from written works and not be overwhelmed with supporting and/or unimportant details; and

- To get the students to enjoy reading.

Course Descriptions. There are two developmental reading courses intended for native speakers of English reflecting different skill levels:

- **RD 095/READ 095 (College Reading Skills I)** is the first-level reading course that is calibrated to an 8th grade reading level.[38] The course's emphasis is on intermediate college reading skills required for success in college courses. Skills cover using dictionaries; enhancing vocabulary, including identifying context clues; comprehending paragraphs and essays through identifying and inferring main ideas; locating supporting details and identifying organizational patterns; using reading strategies and study skills such as test taking and listening skills; and introducing critical thinking skills.

  Hours and Sections: This course is 3 non-credit hours. In 2013, there were 51 sections of RD 095, making it the third most popular Reading course at the College.

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[38] Students whose reading level is assessed at lower level (below 8th grade) and can enroll in adult basic education and pre-developmental reading courses offered through the College's Workforce Development and Continuing Education (WDCE) Division.

- **RD 099/READ 099 (College Reading Skills II)** is the second-level reading course that is calibrated to an 9th/10th grade reading level. This course's emphasis is on advanced college reading skills required for success in college courses. Skills cover comprehending college-level essays through identifying and inferring main ideas, locating supporting details, and identifying organizational patterns; applying reading strategies and study skills, outlining and summarizing; using critical thinking skills, including differentiating fact from opinion and recognizing purpose and tone; and analyzing textbooks and media.

  Hours and Sections: This course is 3 non-credit hours. In 2013, there were 88 sections of RD 099, making it the most popular Reading course at the College.

Assessment, Enrollment, and Outcome Trends. The College provided OLO student cohort data from 2006 to 2011 to describe developmental education enrollment and outcomes among new, non-AELP students requiring reading remediation. This data, detailed in the appendix, describes trends on remediation need, course enrollment, and course completion. It also describes trends by student race, ethnicity, and age (recent graduation status). A review of the data shows that from 2006 to 2011:

- The percentage of students requiring reading remediation fluctuated from 25% for 2006 to 32% for 2009.

- The percentage of students requiring reading remediation that enrolled in developmental reading courses within two years of enrollment increased from 82% to 90%.

- The percentage of students completing their developmental reading sequence within two years of enrollment increased from 64% to 73%.

- The percentage of students that completed their first gateway course within two years of enrollment increased from 36% to 43%.

A review of the reading remediation data by student age (recent graduation status) also shows that:

- Recent graduates were assessed as having a higher need for reading remediation than older students (32% v. 22% in 2011).

- If assessed as needing reading remediation, recent graduates were also more likely to enroll in developmental reading courses than older students (92% v. 85% in 2011).

- Recent graduates achieved better outcomes than older students in achieving the reading developmental sequence completion benchmark within two years (76% v. 64% in 2011).

- Recent graduates also achieved better outcomes than older students in achieving the reading gateway course completion benchmark within two years (46% v. 32% in 2011).

Acceleration Options. Department staff can recommend that a student who excels in RD 095 can skip RD 099 and advance to RD 120 if the student meets the following:

- Earns an A for his/her final overall grade;
- Is eligible to take EN 101A; and
- Earns a score of at least 80% on the RD 099 Final Exam.

2.   Math Developmental Education

Developmental education in math strives to teach students basic arithmetic skills and to define mathematical functions verbally, numerically, graphically, and algebraically. The College's math developmental education programs specifically teach students how to solve linear, quadratic, rational, exponential and radical equations, particularly for real world applications.

College staff report that a recent high school graduate will typically test into the second to last math class they completed in high school. For example, if the student completed Algebra II, then usually he/she will test into Elementary Algebra (Algebra I) rather than into Pre-Algebra or Algebra II. The recent change in state law requiring students to take four years of math in high school may diminish the need for developmental math at the College in future years.

Program Improvements: In the fall of 2011, the College redesigned math developmental education. The new system focuses on an accelerated approach that uses traditional in-class instruction and self-paced lab work. The classes are self-paced, internet-based modules. In turn students can do some of the class work at home. These classes also have requirements for seat time in Math Labs staffed by instructors and test taking at the College's Math Labs. Students can begin at different modules, depending upon their Accuplacer assessment.

In addition to being module based, the current classes are mastery based – students must meet an 80% performance threshold before they can move onto the next level. If a student takes a break from the class, he/she can resume from whichever module was last passed. College staff report that this new approach allows for students to complete course sections more quickly.

Additionally, Pre-Algebra (MA 090) and Elementary Algebra (MA 091) were combined into a single Mathematics Prep course I/II (MA 094). Students requiring both Pre-Algebra and Elementary Algebra will typically spend two semesters in MA 094.   After completing this course, students can take one of two intermediate algebra courses: Intermediate Algebra for Liberal Arts (MA 097) for general studies, humanities, and most social science majors or Intermediate Algebra (MA 099), for students pursuing STEM, economics, business, and elementary education majors.

Course Descriptions: The specific class descriptions for developmental math courses follows:

- **MA 094/MA 080 Mathematics Prep I/II (Pre-Algebra and Elementary Algebra)** offers a review of the fundamentals of arithmetic, an introduction to signed numbers, and a presentation of the basic concepts of algebra. Topics include proportion and percent, polynomials, factoring, linear equations and inequalities in one variable including systems, graphing, integer exponents, and quadratic equations. Applications are included throughout the course. This self-paced course has no lecture and incorporates independent computer use.

    Hours and Sections: This course is 3 non-credit hours per semester. In 2013, there were 245 sections of MA 094, making it the most popular math course at Montgomery College.

- **MA 097/MA 093 Intermediate Algebra Liberal Arts (Algebra II)** develops algebraic and problem-solving skills and concepts intended to prepare students for a mathematics foundation (college-level algebra) course. Topics include linear, quadratic, and exponential equations, functions and their applications, modeling and data analysis.

Hours and Sections: This course is 3 non-credit hours. In 2013, there were 61 sections of MA 097.

- **MA 099/MA 096 Intermediate Algebra (Algebra II)** examines algebraic skills and concepts intended to prepare students for MA 130, MA 160, and MA 180. Algebraic, graphical, numerical, and verbal approaches are used in working with a variety of functions and their applications, including linear, polynomial, exponential, logarithmic, rational, and radical functions. This course also teaches students how to solve systems of equations.

  Hours and Sections: This course is 3 non-credit hours. In 2013, there were 135 sections of MA 099, making it the second most popular math course at the College.

Assessment, Enrollment, and Outcome Trends. The College provided OLO student cohort data from 2006 to 2011 to describe developmental education enrollment and outcomes among new, non-AELP students needing math remediation. This data, detailed in the appendix, describes trends on remediation need, course enrollment, and course completion. It also describes trends by student race, ethnicity, and age (recent graduation status). A review of the data shows that from 2006 to 2011:

- The percentage of students requiring math remediation increased from 68% to 73%.

- The percentage of students requiring math remediation that enrolled in developmental math courses within two years of enrollment increased from 67% to 77%.

- The percentage of students completing their developmental math sequence within two years of enrollment fluctuated between 26% in 2006 to 48% in 2010.

- The percentage of students that completed their first gateway math course within two years of enrollment also fluctuated between 14% in 2006 to 22% in 2010.

A review of the math remediation data by student age (recent graduation status) also shows that:

- Recent graduates were assessed as having a higher need for math remediation than older students (79% v. 60% in 2011).

- If assessed as needing math remediation, recent graduates were more likely to enroll in developmental math courses than older students (79% v. 69% in 2011).

- Recent graduates achieved better outcomes than older students in achieving the math developmental sequence completion benchmark within two years (36% v. 20% in 2011).

- Recent graduates also achieved better outcomes than older students in achieving the math gateway course completion benchmark within two years (22% v. 12% in 2011).

MA 094 Outcomes. College staff report that of the 2,683 students who began in the fall of 2011, 12.6% had completed the math developmental sequence compared to 12.2% in 2009. The pass rate for Intermediate Algebra for Liberal Arts among students who completed MA 094 was 63% for 2011-12 compared to 59% in 2009. However, there has not yet been a sizable increase in the number of students who pass this sequence. Those passing this mastery driven class, however, are more successful in the next math course than those who passed the pre-2011 developmental math class.

Acceleration Options. In addition to having the opportunity to complete MA 094 in an accelerated time frame, there is also now a new accelerated math option that combines MA 097 with MA 115A or 116A for a five credit course that meets the general studies math requirement.

3. Other Student Services and Academic Supports

Students who are new to a community college sometimes have trouble adjusting to the experience, particularly if they are a first generation college student. In order to address this, Montgomery College offers its students numerous supports beyond developmental education coursework to help guide students through the college experience. In particular, the College has taken the "developmental education students do not do optional" approach to deliver additional services to students at-risk of not completing their college credential.

To promote student engagement and achievement, the College is increasingly bringing support services into student classrooms and is also creating one-stop shops for all student services (already in place at the Takoma Park/Silver Spring campus and included in the Rockville campus Capital Improvement Program). The College has also embarked on the "First Year Experience" as a way to connect new students to each other and their campuses to promote student retention and success.

This section briefly describes the additional student services and academic supports that are available to Montgomery College students enrolled in developmental education.

Advising and Counseling. The College provides extensive advising and counseling to students. Counselors help students with their personal, career, and educational goals, including the selection of the right classes. The College also requires faculty to serve as advisors to first year students (completing their first 24 credits). SB 740 is also driving the College to make counseling services more discrete. Of note, the College's counselors and advisors are considered faculty, have graduate degrees, and can teach courses. This differs from the requirements of other community colleges in Maryland that hire counselors without graduate degrees.

Student Tracking. The College has recently implemented a student tracking system known as Starfish, which can be accessed by students and staff. Because of the size of the campus, students are not assigned to one counselor but Starfish allows for any counselor to see the educational records of the students they meet. Some of the features of Starfish include: online signup for appointments with College staff, viewing support networks for courses, receiving referrals and other messages, and reviewing academic plans.

Student Intervention. The College has piloted an early warning system to identify struggling students in MA 094 using Starfish. Based on a mid-term review of course progress, students were contacted by email with one of three messages: (1) You're doing well, keep it up, (2) You have a grade below a C at mid-term – see counselor/professor or (3) You have missed a significant amount of class – please see counselor/professor. According to College staff, most students followed up with their counselors or professors when directed by Starfish emails.

Academic Centers. Students who need extra support or tutoring in reading, writing, language, or mathematics are encouraged to take advantage of the College's Learning Centers and Academic Support Centers located at each Montgomery College campus. The goals of each center are "to give students the tools, skills, and confidence they need to succeed in college and beyond." They include:

- Math Centers that provide resources and tutoring to help students solve a variety of math problems;

- Reading/Writing/Language Centers that provide a range of services from computer tutorial programs that support ESL, Reading, and English classes to individual tutoring sessions across all disciplines;

- Science Centers that provide help through group and individual tutoring; and

- Technology Centers that support computer application coursework and special software needs for a variety of courses.

Disability Support Services. College staff report that developmental education often serves students receiving disability support services (DSS). Unlike the K-12 public school system that makes available students' individualized education plans to instructional personnel, students are required to self-identify as needing accommodations authorized by DSS in higher education. DSS authorized accommodations can include additional time, tutoring, and other services.

College staff report that developmental education instructors often encourage conversations with students with disabilities after the first assignment if they have not identified their accommodation need. While College staff cannot ask students if they have a disability or approved accommodation, if a student identifies an accommodation need, the instructor can direct them to meet with DSS. Moreover, it is advantageous that students with disabilities connect with DSS when they initially enroll at the College to secure accommodations since DSS accommodations are not retroactive.

Student Development Seminars. The College offers the following one or two semester credit courses designed to assist students in developing their education plans and skills for college success:

- Study Habits Development
- Career Development
- First Year Seminar
- Seminar - International Students
- Success Group
- Memory Development
- Building Math Confidence
- Portfolio Development Seminar

Summer Bridge Programs. The College also offers a number of summer bridge programs that serve a cross-section of students. These include the six-week Biomedical Pre-Freshman Summer Bridge Program, the three-week GT STEP Pre-Freshman Summer Bridge Program for students who plan to become STEM majors, and the two-week summer orientation Bridge to College Success Program where students complete the one credit First Year Seminar course (DS 107) over the summer.   Students who successfully complete the later summer bridge program with a grade of C or higher in DS 107 are not charged tuition for this course.

Learning Communities. The College hosts a number of learning communities aimed at enhancing student engagement and academic success. These include several honors programs (e.g. Macklin, Renaissance, Montgomery Scholars), a few communities for at-risk students described under Other Supports below, and a few communities that explicitly serve developmental students by pairing enrollment in First Year Seminar course (DS 107) with enrollment in a developmental reading, writing, and/or math course among students co-enrolled in both courses.

Other Supports. Montgomery College also provides additional supports to students via its -

- Boys to Men Mentoring program aimed at improving the retention of African American/Black male students;

- Combat to College Program at the Rockville campus that provides support for students who are veterans; and

- TRIO Support Services that help low-income, first generation, and/or disabled students remain in school until graduation or transfer to a four-year college or university.

New Requirements under Senate Bill 740. Finally, SB 740 mandates that community colleges offer enhanced counseling services to students, particularly students enrolled in developmental education, and also requires that students complete credit-bearing gateway courses earlier in their community college tenure. More specifically:

- Community colleges must identify pathway systems to graduation for degree seeking students. These pathways must include benchmarks for academic majors and the general education program for undeclared majors.

- Benchmarks must include credit and course criteria that equate to satisfactory progress to a degree; review with advisor of benchmarks as a scheduled event; and students falling behind must see an advisor before registration occurs for the next school term.

And for students enrolled in developmental education courses, SB 740 requires:

- First-time degree-seeking students to enroll in credit-bearing math and English courses with in the first 24 credit hours.

- Degree-seeking students in developmental courses in math, reading or English must enroll in the credit-bearing course (i.e. gateway course) in the semester immediately following completion of their developmental sequence.

These additional student requirements are especially significant for students needing to complete multiple courses in multiple subjects to complete their developmental education sequences.

Chapter 5:   Promising Practices in Developmental Education and Local Practices

This chapter describes promising practices in developmental education and their alignment to local practices administered by Montgomery College. Until recently, there has been little research to document promising practices in developmental education. However, over the past decade, new research has begun to take a more rigorous approach to analyzing developmental education and identifying promising practices for community colleges. The promising practices identified in the research and reviewed in this chapter are summarized in Table 5-1 below.

Table 5-1: Promising Practices in Developmental Education

Category	Promising Practice
A. Avoidance Models for High School Students	• Align high school benchmarks with college expectations of college-readiness • Dual enrollment and early college programs • Early assessments and transitional courses • Summer bridge programs
B. Assessment and Placement Practices	• Multiple measure assessments • Preparation for placement tests
C. Acceleration and Instructional Practices	• Accelerated courses • Modularized courses and mastery learning • Mainstreaming • Contextualized instruction • Learning communities
D. Supplemental Student Supports	• Tutoring • Advising • Student success courses

Of note, while research has identified several promising strategies that promote achievement for developmental learners, research also suggests that the collective implementation of these promising practices will **not** dramatically increase outcomes in developmental education. Most researchers and advocates suggest that a more transformational shift in developmental education is required to dramatically improve outcomes.[39]   Nevertheless, the promising practices described in this chapter offer a start point for improving practices and student outcomes in developmental education.

OLO finds that Montgomery College currently implements in whole or in part the vast majority of the promising practices reviewed in this chapter. Moreover, the College is poised to deliver more promising practices as it implements new requirements mandated under the Maryland College- and career-readiness and College Completion Act of 2013 (SB 740). Additional opportunities for the College to align with promising practice include aligning its benchmarks for college-readiness with MCPS' expectations, using multiple measures to assess student need for remediation, and offering contextualized learning opportunities for developmental students to enhance student engagement and performance.

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[39] See Core Principles for Transforming Remedial Education by the Charles A. Dana Center at the University of Texas at Austin, Complete College America, Education Commission of the States and Jobs for the Future - http://www.jff.org/sites/default/files/publications/RemediationJointStatement-121312update.pdf.

A.   Avoidance Models for High School Students

If a student can be prepared for college-level coursework prior to enrolling in higher education, developmental education can be avoided. A description of promising practices that help students avoid the need for remediation in college follows.

1.   Align High School Benchmarks with College Expectations for College-readiness

Promising Practices: Although producing college- and career-ready high school graduates serves as the penultimate goal of educational reform, no uniform standards defining college- and career-readiness exists. For some institutions, college- and career-readiness refer to completion of a high school curriculum that prepares students for higher education and entry into middle-skill careers. Such a curriculum may include mastery of Algebra II, Trigonometry and/or Calculus and two to three years of a foreign language. And for other institutions, college- and career-readiness refers to cut scores on the SAT, ACT or other standardized assessments regardless of high school courses.

Given the variance in defining college-readiness and the potential for high schools and institutions of higher education to have differing expectations of college-readiness, some community colleges have partnered with their feeder K-12 school systems to align their curriculums. For example, Harper College (IL) has partnered with three of its local school systems to align their curriculums and expectations of college-readiness.[40]

As a result of Harper College's partnerships with its feeder school systems, instructors across both systems realized that high school graduates completing a math course during their senior year were less likely to need remedial math. This partnership also developed a common final exam of Algebra II across school systems, which if completed during a student's senior year guarantees that the student will be ready for college-level math at Harper College. Between 2010 and 2012, math remediation rates at Harper College declined by 12 percentage points.[41]

Local Practices: There is little consistency between the MCPS' and the College's expectations for college-readiness when it comes to high school coursework.   For example, although MCPS requires that students complete four credits of math in order to graduate and also tracks the percentage of students completing Algebra II with a C or above as a measure of college-readiness, neither of these practices align with the College's expectations for college-readiness in math. This is evidenced by research that found that completion of Pre-Calculus and Calculus courses were often necessary for MCPS graduates to earn high enough scores on the Accuplacer to enter college-level math courses at Montgomery College. [42]

The disconnect between coursework expectations of college-readiness in math between MCPS and the College is also evidenced among College faculty who report that MCPS graduates who have completed Algebra II generally test into developmental math at the Algebra I level based on their Accuplacer scores. Yet, MCPS' and the College's college-readiness expectations based on students' performance on the SAT (1,650 or above), ACT (24 or above), and the Accuplacer are aligned.

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[40] See Joshua Wyner, What Excellent Community Colleges Do, Chapter 2 – Equity and Developmental Education: Confronting the Tension Between Access and Success, pages 56-57
[41] Ibid
[42] See 2012 dissertation of Erick Lang (MCPS Associate Superintendent of Curriculum and Instruction) at http://aladinrc.wrlc.org/bitstream/handle/1961/11066/Lang_american_0008E_10262display.pdf?sequence=1

2.   Dual Enrollment and Early College Programs

Promising Practices: Dual enrollment programs allow students to enroll in college courses and earn college credit while they are still high school. While the requirements and course options vary greatly, nearly every community college in the country offers opportunities for high school students to take courses for college credit.

The Center for Community College Research (CCRC) at Columbia University estimates that about 4% of high school students utilize dual enrollment.   One CCRC study found that participants in dual enrollment programs were less likely to need developmental education and were more likely to graduate from high school, to transition to a four-year college, and to persist in postsecondary education. [43]   This CCRC study and others have also found favorable impacts of dual enrollment programs among under-represented students (e.g. Black, Latino, and low-income students).[44]

Unlike many dual enrollment programs, the intent of early college programs is to increase the opportunity for under-served students (e.g. low-income/first generation students) to earn a post secondary credential. Toward this end, early college programs provide dual enrollment opportunities and additional supports to students for high school and college courses. Although a recent evaluation of early colleges did not find a statistically significant difference in the need for developmental math among students, those who enrolled in early colleges had higher graduation rates, college enrollment, and degree attainment rates than comparison students.[45]

Local Practices: There are two dual enrollment opportunities at Montgomery College for MCPS high school students, but neither focuses on serving students who would be placed into development education. The Early College Program at Montgomery College and the College Institute at Kennedy, Gaithersburg, Seneca Valley, and Wootton high schools serve high-achieving high school juniors and/or seniors.[46] For example, student applications to the College Institute require scores of 550 on each SAT section or an equivalent score on the ACT or Accuplacer. SB 740 requires MCPS and other K-12 systems to pick up most of the tab for dual enrollments among Maryland's community colleges for up to four college courses.

3.   Early Assessments and Transitional Courses

Promising Practices: With early assessments, high schools use community college placement tests to assess the college-readiness of students while they are still in high school.   Early assessment programs are generally developed collaboratively by colleges and high schools.   For example, two early assessment tests, California's Early Assessment Program and El Paso's College-Readiness Initiative, were developed collaboratively and have yielded positive results on student achievement that include reductions in the demand for developmental education. [47]

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[43] See Broadening the Benefits of Dual Enrollment Reaching Underachieving and Underrepresented Students with Career-Focused Programs http://ccrc.tc.columbia.edu/media/k2/attachments/broadening-benefits-dual-enrollment-rp.pdf

[44] See Early College, Early Success: Early College High School Initiative Impact Study, American Institutes for Research, http://www.air.org/sites/default/files/downloads/report/ECHSI_Impact_Study_Report_Final1_0.pdf

[45] Ibid

[46] See Early College Program description at http://cms.montgomerycollege.edu/edu/department.aspx?id=23873 and College Institute description at http://www.montgomeryschoolsmd.org/schools/woottonhs/programs/collegeinstitute/

[47] See Reshaping the College Transition: States That Offer Early College Readiness Assessments and Transition Curricula http://ccrc.tc.columbia.edu/publications/reshaping-the-college-transition-state-scan.html

High schools offering early assessments tend to pair this practice with transitional courses aimed at improving the college-readiness of students identified as needing remediation. Transitional courses are usually supplemental to a college-prep curriculum and are offered in the student's junior or senior year of high school. The intent of transition courses is to reduce the demand for developmental education in college. Several jurisdictions have implemented transitional courses, including:

- West Virginia, which has developed Transition Mathematics and English for Seniors courses statewide;

- The Tennessee SAILS (Seamless Alignment and Integrated Learning Support) program that introduces the developmental math curriculum to high school seniors; and

- A Kentucky Senate bill that requires schools to provide a transitional course or monitored interventions to every student not meeting college-readiness benchmarks in English or math.

Local Practices: MCPS currently offers early assessments via the High School Accuplacer Program. This program tests MCPS students with the Accuplacer Diagnostic and then offers interventions to students who score below college-readiness levels in 11 high schools. These online tutorial interventions offered via Pearson's My Foundations Lab, however, fall short of the goals and scope of transitional courses.

Under SB 740, MCPS and other Maryland school systems must develop transitional courses for seniors in need of them by 2016-17. Maryland high schools must implement early assessments for high school juniors by 2015-16 and reassess them as seniors after completion of their transition course(s). SB 740 forbids transition courses from precluding or replacing courses required for high school graduation.

4.   Summer Bridge Programs

Promising Practices: Similar to transitional courses, summer bridge programs provide students who need developmental education the opportunity to complete developmental coursework before the start of their first fall term in college. Summer bridge programs typically provide students the opportunity to complete their developmental math or English requirements over the summer by combining an accelerated remedial course with substantial academic support. Summer bridge programs can also focus on increasing students' comfort with the college environment and familiarity with the pace of college-level instruction. Some bridge programs, like the Community College of Denver, combine the bridge program with a dual enrollment program.

Summer bridge programs have been utilized at four-year colleges for awhile and have been implemented at many community colleges more recently. Yet, there is only limited, non-experimental research describing the impact of summer bridge programs among community college students. For example, in a study of eight developmental summer bridge programs, Texas researchers found that the programs had a positive impact on introductory college-level course completion in math and writing in the year and a half following the program, but these effects were not statistically significant at the end of two years.[48]

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[48] See Bridging the Gap: An Impact Study of Eight Developmental Summer Bridge Programs in Texas http://www.mdrc.org/sites/default/files/full_629.pdf

Local Practices: Montgomery College offers a number of summer bridge programs that include a cross-section of students. These include the six-week Biomedical Pre-Freshman Summer Bridge Program, the three-week GT STEP Pre-Freshman Summer Bridge Program for students who plan to become STEM majors, and the two-week summer orientation Bridge to College Success Program where students complete the one credit First Year Seminar course (DS 107).

Developmental students can participate in the Bridge to College Success program at no cost to them if they earn a C or better in DS 107. Unlike the typical summer bridge program that includes remedial coursework in math, reading, or English, the College's summer bridge program for recent high school graduates instead focuses on exploring career goals, developing education plans, learning time management, and developing other skills critical to student success.

B.   Assessment and Placement Promising Practices

Almost all community colleges use standardized tests to determine the college-readiness of students and their course placements. A review of the research, however, finds that two practices often result in more accurate assessments of college-readiness that diminish the demand for remediation and improve student outcomes: (1) use of multiple measures to assess college-readiness; and (2) preparation for standardized assessments. A summary of these two promising practices follows.

1.   Multiple Measure Assessment

Promising Practices: The accurate assessment and placement of students into developmental education is essential to students' success at community colleges. According to studies cited by the Community College Research Center (CCRC) at Columbia University, the two most used assessment tests, the ACCUPLACER and COMPASS, misplace 33% and 27% of students, respectively.

Some community colleges are expanding their course placement process to include a review of a student's SAT/ACT scores, high school grades, class rank, and placement scores. For example, the states of California, Mississippi, and South Dakota all can review high school performance, SAT/ACT scores, placement testing, and special interests and skills for course placement decisions in their community colleges.

Another approach being used by some colleges is self-placement. For example, at Shasta College (OR), students take customized math placement tests and review their results with a faculty member. Students then make their own choices about which math classes to take.[49]

Assessing the cognitive and non-cognitive skills that impact student achievement is another approach to assessing college-readiness. For example, students at the Community College of Vermont take standardized assessments to measure their academic skills and self-assessments about their attitudes to inform their course placement decisions. Students meet with their advisors to discuss the results of both assessments before selecting the core content classes that are most appropriate for them.

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[49] http://www.shastacollege.edu/Student%20Services/Enrollment%20Services/Assessment/Pages/12251.aspx

Although there are few evaluations of multiple measure approaches, researchers at CCRC have found that the use of multiple measures often results in more effective course placements. [50] More specifically, they have found that high school GPAs were a more accurate measure for course placement and a better indicator of performance than standardized assessments.

Local Practices: Aligning with MHEC regulations that establish common cut scores among community colleges for determining course placements, Montgomery College has relied on the Accuplacer and equivalent standardized test scores (SAT and ACT) to determine course placements among first-time college students rather than multiple measures.

To the extent that Montgomery College has utilized multiple measures, it has been limited to the appeal process where students can request a "review of placement" with the appropriate departmental chair if they are dissatisfied with their course placement based on the Accuplacer. During this review, other evidence of students' college-readiness can be considered, such as high school transcripts and samples of prior coursework.

Recently, the College has also begun a pilot project where the Math Department reviews the high school transcripts of incoming students to determine their college-readiness in math. College leadership reports that it has recently asked the English and Reading Department to consider implementing a similar pilot transcript review process to determine college-readiness in these fields.

2. Preparation for Placement Tests

Promising Practices: Community colleges can provide additional supports for students preparing to take a placement exam such as prep classes, tutorials, and practice exams. Some examples include:

- Cuyahoga Community College (OH) that implemented mandatory test review courses for students in math and English; and

- Santa Monica College (CA) that offers Prep2Test, an online orientation that describes the content and format of assessment tests.

Research shows that most programs that provide test preparation supports target students who are re-taking a placement exam after initial failure. One study from a North Carolina community college found that of all the students who took the review course before re-testing, 60% of students tested at least one level higher in the developmental reading and English sequence and 35% of students tested at least one level higher in the developmental math sequence.[51]

Local Practices: Montgomery College offers several supports for students taking the Accuplacer or re-taking it to improve their scores. For example, on its website, the College offers online study materials for students including an Accuplacer preparation guide, online test preparation program, math preparation tips, and the College Board Accuplacer website link.

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[50] Assessing Developmental Assessment in Community Colleges, CCRC Working Paper No. 19 http://ccrc.tc.columbia.edu/Publication.asp?UID=856 and Do High-Stakes Placement Exams Predict College Success?, CCRC Working Paper No. 41 http://ccrc.tc.columbia.edu/Publication.asp?UID=1026 and Predicting Success in College: The Importance of Placement Tests and High School Transcripts, CCRC Working Paper No. 42 http://ccrc.tc.columbia.edu/Publication.asp?UID=1030.
[51] Developmental Strategies for College Readiness and Success http://www.ecs.org/docs/DevEdStrategies.pdf

The College also offers the Accuplacer Advancer, an online tutorial to review skills in any of the Accuplacer subject areas.   Students who enroll in the Advancer take the diagnostic test(s) first before meeting with a counselor to develop a personalized online tutorial program to improve needed skills. After the student completes the Advancer, they can retake the Accuplacer.

Finally, the College offers Fast Track math courses that provide intensive reviews to help place students into a higher math course than tested into via the Accuplacer. Two courses are offered:

- Basic Fast Track that covers Pre-Algebra and Elementary Algebra topics (Algebra I); and

- Advanced Fast Track that covers Elementary and Intermediate Algebra topics (Algebra II).

According to College staff, students completing these test preparation options typically are placed into higher level/intermediate developmental courses after completing them.

C.   Acceleration and Instructional Models

The time it takes for a student to progress through developmental education can be a deterrent for participation. As a result, community colleges have placed an emphasis on helping students progress more quickly through the developmental sequence into college-credit coursework. The following summarizes promising practices to accelerate students through developmental coursework.

1.   Accelerated Courses.

Promising Practices: Accelerated courses allow students to take developmental education courses in a compressed time frame, usually in the summer or in half a semester during the regular school year. In many community colleges, two levels of a developmental education subject are offered together and run back to back within the same semester, allowing students to complete both courses within one semester. Three examples of accelerated programs with promising trends follow:[52]

- *The FastStart Program at the Community College of Denver*. Students in the FastStart program were more likely to complete gatekeeper math than students in the traditional developmental course sequence due to higher enrollment rates in gatekeeper math among those who participated in FastStart. There was, however, no statistically significant difference in pass rates between FastStart and traditional students.

- *The Accelerated English Program at Chabot College.* The program showed results similar to the FastStart program - Chabot's accelerated students were more likely to complete their gatekeeper English course than students who completed the traditional developmental education sequence due to higher enrollment rates.

- *City University of New York's (CUNY) Community Colleges*. CUNY students in the fast-track sequences were more likely to enroll in and complete gatekeeper courses. In math, fast-track students were equally likely to pass the gatekeeper course but accrued less college-level credits. Fast-track writing students enrolled in gatekeeper English were less likely to pass than students from the traditional track but accrued more college-level credits.

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[52] See Unlocking the Gate http://www.mdrc.org/sites/default/files/full_595.pdf for a more detailed description.

Local Practices: Montgomery College offers students accelerated paths through each developmental subject area. For example, students in developmental English class ENGL 001 that earn a grade of B or better can bypass ENGL 002 and go directly to ENGL 101 or 101A. Similarly, students in developmental reading class READ 095 that earn an A in this course can bypass READ 099 if they also achieve an ENGL 101 assessment level for English and the consent of the department.

The College also offers two accelerated paths in math. First, students can proceed through MATH 094 within one semester rather than two since this is a self-paced course. And students eligible for MATH 97 can enroll in an accelerated course that combines developmental Intermediate Algebra with college-level math via the five hour MATH 115A/116A course that meets the math requirement for general studies majors at the College.

2.   Modularized Courses/Mastery Learning.

Promising Practices: Modularized courses divide a traditional semester-long course into distinct learning units (modules). Each module addresses and improves a particular skill or competency. Modules have become increasingly used throughout the country, particularly in math developmental education. The state of Virginia underwent a developmental math redesign that turned a single developmental education course (with four or five credits) into one-credit modules requiring students to take only those modules that they needed based on the results of an assessment.

The limited research on modularization finds increases in pass rates for developmental and college-level courses as well as gains in students' grade point averages and their persistence in school. One 2008 study of a modularized program at the Cleveland State Community College (CSCC) by the National Center for Academic Transformation reported that the changes at CSCC led to improvements in students' learning and retention.[53]

Mastery learning is defined as dividing the curriculum into manageable units and testing students on each unit to ensure that they have mastered the content before they move on to another unit. Students who use mastery learning usually have individualized instruction and ongoing feedback, which enable students to learn at their own pace and to monitor their performance.

Local Practices: Montgomery College redesigned its developmental math curriculum to exemplify the modularized coursework and mastery learning approach. All developmental math courses are self-paced internet-based modules that can be completed wherever a student has a computer. Students can begin at whichever module they test into and, if the student stops coursework, they can resume from whichever module was last passed. Classes are also mastery based – students must meet an 80% performance threshold before they can move to the next level.

3.   Mainstreaming

Promising Practices: Mainstreaming refers to the process of enrolling developmental students into college-level classes to accelerate their progress. Mainstreaming can take a variety of forms including offering a traditional course with a modified curriculum over a longer period of time and providing supplemental supports, such as tutoring or additional class periods, for developmental students who are mainstreamed.

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[53] http://www.ecs.org/docs/DevEdStrategies.pdf

The Accelerated Learning Project (ALP) at the Community College of Baltimore County (CCBC) is a national model for using mainstreaming to enhance the writing skills of developmental students. ALP places students who score near the college-level cut point on writing assessments into college-level writing courses with college-credit students. ALP also enrolls both set of students into a companion writing course that provides extra academic support as is taught by the same instructor.

In a rigorous evaluation, CCRC researchers found that developmental students who participated in ALP completed more college-level courses in English, enrolled in and completed additional college requirements, and attempted college courses at higher rates than non-ALP students.[54] They also found that ALP students were more likely to persist to the next year than non-ALP students and that ALP offered a significantly more cost-effective pathway through the required college-level English courses than the traditional developmental sequence as measured by cost per successful student.

Local Practices: Montgomery College's Advancement to College English (PACE) program is modeled after the ALP. Established in spring 2011, the PACE program places qualified developmental students (students with Accuplacer English scores between 80-89, reading scores of 79 or higher, and reviewed writing samples) into special sections of English 101A. With a reduced class size (18 v. 22 students), an in-class tutor, and traditional students alongside developmental students, the goal is to accelerate developmental education but still provide support. According to College staff, PACE has also yielded improved student performance.

4. Contextualized Instruction

Promising Practices: Contextualized instruction combines instruction in developmental education with content that is relevant to the students. For example, a course could combine instruction in developmental reading, English, or math with career and technology education. Contextualized instruction can be delivered in a variety of ways including relating subject matter to real world applications and allowing students to solve relevant problems.

The best known and successful application of contextual learning is Washington State's I-BEST program (Integrated Basic Education and Skills Training). In this model, basic skills instructors and technical faculty jointly teach college-level occupational classes that admit developmental education students. Researchers have found that students in the I-BEST program were significantly more likely to advance into credit-bearing courses, persist in college, earn credits that counted toward a credential, earn an occupational certificate, and make learning gains on basic skills tests.[55]

Other contextualized learning programs that modulate math instruction based on students' interests and/or long term goals include:

- The New Mathways Program (NMP) in Texas that offers three math pathways based on students' degree goals: statistical reasoning, quantitative reasoning, and STEM preparation.
- The Colorado Community College System (CCCS) mathematics sequence that places students in one of two pathways based upon their planned program of study: algebra-based or statistics or quantitative reasoning.

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[54] See http://ccrc.tc.columbia.edu/media/k2/attachments/remedial-english-alp-effective-affordable.pdf
[55] I-BEST: New Evidence of Effectiveness http://ccrc.tc.columbia.edu/publications/i-best-new-evidence.html

Local Practices: Montgomery College is considering offering a statistics pathway to completing the college-level math requirement (Statway), but it is not currently offered. Montgomery College has two I-BEST programs in apartment maintenance and certified nursing assistance. Both WDCE administered programs, however, focus on pre-developmental education (adult education/basic skills) students rather than developmental students.

5.   Learning Communities

Promising Practices: Learning communities refer to groups where students enroll in two or more courses as a cohort and provide support for one another. A developmental learning community often combines two courses, such as developmental writing and reading or a developmental math and student success course. Learning communities can also foster social integration into the college, particularly among community college students who are often part-time students and/or commuters.[56]

Overall, researchers have found the effects of learning communities have been modestly positive. The more comprehensive learning community programs have resulted in positive impact on student engagement, college persistence, credits earned, and developmental course sequence completion in English. Programs that were less comprehensive had no effect on students.

Local Practices: Montgomery College hosts a number of learning communities aimed at enhancing student engagement and academic success. These include several honors programs (Macklin, Renaissance, Montgomery Scholars) and a few communities for at-risk students (TRIO, Boys to Men, and Young Mothers Groups). The College also offers learning communities that explicitly serve developmental students. These learning communities combine student enrollment in the First Year Seminar (DS 107) with enrollment in developmental reading, writing, and/or math courses.

D.   Promising Practices for Supplemental Student Supports to Developmental Education

Students who place into developmental education generally begin college more academically under prepared than the general population of students. To address these barriers to academic success, many colleges offer academic supports, such as tutoring or computer tutorials. While there is limited research available on comprehensive academic supports, there are several promising models that focus on select support services which have shown some encouraging results. This section summarizes those practices.

1.   Tutoring

Promising Practices: Tutoring programs have been established in many community colleges to assist developmental students. Tutoring can be offered by faculty, staff, peers, or via computer. A more focused approach to tutoring, referred to as supplemental instruction, is increasingly used among community colleges. Supplemental instruction is a structured tutoring model that links to specific developmental education courses. There is, however, little rigorous evidence on the success of either generalized tutoring or supplemental instruction programs for developmental students.

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[56] See Montgomery College's Unprepared Students: Their Progression to College-level Courses http://cms.montgomerycollege.edu/WorkArea/DAsset.aspx?id=27260.

Local Practices: Montgomery College operates Reading, Writing, Math, and Science Centers at each of its campuses that provide educational and support services, including group lessons, computer tutorials, and individual tutoring. The goals of each center are "to give students the tools, skills, and confidence they need to succeed in college and beyond."

2.   Advising

Promising Practices: Research indicates that more intensive advising models can improve the success of developmental students. Lower advising caseloads allow for more personalization and attention to individual students and can lead to more achievement. Research also indicates that conducting mandatory advising sessions with developmental students can positively impact achievement.

Local Practices: Montgomery College is moving toward a more effective tracking and more intrusive approach to advising students by providing early academic advising and support to students. Two features of this approach include an online student tracking system (Starfish) and the piloting of an early intervention system for struggling students. The online tracking system allows students and staff members to signup for appointments, view support networks for courses, receive referrals and other messages, and review academic plans. The College also requires that faculty serve as advisors to first year students who have earned less than 24 credits.

SB 740 also requires that the College enhance its advising and counseling services to students by: identifying pathway systems to graduation for degree-seeking students that include benchmarks for academic majors and the general education program for undeclared majors; and setting benchmarks that equate to satisfactory progress to a degree and reviewing student progress on these benchmarks with an advisor before registering for the next school term. As the College implements these additional requirements, its advising practices will more directly align with promising advising practices in developmental education.

3.   Student Success Courses

Promising Practices: Student success courses have become one of the most popular support interventions among community colleges nationally. Sometimes called "student development," or "new student orientation" courses, student success classes are generally offered to introduce new students to college life, help them learn about their college's services, and give them academic tools.

Student success courses are often designed to help a student to "learn to learn." Course topics can include note taking, group- and self-study, test taking, time management, and successful education habits. Some community colleges take a broader approach and review broader content on career exploration and planning, college culture and expectations, and life skills such as personal finance.

Local Practices: Montgomery College offers a number of student success courses via its First Year Experience Program (FYE) that help prepare students for college life. The FYE Program includes:

- Academic advising;
- New Student Orientation;
- First Year Seminar about adjusting to college (including academic and student services available) for domestic and international students;

- Other student development courses such as Memory Development, Study Skills, Career Development, Success Group, and Building Math Confidence;

- Development of an education plan; and

- Other activities and programs such as mentoring, leadership training, student government, clubs, service learning, career and transfer exploration, workshops, and podcasts.

E.   Summary of Alignment of Promising Practices and Local Practices

Research has identified several promising strategies that promote achievement among developmental learners in higher education. However, it is important to note that the research suggests that the collective implementation of these promising practices is *not* expected to dramatically increase outcomes in developmental education. Nevertheless, these practices are a start while research continues to identify more effective measures to enhance developmental education.

The table on the next page summarizes the alignment between the promising practices in developmental education and Montgomery College's practices.   Overall, Montgomery College's practices in whole or in part align with 13 of the 14 promising practices identified in this chapter's review. More specifically, Montgomery College's practices:

- Fully align with the following eight promising practices:

  o   Preparation for placement tests via the Advancer and Fast Math programs;
  o   Accelerated courses and opportunities in math, English, and reading;
  o   Modularized courses and mastery learning in math;
  o   Mainstreaming in college-level English courses with supports;
  o   Tutoring in all subject areas;
  o   Advising for first year students that will increase under SB 740;
  o   Student success courses across several topics; and
  o   Learning communities that combine course enrollments for developmental students.

- Partially align with the following five promising practices:

  o   Alignment between high school and college expectations for college-readiness because test score expectations align but course work expectations do not;
  o   Early assessment and transitional courses because MCPS does not yet offer a transitional course for student testing below college-readiness levels;
  o   Multiple measure assessments because the use of more than standardized test scores to determine developmental course placement is not systematic;
  o   Contextualized instruction because the College's current efforts do not address the needs of developmental students; and
  o   Summer bridge programs that serve developmental students but do not include developmental courses.

- But does not align with only one of the promising practices – dual enrollment and early college programs – because the College excludes developmental students and/or students at-risk of remediation from these programs.

Table 5-2: Alignment between Promising Practices in Developmental Education and Montgomery College's Practices

Promising Practice	Current Local Practice	Alignment Status
Align HS Benchmarks with College Expectations of College-readiness	MCPS milestones for college-readiness include Algebra II by Grade 11 and high test scores on the SAT/ACT	Partial, test milestones align but not course taking milestones
Dual Enrollment and Early College Programs	Early Placement Program College Institute	No, does not serve developmental students
Early Assessments and Transitional Courses	Accuplacer Diagnostic and My Pearson Lab Intervention at 11 MCPS high schools	Partial but will become yes with SB 740 implementation
Summer Bridge Programs	Bridge to College Success, GT STEP Summer Bridge, Biomedical Scholars	Partial, does not include developmental courses
Multiple Measure Assessments	Accuplacer cut scores and equivalents, review of placements, and pilot efforts in math course placements	Partial, multiple measures not systematically used
Preparation for Placement Tests	Online resources, Accuplacer Advancer and Fast Track courses	Yes
Accelerated Courses	Opportunities to skip intermediate reading and English courses with high grades in lower level courses	Yes
Modularized Courses and Mastery Learning	Modularized and mastery based Math Preparation curriculum	Yes
Mainstreaming into College-level Courses	PACE English course	Yes
Contextualized Instruction	I-BEST Program in apartment maintenance and certified nursing assistance for basic skills students	Partial, need to develop contextualized learning for developmental students
Learning Communities	Honors, at-risk, and developmental learning communities	Yes
Tutoring	Math/Science Centers; Writing and Language Centers	Yes
Advising	Starfish to support advising and counseling	Yes
Student Success Courses	Student development courses	Yes

Chapter 6: Summary of Findings and Recommendations

The County Council tasked the Office of Legislative Oversight to undertake this project to improve their understanding and oversight of developmental education at Montgomery College that prepare students for college-level coursework. This report describes: the demand for remedial courses at Montgomery College; the policy drivers that shape demand; the College's developmental education programs, costs and outcomes; and the alignment between local practices and promising practices for improving outcomes in developmental education.

Overall, OLO finds that while the College has revamped its developmental education programs and services and the vast majority of the College's practices align with promising practices, outcomes among students enrolled in remedial courses at the College remain low, particularly in math. OLO also finds that the College's primary reliance on testing data to determine remediation need may overstate the need for developmental education, particularly among students who have completed a college-prep curriculum in high school. To improve local outcomes in developmental education, OLO offers two recommendations for College action: utilize multiple measures of performance to more accurately determine the actual need for remediation and coordinate with MCPS to create common, end of course assessments that demonstrate college-readiness in math.

A detailed description of OLO's eight key findings and two recommendations follows.

A. Report Findings

FINDING #1: Most students new to Montgomery College place into developmental math and about a third place into developmental English or reading. Remediation rates are higher among recent graduates and Black and Latino students.

In 2011, 4,021 new non-American English Language Program (AELP/non-ESOL) students enrolled in Montgomery College. Of this total:

- 73% were assessed as requiring math remediation;
- 35% were assessed as requiring English remediation; and
- 29% were assessed as requiring reading remediation.

As a consequence, these students were required to complete one or more developmental courses before they could enroll in: (a) credit-bearing courses that meet their general education requirements for higher education credentials; and/or (b) other college-level, credit-bearing courses that required placement in English 101 – the gateway English course.

The demand for developmental education at Montgomery College was particularly high among **recent high school graduates** who accounted for 67% of all new non-AELP students in 2011:

- 79% were assessed as requiring math remediation compared to 60% of older students;
- 38% were assessed as requiring English remediation compared to 28% of older students; and
- 32% were assessed as requiring reading remediation compared to 22% of older students.

Higher remediation rates among new graduates at the College parallel state and national data describing remediation rates among community colleges. National estimates suggest that 58-68% of recent graduates at community colleges require some remediation. And according to the Maryland Higher Education Commission, 71% of new high school graduates required remediation among all community colleges in Maryland.

The demand for developmental education was also particularly high among **Black and Latino students** who accounted for 44% of all new non-AELP students at the College in 2011:

- 82% of Black students and 87% of Latino students were assessed as requiring math remediation compared to 56% of Asian students and 59% of White students;

- 42% of Black students and 50% of Latino students were assessed as requiring English remediation compared to 29% of Asian students and 21% of White students; and

- 37% of Black students and 43% of Latino students were assessed as requiring reading remediation compared to 25% of Asian students and 15% of White students.

FINDING #2:   **A majority of developmental students at Montgomery College are enrolled in the lowest level remedial courses.**

Students requiring developmental education at Montgomery College are placed into either lower or intermediate level remedial courses based on their placement scores by subject area. As noted below, a majority of developmental students are enrolled in the lowest level courses. More specifically, 55% of developmental English students and 57% of developmental math students are enrolled in the lowest level remedial courses compared to 35% of developmental reading courses. Without course acceleration, a majority of developmental students at the College must complete two or more non-credit courses before they can begin credit-level courses in their remediated subjects.

Table 6-1: Developmental Courses at Montgomery College and 2013 Enrollment

Name of Courses	Course Numbers	2013 Enrollment	Share of Enrollment
Reading			
College Reading Skills I	RD 095	810	35%
College Reading Skills II	RD 099	1,479	65%
English			
Basic English I	EN 001	1,429	55%
Basic English II	EN 002	1,165	45%
Mathematics			
Mathematics Preparation I/II (Pre-Algebra and Algebra I)	MATH 094	6,042	57%
Intermediate Algebra (Algebra II)	MATH 097; MATH 099	4,459	43%

FINDING #3: The College's remediation rates may overstate the need for remediation.

Among students new to higher education who have not completed a college-level course in math, English, or reading, the Maryland Higher Education Commission requires Montgomery College and other community colleges in the state to use the common rubric below to assign incoming students to developmental courses. Unlike four-year public colleges, most developmental placement decisions among Maryland community colleges rely exclusively on standardized test scores (e.g. Accuplacer).

Table 6-2: Developmental Courses at Montgomery College and Accuplacer Placement Scores

Name of Course	Course Number	Accuplacer Score
Reading		
College Reading Skills I	RD/READ 095	53-65
College Reading Skills II	RD/READ 099	66-78
English		
Basic English I	EN/ENGL 001	0-79
Basic English II	EN/ENGL 002	80-89
Mathematics		
Mathematics Preparation I/II (Pre-Algebra and Algebra I)	MATH 094/080	0-61
Intermediate Algebra (Algebra II) for o Liberal Arts	MATH 097/093	62-120
o Business, Elementary Education, & STEM majors	MATH 099/096	

Yet research from the Community College Research Center (CCRC) suggests that developmental placements based on test scores alone overstate the actual need for remediation or level of remediation needed. For example, the CCRC has found that remedial placements based exclusively on test scores assign between a quarter to a third of students into remedial courses who could have passed college-level courses with a grade B or better. CCRC studies have also found that:

- Using students' high school grade point averages and transcripts instead of placement tests were predicted to reduce placement error rates in half;

- Giving students the opportunity to use the best of their placement test or high school grade point averages to determine remediation needs increased college-level coursework and completion rates; and

- Ignoring remedial coursework recommendations and enrolling directly into college-level courses enhanced the success rates of students.

Placement tests alone may offer an insufficient picture of students' readiness for college-level courses because students often "just show up" to take these tests rather than prepare for them. Local graduation requirements and course taking data suggest that most Montgomery College students likely completed a college-prep curriculum in high school that included Algebra II. Thus, the use of multiple measures such as high school transcripts and grade point averages to assess college-readiness would likely lower the demand for remediation and developmental courses at the College.

FINDING #4:   New testing and proposed performance requirements in Maryland will likely reinforce the demand for developmental education at Montgomery College.

New testing and performance requirements, codified under state laws and proposed regulations to implement the Common Core State Standards (CCSS) and the Maryland College- and career-readiness and Completion Act (Senate Bill 740), will likely reinforce the local demand for remediation.

With Maryland's adoption of the CCSS, school systems across the state now require that this year's 9th and 10th grade students must pass two new assessments in order to graduate: PARCC assessments for Algebra I and English 10. State and local officials anticipate that the proportion of students passing the new PARCC assessments aligned with college-ready levels of performance will likely be lower than the proportion of students deemed proficient on High School Assessments, which a vast majority of students passed.

Starting in 2015-16, SB 740 also requires that school systems assess the college-readiness of students by the end of Grade 11. Toward this end, MSDE has recommended the use of two PARCC exams in Algebra II and English 11 to assess college-readiness among 11th graders. MSDE further proposed that students earning less than a score of 4 on either assessment will be deemed "non-college-ready" and will enroll in "transitional courses" aimed at improving their college-readiness as seniors. MSDE also proposed that students passing either assessment will be deemed college-ready in tested subjects and will be able to directly enroll in credit courses in any Maryland public college.

Given the current performance of MCPS students on current standardized assessments of college-readiness, it is anticipated that the demand for transitional courses will be high and the demand for remediation at Montgomery College will continue.   For example, among MCPS Class of 2013, only 41% of graduates achieved college-readiness benchmark scores of 1,650 or above on the SAT or 24 or above on the ACT.   The wide achievement gaps on such measures impacting students that disproportionately enroll at the College, further suggests that the local demand for developmental education will remain unabated if current student enrollment patterns persist.

FINDING #5:   State laws and regulations drive the demand for developmental education locally, but County taxpayers, students, and their families bear the brunt of the costs of funding developmental education at Montgomery College.

As noted in Findings 2 and 3, state regulations regarding placement testing among community colleges and new laws and proposed regulations expanding testing requirements and performance expectations drive the demand for remediation at Montgomery College. Yet, County taxpayers, students, and their families bear the brunt of the costs of funding developmental education programs and services locally.

At the request of OLO, Montgomery College staff estimated and calculated the annual cost of developmental education between 2007 and 2013. Based on an estimate that developmental education comprised 10.7% of total hours of enrollment at the College (billable hours), the cost of remediation was $14.9 million at Montgomery College in 2013 for instruction, academic support and student services for students enrolled in remedial coursework.

As noted in the table below, County dollars funded about half of this total cost ($6.5 million) in 2013 followed by $5.6 million in tuition and related charges and $2.1 million in State aid. But it is likely students who bear the most significant costs as they must not only pay tuition and fees for the classes but they must also delay their progress through college. Many students are discouraged when they find out that they are not eligible for college-level courses when they enroll at the College.

Table 6-3: Estimated Revenue Sources for Developmental Education, FY 2013

Sources of Funds	FY 2014 Budget	% of All Revenue	If revenue for DE split same way, then …
Tuition and Related Charges	$85,555,492	38%	$5,611,508
Other Student Fees	$1,697,759	1%	$111,354
County Contribution	$98,933,727	43%	$6,488,974
State Aid	$31,688,491	14%	$2,078,420
Fed. State and Priv. Gifts and Grants	$325,000	0%	$21,316
Other Revenues	$1,325,000	1%	$86,906
Revenue Transfers	$0	0%	$0
Use of Fund Balance	$8,202,226	4%	$537,977
Total Sources of Funds	*$227,727,695*	*100%*	*$14,936,454*

FINDING #6: **Montgomery College has revamped its developmental education programs and offers a host of additional services aimed at enhancing student outcomes.**

The College recognizes that developmental education can serve as a bridge for students needing to prepare for college-level coursework and also an impediment for those desiring to immediately enroll in college-level courses. Improving the efficacy of developmental courses and reducing the amount of time that students are required to spend in remedial courses have been persistent challenges for the College. To address these concerns, the College has undertaken several changes that include -

- *Program Improvements in Math Instruction:* The College redesigned its developmental math courses in 2011, combining its Pre-Algebra and Elementary Algebra I courses into a single course – Math Preparation I and II (MATH 094). The current system provides opportunities for acceleration by combining traditional in-class instruction with self-paced modules that are internet-based. Moreover, if a student takes a break from the class, he/she can resume from whichever module was last passed. Current classes are also mastery based – students must meet an 80% performance threshold before they can move to the next level. There is also a new accelerated math option that combines MATH 097 with MATH 115A/116A for a five credit course that meets the math requirement for general studies majors.

- *Program Improvements in Reading and English:* Montgomery College combined its Reading and English departments into one department this past July. With this merger, the College plans to develop integrated developmental reading and English courses that teach students how to identify and develop patterns in both reading and writing. The College also offers accelerated paths in both subjects where students earning an A/B in the lower level developmental course (College Reading Skills I/Basic English I) can bypass the intermediate developmental course (College Reading Skills II/Basic English II) and enroll directly into the gateway college-credit English course (i.e. ENG 101/101A).

The College also began the PACE program for developmental English students two years ago as an acceleration model with mainstreaming. The PACE program co-enrolls developmental and credit students into the same English course (EN 101) for a 5 hour class rather than a 3 hour class. PACE provides enrolled students access to tutors and smaller classes (18 rather than 22 students). And, with the merger of the Reading and English departments, the class sizes of all developmental English and Reading courses will decline from 22 to 20 students.

- *Student Services and Academic Supports:* The College also offers a number of additional services aimed at reducing the demand for developmental education and the successful completion of developmental coursework. These include:

  o Test Preparation via online tools, preparation courses and Accuplacer testing among select MCPS high schools;
  o Post-Accuplacer advising via the Montgomery Advisory Program where College staff recommend course pathways for students;
  o The "First Year Experience" to connect new students to campus supports that promote retention and success;
  o Use of the Starfish online student tracking system to support counseling and advising;
  o Academic Centers in Reading, Writing, Math, and Science that provide education and support services, including group lessons, computer tutorials, and individual tutoring;
  o Student Development Seminars that offer short courses designed to assist students in developing their education plans and skills for college success;
  o Disability Support Services that provide identified students with disabilities accommodations that can include additional time, tutoring, and other services; and
  o Other supports aimed at improving the retention of Black males (Boys to Men Mentoring), the transition of veterans (Combat to College), and low-income, first generation college students (TRIO Program).

FINDING #7: **The vast majority of the College's practices align with promising practices in developmental education.**

Montgomery College implements in whole or in part a majority of the promising practices identified in the research literature. As noted in the table on the next page, Montgomery College's practices at least partially align with 13 of the 14 identified promising practices.

Moreover, the College is poised to deliver more promising practices as it implements new requirements mandated under SB 740 (e.g. transitional courses). It is important to note, however, that the research also suggests that the collective implementation of these promising practices will not dramatically increase outcomes in developmental education. Most researchers and advocates suggest that a more transformational shift in developmental education is required to dramatically improve outcomes in higher education.

Table 6-4: Alignment between Promising Practices and Montgomery College Practices

Promising Practice	Current Local Practice	Alignment Status
Align High School Curriculum with College-readiness Expectations	MCPS milestones for college-readiness include Algebra II by Grade 11 and high test scores on the SAT, ACT, AP	Partial, course taking milestones do not align
Dual Enrollment and Early College Programs	Early Placement Program College Institute	No, does not deserve developmental students
Early Assessments and Transitional Courses	Accuplacer Diagnostic and My Pearson Lab Intervention at 11 MCPS high schools	Partial, will become yes with SB 740
Summer Bridge Programs	Bridge to College Success, Biomedical Scholars, and GT STEP Summer Bridge Pre-Freshman Programs	Partial, does not include developmental courses
Multiple Measure Assessments	Accuplacer cut scores and equivalents, review of placements, and pilot efforts in math course placements	Partial, multiple measures not systematically used
Preparation for Placement Tests	Online resources, Accuplacer Advancer and Fast Track courses	Yes
Accelerated Courses	Can skip intermediate reading and English courses with high grades in lower courses	Yes
Modularized Courses and Mastery Learning	Modularized and mastery based Math Preparation course curriculum	Yes
Mainstreaming	PACE English course	Yes
Contextualized Instruction	I-BEST Program in apartment maintenance and certified nursing assistance	Partial, serves basic skills not developmental
Learning Communities	Honors, at-risk, and developmental learning communities	Yes
Tutoring	Math/Science Centers Writing and Language Centers	Yes
Advising	Starfish to support advising and counseling	Yes
Student Success Courses	Student development courses	Yes

FINDING #8: **Performance outcomes in developmental education at Montgomery College are low, particularly for math remediation.**

Student outcomes in developmental education remain modest because the majority of students requiring remediation do not complete their developmental sequence (required remedial coursework) or first gateway (college-level) course within two years. More specifically, a review of the College's cohort data on performance among non-AELP students between 2006 and 2011 finds that:

- Although an increasing majority of students requiring English and reading remediation completed their developmental sequences within two years, less than half completed their first gateway course within two years of enrollment; and

- Less than half of students requiring math remediation completed their developmental sequences within two years, and less than a quarter completed their first gateway course within two years of enrollment.

Interestingly, the performance of recent high school graduates in remedial courses across subjects generally exceeded the performance of older students in remedial courses. However, the modularization of developmental math courses under taken by the College in 2011 with the conversion of MA 090 and 091 into MA 094 has not yet translated into improved outcomes.

B.   Recommendations for Montgomery College

RECOMMENDATION #1:   Pilot the Use of Multiple Measures to Assess Remediation Need

Although the College has recently begun efforts to pilot the use of multiple measures to assess the need for remediation in math, OLO offers this recommendation to support the College's current efforts and its expansion if an evaluation of the College's pilot efforts finds that it's effective.

According to the research, the use of multiple measures to assess the college-readiness of students serve as better predictors of remediation need than placement test scores alone. Yet, Montgomery College relies almost exclusively on placement test scores from the Accuplacer or alternatives such as the SAT to determine the need for developmental education among its first-time college students. Current placement practices that identify one-third of new students as needing reading or English remediation and three-quarters as needing math remediation may overstate the actual need for developmental education at the College.

To more accurately assess the need for remediation among new students, OLO recommends that the College expand its pilot approach for utilizing multiple measures of student performance to determine remediation need. Specifically, OLO recommends that the College pilot the use of high school grade point averages and course performance in relevant high school courses to determine developmental education placements in English, reading, and math. OLO also recommends that the College evaluate the multiple measures approach if expanded to discern the fidelity and effectiveness of the multiple measures placement approach on developmental outcomes at the College.

RECOMMENDATION #2:   Align MCPS Coursework and the College's Expectations for College-readiness in Math

MCPS tracks the percentage of students completing Algebra II by Grade 11 with a C or better grade as a measure of college-readiness. Yet, recent high school graduates typically have to complete Pre-Calculus or a higher-level math course to score high enough on the Accuplacer to test out of developmental math because students tend to test into the second to last course completed while in high school. So, if a student's highest math course at MCPS was Algebra II, they would typically test into Algebra I at the College and would be required to complete two remedial math classes (Mathematics Preparation and Intermediate Algebra) before enrolling in a college-level math course.

Implementation of the Maryland College- and career-readiness and College Completion Act of 2013 (Senate Bill 740) will improve the alignment between MCPS' course requirements and Montgomery College's expectations for college-readiness in two ways. First, SB 740 requires that students complete a math class during their senior year beginning with this year's 9th grade cohort. This should improve students' performance on the Accuplacer during and immediately after their senior year. Proposed regulations by MSDE to implement SB 740 also recommend that Maryland's public colleges recognize passing the PARCC Algebra II test as a marker of college-readiness in math by 2015-16. If enacted, MCPS students who pass this assessment after completing Algebra II will be able to enter college-level math at Montgomery College without having to pass the Accuplacer.

Although implementation of SB 740 will improve the alignment between MCPS and the College's sequences of math courses that demonstrate college-readiness, additional opportunities to align institutional expectations of math proficiency and college-readiness exist. For example, the College could work with MCPS to develop end-of-course exams recognized by both institutions as markers of math proficiency. More specifically, a jointly recognized assessment of Algebra I proficiency used as an end-of-course exam by MCPS could reduce the need for Pre-Algebra and Algebra I (MATH 094) placements at Montgomery College. Similarly, jointly recognized end of MCPS course exams of Pre-Calculus and Calculus proficiency could expedite MCPS graduates progress in meeting their general education math and major requirements at the College, particularly in STEM fields.

OLO recommends that the College partner with MCPS to pilot the development of end of course math assessments that are recognized by both institutions as markers of math proficiency and college-readiness. OLO recommends that this partnership initially focus on the sequence of math courses covered in developmental math: Pre-Algebra, Algebra I, and Algebra II. If these jointly developed assessments are effective at improving student outcomes, then OLO recommends that joint assessments be developed for math courses beyond Algebra II (e.g. Pre-Calculus and Calculus).

Chapter 7: Agency Comments

The Office of Legislative Oversight shared a final draft of this report with Montgomery College for technical comment. OLO appreciates the time taken by Montgomery College staff to review the draft report and to provide technical feedback. This final report incorporates technical corrections and feedback received by Montgomery College personnel.

Written comments from the President of Montgomery College, Dr. DeRionne Pollard, will be posted online with this report and will be included in the packet for Committee's review of the report.

APPENDIX

Includes data tables on developmental education need, enrollment, and outcomes by subject area

List of Appendices

ENGLISH

Table A-1: Developmental English Need vs. Enrollment for New Non-AELP Students by Age

	2006	2007	2008	2009	2010	2011	# Change
All Students							
# New Non-AELP Enrollment	4,398	3,634	3,922	4,226	4,356	4,021	-377
# Needing English DE	1,127	1,244	1,265	1,494	1,416	1,397	270
% Needing English DE	*27%*	*34%*	*32%*	*35%*	*33%*	*35%*	*8%*
# Enrolled in English DE	942	1,076	1,125	1,304	1,240	1,274	332
% Needing English DE Enrolled	*84%*	*86%*	*89%*	*87%*	*88%*	*91%*	8%
Recent Grads							
# New Non-AELP Enrollment	2,781	2,554	2,460	2,810	2,953	2,702	-79
# Needing English DE	813	962	939	1,025	1,019	1,032	219
% Needing English DE	*29%*	*38%*	*38%*	*36%*	*35%*	*38%*	*9%*
# Enrolled in English DE	723	872	868	945	919	976	253
% Needing English DE Enrolled	*89%*	*91%*	*92%*	*92%*	*90%*	*95%*	*6%*
Older Grads							
# New Non-AELP Enrollment	1,617	1,080	1,462	1,416	1,403	1,319	-298
# Needing English DE	314	282	326	469	397	365	51
% Needing English DE	*19%*	*26%*	*22%*	*33%*	*28%*	*28%*	*9%*
# Enrolled in English DE	219	204	257	359	321	298	79
% Needing English DE Enrolled	*70%*	*72%*	*79%*	*77%*	*81%*	*82%*	*12%*

Table A-2: Outcomes for Students Needing Developmental English by Age

	2006	2007	2008	2009	2010	2011	# Change
All Students							
# Needing DE English	1,127	1,244	1,265	1,494	1,416	1,397	270
# Completed English DE Sequence	661	815	612	832	655	983	322
% Need that Completed English DE Sequence	*59%*	*66%*	*48%*	*56%*	*46%*	*70%*	*12%*
# Completed English Gateway	413	505	505	417	518	642	229
% Need that Completed English Gateway	*37%*	*41%*	*40%*	*28%*	*37%*	*46%*	*9%*
Recent Grads							
# Needing DE English	813	962	939	1,025	1,019	1,032	219
# Completed English DE Sequence	523	646	487	648	517	779	256
% Completing English DE Sequence	*64%*	*67%*	*52%*	*63%*	*51%*	*75%*	*11%*
# Completed English Gateway	338	435	410	327	421	522	184
% Completing English Gateway	*42%*	*45%*	*44%*	*32%*	*41%*	*51%*	*9%*
Older Grads							
# Needing DE English	314	282	326	469	397	365	51
# Completed English DE Sequence	138	169	125	184	138	204	66
% Completing English DE Sequence	*44%*	*60%*	*38%*	*39%*	*35%*	*56%*	*12%*
# Completed English Gateway	75	70	95	90	97	120	45
% Completing English Gateway	*24%*	*25%*	*29%*	*19%*	*24%*	*33%*	*9%*

Table A-3: Outcomes for Students Enrolling in Developmental English by Age

	2006	2007	2008	2009	2010	2011	# Change
All Students							
# Enrolling in DE English	942	1,076	1,125	1,304	1,240	1,274	332
# Completed English DE Sequence	661	815	612	832	655	983	322
% Enrolled that Completed English DE Sequence	*70%*	*76%*	*54%*	*64%*	*53%*	*77%*	*7%*
# Completed English Gateway	413	505	505	417	518	642	229
% Enrolled that Completed English Gateway	*44%*	*47%*	*45%*	*32%*	*42%*	*50%*	*7%*
Recent Grads							
# Enrolling in DE English	723	872	868	945	919	976	253
# Completed English DE Sequence	523	646	487	648	517	779	256
% Enrolled that Completed English DE Sequence	*72%*	*74%*	*56%*	*69%*	*56%*	*80%*	*7%*
# Completed English Gateway	338	435	410	327	421	522	184
% Enrolled that Completed English Gateway	*47%*	*50%*	*47%*	*35%*	*46%*	*53%*	*7%*
Older Grads							
# Enrolling in DE English	219	204	257	359	321	298	79
# Completed English DE Sequence	138	169	125	184	138	204	66
% Enrolled that Completed English DE Sequence	*63%*	*83%*	*49%*	*51%*	*43%*	*68%*	*5%*
# Completed English Gateway	75	70	95	90	97	120	45
% Enrolled that Completed English Gateway	*34%*	*34%*	*37%*	*25%*	*30%*	*40%*	*6%*

Table A-4: Developmental English Need vs. Enrollment for New Non-AELP Students by Race and Ethnicity

	2006	2007	2008	2009	2010	2011	# Change
Asian Students							
# New Non-AELP Enrollment	511	462	457	459	549	418	-93
# Needing English DE	106	126	116	125	146	120	14
% Needing English DE	*21%*	*27%*	*25%*	*27%*	*27%*	*29%*	*8%*
# Enrolled in English DE	74	114	103	110	126	110	36
% Needing English DE Enrolled	*70%*	*90%*	*89%*	*88%*	*86%*	*92%*	*22%*
Black Students							
# New Non-AELP Enrollment	1,085	1,041	1,158	1,305	1,214	1,231	146
# Needing English DE	431	454	495	633	528	519	88
% Needing English DE	*40%*	*44%*	*43%*	*49%*	*43%*	*42%*	*2%*
# Enrolled in English DE	366	383	427	531	459	466	100
% Needing English DE Enrolled	*85%*	*84%*	*86%*	*84%*	*87%*	*90%*	*5%*
Latino Students							
# New Non-AELP Enrollment	648	483	546	401	557	553	-95
# Needing English DE	246	214	229	186	216	279	33
% Needing English DE	*38%*	*44%*	*42%*	*46%*	*39%*	*50%*	*12%*
# Enrolled in English DE	214	197	214	170	195	263	49
% Needing English DE Enrolled	*87%*	*92%*	*93%*	*91%*	*90%*	*94%*	*7%*
White Students							
# New Non-AELP Enrollment	1,814	1,336	1,426	1,374	1,407	1,253	-561
# Needing English DE	340	340	325	304	319	262	-78
% Needing English DE	*19%*	*25%*	*23%*	*22%*	*23%*	*21%*	*2%*
# Enrolled in English DE	286	285	299	268	281	231	-55
% Needing English DE Enrolled	*84%*	*84%*	*92%*	*88%*	*88%*	*88%*	*4%*

Table A-5: Outcomes for Students Needing Developmental English by Race and Ethnicity

	2006	2007	2008	2009	2010	2011	# Change
Asian Students							
# Needing DE English	106	126	116	125	146	120	14
# Completed English DE Sequence	57	96	72	88	104	97	40
% Need that Completed English DE Sequence	*54%*	*76%*	*62%*	*70%*	*71%*	*81%*	*27%*
# Completed English Gateway	45	70	72	54	75	76	31
% Need that Completed English Gateway	*42%*	*56%*	*62%*	*43%*	*51%*	*63%*	*21%*
Black Students							
# Needing DE English	431	454	495	633	528	519	88
# Completed English DE Sequence	224	262	189	276	188	328	104
% Completing English DE Sequence	*52%*	*58%*	*38%*	*44%*	*36%*	*63%*	*11%*
# Completed English Gateway	112	138	159	116	166	200	88
% Completing English Gateway	*26%*	*30%*	*32%*	*18%*	*31%*	*39%*	*13%*
Latino Students							
# Needing DE English	246	214	229	186	216	279	33
# Completed English DE Sequence	155	148	115	116	113	207	52
% Completing English DE Sequence	*63%*	*69%*	*50%*	*62%*	*52%*	*74%*	*11%*
# Completed English Gateway	98	93	94	57	95	140	42
% Completing English Gateway	*40%*	*43%*	*41%*	*31%*	*44%*	*50%*	*10%*
White Students							
# Needing DE English	340	340	325	304	319	262	-78
# Completed English DE Sequence	223	230	184	200	158	190	-33
% Completing English DE Sequence	*66%*	*68%*	*57%*	*66%*	*50%*	*73%*	*7%*
# Completed English Gateway	158	161	154	117	116	133	-25
% Completing English Gateway	*46%*	*47%*	*47%*	*38%*	*36%*	*51%*	*4%*

Table A-6: Outcomes for Students Enrolling in Developmental English by Race and Ethnicity

	2006	2007	2008	2009	2010	2011	# Change
Asian Students							
# Enrolling in DE English	74	114	103	110	126	110	36
# Completed English DE Sequence	57	96	72	88	104	97	40
% Enrolled that Completed English DE Sequence	*77%*	*84%*	*70%*	*80%*	*83%*	*88%*	*11%*
# Completed English Gateway	45	70	72	54	75	76	31
% Enrolled that Completed English Gateway	*61%*	*61%*	*70%*	*49%*	*60%*	*69%*	*8%*
Black Students							
# Enrolling in DE English	366	383	427	531	459	466	100
# Completed English DE Sequence	224	262	189	276	188	328	104
% Enrolled that Completed English DE Sequence	*61%*	*68%*	*44%*	*52%*	*41%*	*70%*	*9%*
# Completed English Gateway	112	138	159	116	166	200	88
% Enrolled that Completed English Gateway	*31%*	*36%*	*37%*	*22%*	*36%*	*43%*	*12%*
Latino Students							
# Enrolling in DE English	214	197	214	170	195	263	49
# Completed English DE Sequence	155	148	115	116	113	207	52
% Enrolled that Completed English DE Sequence	*72%*	*75%*	*54%*	*68%*	*58%*	*79%*	*6%*
# Completed English Gateway	98	93	94	57	95	140	42
% Enrolled that Completed English Gateway	*46%*	*47%*	*44%*	*34%*	*49%*	*53%*	*7%*
White Students							
# Enrolling in DE English	286	285	299	268	281	231	-55
# Completed English DE Sequence	223	230	184	200	158	190	-33
% Enrolled that Completed English DE Sequence	*78%*	*81%*	*62%*	*75%*	*56%*	*82%*	*4%*
# Completed English Gateway	158	161	154	117	116	133	-25
% Enrolled that Completed English Gateway	*55%*	*56%*	*52%*	*44%*	*41%*	*58%*	*2%*

READING

Table A-7: Developmental Reading Need vs. Enrollment for New Non-AELP Students by Age

	2006	2007	2008	2009	2010	2011	# Change
All Students							
# New Non-AELP Enrollment	4,398	3,634	3,922	4,226	4,356	4,021	-377
# Needing Reading DE	1,109	1,057	1,147	1,347	1,247	1,162	53
% Needing Reading DE	*25%*	*29%*	*29%*	*32%*	*29%*	*29%*	*4%*
# Enrolled in Reading DE	907	929	984	1,154	1,061	1,047	140
% Needing Reading DE Enrolled	*82%*	*88%*	*86%*	*86%*	*85%*	*90%*	*8%*
Recent Grads							
# New Non-AELP Enrollment	2,781	2,554	2,460	2,810	2,953	2,702	-79
# Needing Reading DE	858	837	894	969	954	878	20
% Needing Reading DE	*31%*	*33%*	*36%*	*34%*	*32%*	*32%*	*1%*
# Enrolled in Reading DE	725	756	795	858	828	806	81
% Needing Reading DE Enrolled	*84%*	*90%*	*89%*	*89%*	*87%*	*92%*	*7%*
Older Grads							
# New Non-AELP Enrollment	1,617	1,080	1,462	1,416	1,403	1,319	-298
# Needing Reading DE	251	220	253	378	293	284	33
% Needing Reading DE	*16%*	*20%*	*17%*	*27%*	*21%*	*22%*	*6%*
# Enrolled in Reading DE	182	173	189	296	233	241	59
% Needing Reading DE Enrolled	*73%*	*79%*	*75%*	*78%*	*80%*	*85%*	*12%*

Table A-8: Outcomes for Students Needing Developmental Reading by Age

	2006	2007	2008	2009	2010	2011	# Change
All Students							
# Needing DE Reading	1,109	1,057	1,147	1,347	1,247	1,162	53
# Completed Reading DE Sequence	710	721	764	759	822	848	138
% Completing Reading DE Sequence	*64%*	*68%*	*67%*	*56%*	*66%*	*73%*	*9%*
# Completed Reading Gateway	399	421	558	398	617	494	95
% Completing Reading Gateway	*36%*	*40%*	*49%*	*30%*	*49%*	*43%*	*7%*
Recent Grads							
# Needing DE Reading	858	837	894	969	954	878	20
# Completed Reading DE Sequence	586	602	647	599	664	666	80
% Completing Reading DE Sequence	*68%*	*72%*	*72%*	*62%*	*70%*	*76%*	*8%*
# Completed Reading Gateway	344	373	465	326	513	404	60
% Completing Reading Gateway	*40%*	*45%*	*52%*	*34%*	*54%*	*46%*	*6%*
Older Grads							
# Needing DE Reading	251	220	253	378	293	284	33
# Completed Reading DE Sequence	124	119	117	160	158	182	58
% Completing Reading DE Sequence	*49%*	*54%*	*46%*	*42%*	*54%*	*64%*	*15%*
# Completed Reading Gateway	55	48	93	72	104	90	35
% Completing Reading Gateway	*22%*	*22%*	*37%*	*19%*	*35%*	*32%*	*10%*

Table A-9: Outcomes for Students Enrolling in Developmental Reading by Age

	2006	2007	2008	2009	2010	2011	# Change
All Students							
# Enrolling in DE Reading	907	929	984	1,154	1,061	1,047	140
# Completed Reading DE Sequence	710	721	764	759	822	848	138
% Enrolled that Completed Reading DE Sequence	*78%*	*78%*	*78%*	*66%*	*77%*	*81%*	*3%*
# Completed Reading Gateway	399	421	558	398	617	494	95
% Enrolled that Completed Reading Gateway	*44%*	*45%*	*57%*	*34%*	*58%*	*47%*	*3%*
Recent Grads							
# Enrolling in DE Reading	725	756	795	858	828	806	81
# Completed Reading DE Sequence	586	602	647	599	664	666	80
% Enrolled that Completed Reading DE Sequence	*81%*	*80%*	*81%*	*70%*	*80%*	*83%*	*2%*
# Completed Reading Gateway	344	373	465	326	513	404	60
% Enrolled that Completed Reading Gateway	*47%*	*49%*	*58%*	*38%*	*62%*	*50%*	*3%*
Older Grads							
# Enrolling in DE Reading	182	173	189	296	233	241	59
# Completed Reading DE Sequence	124	119	117	160	158	182	58
% Enrolled that Completed Reading DE Sequence	*68%*	*69%*	*62%*	*54%*	*68%*	*76%*	*7%*
# Completed Reading Gateway	55	48	93	72	104	90	35
% Enrolled that Completed Reading Gateway	*30%*	*28%*	*49%*	*24%*	*45%*	*37%*	*7%*

Table A-10: Developmental Reading Need vs. Enrollment for New Non-AELP Students by Race and Ethnicity

	2006	2007	2008	2009	2010	2011	# Change
Asian Students							
# New Non-AELP Enrollment	511	462	457	459	549	418	-93
# Needing Reading DE	117	118	97	117	143	103	-14
% Needing Reading DE	*23%*	*26%*	*21%*	*25%*	*26%*	*25%*	*2%*
# Enrolled in Reading DE	79	101	87	106	113	93	14
% Needing Reading DE Enrolled	*68%*	*86%*	*90%*	*91%*	*79%*	*90%*	*23%*
Black Students							
# New Non-AELP Enrollment	1,085	1,041	1,158	1,305	1,214	1,231	146
# Needing Reading DE	420	408	483	567	467	455	35
% Needing Reading DE	*39%*	*39%*	*42%*	*43%*	*38%*	*37%*	*-2%*
# Enrolled in Reading DE	352	360	413	471	394	407	55
% Needing Reading DE Enrolled	*84%*	*88%*	*86%*	*83%*	*84%*	*89%*	*6%*
Latino Students							
# New Non-AELP Enrollment	648	483	546	401	557	553	-95
# Needing Reading DE	246	187	212	172	189	239	-7
% Needing Reading DE	*38%*	*39%*	*39%*	*43%*	*34%*	*43%*	*5%*
# Enrolled in Reading DE	209	170	188	150	167	220	11
% Needing Reading DE Enrolled	*85%*	*91%*	*89%*	*87%*	*88%*	*92%*	*7%*
White Students							
# New Non-AELP Enrollment	1,814	1,336	1,426	1,374	1,407	1,253	-561
# Needing Reading DE	321	242	258	257	256	186	-135
% Needing Reading DE	*18%*	*18%*	*18%*	*19%*	*18%*	*15%*	*-3%*
# Enrolled in Reading DE	264	204	217	223	218	166	-98
% Needing Reading DE Enrolled	*82%*	*84%*	*84%*	*87%*	*85%*	*89%*	*7%*

Table A-11: Outcomes for Students Needing Developmental Reading by Race and Ethnicity

	2006	2007	2008	2009	2010	2011	# Change
Asian Students							
# Needing DE Reading	117	118	97	117	143	103	-14
# Completed Reading DE Sequence	71	89	77	84	103	81	10
% Completing Reading DE Sequence	*61%*	*75%*	*79%*	*72%*	*72%*	*79%*	*18%*
# Completed Reading Gateway	50	55	60	49	102	55	5
% Completing Reading Gateway	*43%*	*47%*	*62%*	*42%*	*71%*	*53%*	*10%*
Black Students							
# Needing DE Reading	420	408	483	567	467	455	35
# Completed Reading DE Sequence	255	254	292	237	275	317	62
% Completing Reading DE Sequence	*61%*	*62%*	*60%*	*42%*	*59%*	*70%*	*9%*
# Completed Reading Gateway	116	119	200	99	186	176	60
% Completing Reading Gateway	*28%*	*29%*	*41%*	*17%*	*40%*	*39%*	*11%*
Latino Students							
# Needing DE Reading	246	187	212	172	189	239	-7
# Completed Reading DE Sequence	170	138	150	114	141	183	13
% Completing Reading DE Sequence	*69%*	*74%*	*71%*	*66%*	*75%*	*77%*	*7%*
# Completed Reading Gateway	94	87	106	53	103	102	8
% Completing Reading Gateway	*38%*	*47%*	*50%*	*31%*	*54%*	*43%*	*5%*
White Students							
# Needing DE Reading	321	242	258	257	256	186	-135
# Completed Reading DE Sequence	211	168	184	178	175	134	-77
% Completing Reading DE Sequence	*66%*	*69%*	*71%*	*69%*	*68%*	*72%*	*6%*
# Completed Reading Gateway	139	118	145	120	138	89	-50
% Completing Reading Gateway	*43%*	*49%*	*56%*	*47%*	*54%*	*48%*	*5%*

Table A-12: Outcomes for Students Enrolling in Developmental Reading by Race and Ethnicity

	2006	2007	2008	2009	2010	2011	# Change
Asian Students							
# Enrolling in DE Reading	79	101	87	106	113	93	14
# Completed Reading DE Sequence	71	89	77	84	103	81	10
% Enrolled that Completed Reading DE Sequence	*90%*	*88%*	*89%*	*79%*	*91%*	*87%*	*-3%*
# Completed Reading Gateway	50	55	60	49	102	55	5
% Enrolled that Completed Reading Gateway	*63%*	*54%*	*69%*	*46%*	*90%*	*59%*	*-4%*
Black Students							
# Enrolling in DE Reading	352	360	413	471	394	407	55
# Completed Reading DE Sequence	255	254	292	237	275	317	62
% Enrolled that Completed Reading DE Sequence	*72%*	*71%*	*71%*	*50%*	*70%*	*78%*	*5%*
# Completed Reading Gateway	116	119	200	99	186	176	60
% Enrolled that Completed Reading Gateway	*33%*	*33%*	*48%*	*21%*	*47%*	*43%*	*10%*
Latino Students							
# Enrolling in DE Reading	209	170	188	150	167	220	11
# Completed Reading DE Sequence	170	138	150	114	141	183	13
% Enrolled that Completed Reading DE Sequence	*81%*	*81%*	*80%*	*76%*	*84%*	*83%*	*2%*
# Completed Reading Gateway	94	87	106	53	103	102	8
% Enrolled that Completed Reading Gateway	*45%*	*51%*	*56%*	*35%*	*62%*	*46%*	*1%*
White Students							
# Enrolling in DE Reading	264	204	217	223	218	166	-98
# Completed Reading DE Sequence	211	168	184	178	175	134	-77
% Enrolled that Completed Reading DE Sequence	*80%*	*82%*	*85%*	*80%*	*80%*	*81%*	*1%*
# Completed Reading Gateway	139	118	145	120	138	89	-50
% Enrolled that Completed Reading Gateway	*53%*	*58%*	*67%*	*54%*	*63%*	*54%*	*1%*

MATH

Table A-13: Developmental Math Need vs. Enrollment for New Non-AELP Students by Age

	2006	2007	2008	2009	2010	2011	# Change
All Students							
# New Non-AELP Enrollment	4,398	3,634	3,922	4,226	4,356	4,021	-377
# Needing Math DE	2,772	2,591	2,715	3,247	3,120	2,925	153
% Needing Math DE	*63%*	*71%*	*69%*	*77%*	*72%*	*73%*	*10%*
# Enrolled in Math DE	1,854	2,084	2,136	2,450	2,426	2,240	386
% Needing Math DE Enrolled	*67%*	*80%*	*79%*	*75%*	*78%*	*77%*	*10%*
Recent Grads							
# New Non-AELP Enrollment	2,781	2,554	2,460	2,810	2,953	2,702	-79
# Needing Math DE	1,982	1,933	1,925	2,250	2,240	2,133	151
% Needing Math DE	*71%*	*76%*	*78%*	*80%*	*76%*	*79%*	*8%*
# Enrolled in Math DE	1,415	1,641	1,603	1,851	1,842	1,693	278
% Needing Math DE Enrolled	*71%*	*85%*	*83%*	*82%*	*82%*	*79%*	*8%*
Older Grads							
# New Non-AELP Enrollment	1,617	1,080	1,462	1,416	1,403	1,319	-298
# Needing Math DE	790	658	790	997	880	792	2
% Needing Math DE	*49%*	*61%*	*54%*	*70%*	*63%*	*60%*	*11%*
# Enrolled in Math DE	439	443	533	599	584	547	108
% Needing Math DE Enrolled	*56%*	*67%*	*67%*	*60%*	*66%*	*69%*	*13%*

Table A-14: Outcomes for Students Needing Developmental Math by Age

	2006	2007	2008	2009	2010	2011	# Change
All Students							
# Needing DE Math	2,772	2,591	2,715	3,247	3,120	2,925	153
# Completed Math DE Sequence	707	881	1,091	1,191	1,498	932	225
% Completing Math DE Sequence	*26%*	*34%*	*40%*	*37%*	*48%*	*32%*	*6%*
# Completed Math Gateway	389	462	537	593	683	554	165
% Completing Math Gateway	*14%*	*18%*	*20%*	*18%*	*22%*	*19%*	*5%*
Recent Grads							
# Needing DE Math	1,982	1,933	1,925	2,250	2,240	2,133	151
# Completed Math DE Sequence	557	711	848	915	1,255	774	217
% Completing Math DE Sequence	*28%*	*37%*	*44%*	*41%*	*56%*	*36%*	*8%*
# Completed Math Gateway	314	371	418	462	536	459	145
% Completing Math Gateway	*16%*	*19%*	*22%*	*21%*	*24%*	*22%*	*6%*
Older Grads							
# Needing DE Math	790	658	790	997	880	792	2
# Completed Math DE Sequence	150	170	243	276	243	158	8
% Completing Math DE Sequence	*19%*	*26%*	*31%*	*28%*	*28%*	*20%*	*1%*
# Completed Math Gateway	75	91	119	131	147	95	20
% Completing Math Gateway	*9%*	*14%*	*15%*	*13%*	*17%*	*12%*	*3%*

Table A-15: Outcomes for Students Enrolling in Developmental Math by Age

	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**# Change**
All Students							
# Enrolling in DE Math	1,854	2,084	2,136	2,450	2,426	2,240	386
# Completed Math DE Sequence	707	881	1,091	1,191	1,498	932	225
% Enrolled that Completed Math DE Sequence	*38%*	*42%*	*51%*	*49%*	*62%*	*42%*	*3%*
# Completed Math Gateway	389	462	537	593	683	554	165
% Enrolled that Completed Math Gateway	*21%*	*22%*	*25%*	*24%*	*28%*	*25%*	*4%*
Recent Grads							
# Enrolling in DE Math	1,415	1,641	1,603	1,851	1,842	1,693	278
# Completed Math DE Sequence	557	711	848	915	1,255	774	217
% Enrolled that Completed Math DE Sequence	*39%*	*43%*	*53%*	*49%*	*68%*	*46%*	*6%*
# Completed Math Gateway	314	371	418	462	536	459	145
% Enrolled that Completed Math Gateway	*22%*	*23%*	*26%*	*25%*	*29%*	*27%*	*5%*
Older Grads							
# Enrolling in DE Math	439	443	533	599	584	547	108
# Completed Math DE Sequence	150	170	243	276	243	158	8
% Enrolled that Completed Math DE Sequence	*34%*	*38%*	*46%*	*46%*	*42%*	*29%*	*-5%*
# Completed Math Gateway	75	91	119	131	147	95	20
% Enrolled that Completed Math Gateway	*17%*	*21%*	*22%*	*22%*	*25%*	*17%*	*0%*

Table A-16: Developmental Math Need vs. Enrollment for New Non-AELP Students by Race and Ethnicity

	2006	2007	2008	2009	2010	2011	# Change
Asian Students							
# New Non-AELP Enrollment	511	462	457	459	549	418	-93
# Needing Math DE	277	251	241	277	292	235	-42
% Needing Math DE	*54%*	*54%*	*53%*	*60%*	*53%*	*56%*	*2%*
# Enrolled in Math DE	199	216	211	241	247	192	-7
% Needing Math DE Enrolled	*72%*	*86%*	*88%*	*87%*	*85%*	*82%*	*10%*
Black Students							
# New Non-AELP Enrollment	1,085	1,041	1,158	1,305	1,214	1,231	146
# Needing Math DE	862	853	917	1,117	1,003	1,009	147
% Needing Math DE	*79%*	*82%*	*79%*	*86%*	*83%*	*82%*	*3%*
# Enrolled in Math DE	564	648	660	766	715	758	194
% Needing Math DE Enrolled	*65%*	*76%*	*72%*	*69%*	*71%*	*75%*	*10%*
Latino Students							
# New Non-AELP Enrollment	648	483	546	401	557	553	-95
# Needing Math DE	511	408	464	357	464	482	-29
% Needing Math DE	*79%*	*84%*	*85%*	*89%*	*83%*	*87%*	*8%*
# Enrolled in Math DE	358	348	378	272	379	374	16
% Needing Math DE Enrolled	*70%*	*85%*	*81%*	*76%*	*82%*	*78%*	*8%*
White Students							
# New Non-AELP Enrollment	1,814	1,336	1,426	1,374	1,407	1,253	-561
# Needing Math DE	1,116	843	842	924	871	745	-371
% Needing Math DE	*62%*	*63%*	*59%*	*67%*	*62%*	*59%*	*-2%*
# Enrolled in Math DE	723	685	687	711	686	565	-158
% Needing Math DE Enrolled	*65%*	*81%*	*82%*	*77%*	*79%*	*76%*	*11%*

Table A-17: Outcomes for Students Needing Developmental Math by Race and Ethnicity

	2006	2007	2008	2009	2010	2011	# Change
Asian Students							
# Needing DE Math	277	251	241	277	292	235	-42
# Completed Math DE Sequence	110	114	148	151	243	115	5
% Completing Math DE Sequence	*40%*	*45%*	*61%*	*55%*	*83%*	*49%*	*9%*
# Completed Math Gateway	63	67	79	89	115	68	5
% Completing Math Gateway	*23%*	*27%*	*33%*	*32%*	*39%*	*29%*	*6%*
Black Students							
# Needing DE Math	862	853	917	1,117	1,003	1,009	147
# Completed Math DE Sequence	158	205	259	276	340	255	97
% Completing Math DE Sequence	*18%*	*24%*	*28%*	*25%*	*34%*	*25%*	*7%*
# Completed Math Gateway	89	103	116	127	141	153	64
% Completing Math Gateway	*10%*	*12%*	*13%*	*11%*	*14%*	*15%*	*5%*
Latino Students							
# Needing DE Math	511	408	464	357	464	482	-29
# Completed Math DE Sequence	130	164	188	131	263	155	25
% Completing Math DE Sequence	*25%*	*40%*	*41%*	*37%*	*57%*	*32%*	*7%*
# Completed Math Gateway	69	76	90	69	103	84	15
% Completing Math Gateway	*14%*	*19%*	*19%*	*19%*	*22%*	*17%*	*4%*
White Students							
# Needing DE Math	1,116	843	842	924	871	745	-371
# Completed Math DE Sequence	306	318	379	399	418	267	-39
% Completing Math DE Sequence	*27%*	*38%*	*45%*	*43%*	*48%*	*36%*	*8%*
# Completed Math Gateway	167	183	201	201	225	161	-6
% Completing Math Gateway	*15%*	*22%*	*24%*	*22%*	*26%*	*22%*	*7%*

Table A-18: Outcomes for Students Enrolling in Developmental Math by Race and Ethnicity

	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**# Change**
Asian Students							
# Enrolling in DE Math	199	216	211	241	247	192	-7
# Completed Math DE Sequence	110	114	148	151	243	115	5
% Enrolled that Completed Math DE Sequence	*55%*	*53%*	*70%*	*63%*	*98%*	*60%*	*5%*
# Completed Math Gateway	63	67	79	89	115	68	5
% Enrolled that Completed Math Gateway	*32%*	*31%*	*37%*	*37%*	*47%*	*35%*	*4%*
Black Students							
# Enrolling in DE Math	564	648	660	766	715	758	194
# Completed Math DE Sequence	158	205	259	276	340	255	97
% Enrolled that Completed Math DE Sequence	*28%*	*32%*	*39%*	*36%*	*48%*	*34%*	*6%*
# Completed Math Gateway	89	103	116	127	141	153	64
% Enrolled that Completed Math Gateway	*16%*	*16%*	*18%*	*17%*	*20%*	*20%*	*4%*
Latino Students							
# Enrolling in DE Math	358	348	378	272	379	374	16
# Completed Math DE Sequence	130	164	188	131	263	155	25
% Enrolled that Completed Math DE Sequence	*36%*	*47%*	*50%*	*48%*	*69%*	*41%*	*5%*
# Completed Math Gateway	69	76	90	69	103	84	15
% Enrolled that Completed Math Gateway	*19%*	*22%*	*24%*	*25%*	*27%*	*22%*	*3%*
White Students							
# Enrolling in DE Math	723	685	687	711	686	565	-158
# Completed Math DE Sequence	306	318	379	399	418	267	-39
% Enrolled that Completed Math DE Sequence	*42%*	*46%*	*55%*	*56%*	*61%*	*47%*	*5%*
# Completed Math Gateway	167	183	201	201	225	161	-6
% Enrolled that Completed Math Gateway	*23%*	*27%*	*29%*	*28%*	*33%*	*28%*	*5%*