

MONTGOMERY COLLEGE

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THE DEVELOPMENTAL MATH TASK FORCE: OUTCOMES AND EVALUATION

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Executive Summary

I. Brief History

In July, 2009 a Collegewide Developmental Math Task Force was formed and charged with reforming the developmental math program on a collegewide basis. The goal of the initiative was to increase the percentage of students starting at the developmental level who go on to successfully complete a college level math course (and eventually a degree), and to provide students the opportunity to reduce the time needed to accomplish this than had been the case previously. The Task Force made the following recommendations:

1. Combine/Integrate MA 090 (PreAlgebra) and MA091 (Elementary Algebra) into one “Developmental Math” course anticipated to take two semesters.
2. Implement an *emporium-style* course redesign model for the new “Developmental Math” course.
3. Create a 5-hour MA116A integrating MA101 (currently MA 097) and MA116 (Elementary Statistics).
4. Eliminate MA 101 (Intermediate Algebra for Liberal Arts)
5. Offer only one college-level survey course.

II. Status of the Recommendations

Recommendations 1 and 2 were successfully implemented in the form of “Mathematics Prep” (MA 094) which was offered for the first time in fall 2011. Approximately 5200 students across the College enrolled in the course during the 2011-12 academic year. Key features of the new course are:

- Students are required to be actively engaged in MA 094 a minimum 225 minutes per week - 75 minutes in a weekly classroom meeting with their instructor and the remaining 150 minutes in the dedicated open developmental math lab on their campus.
- Students work at their own pace.
- Students must achieve a mastery level of 80 % on each test before they can move on to new material.
- The instructional delivery system, MyLabsPlus by Pearson Learning Solutions, is a comprehensive, web-based platform that includes instructional videos and PowerPoint presentation, learning aids, and all homework and tests and can be accessed by students wherever there is internet capability.
- Faculty work one-one-one with students, as a tutor, mentor, and advisor in both the classroom and the developmental lab.
- Students who need additional(s) to complete the curriculum continue from where they left off in the previous semester, provided there is no more than one year between enrollments.

Recommendations 3, 4 and 5, which dealt with intermediate algebra and the college level math requirement for liberal arts majors have been only partially implemented at the time of this

report. MA 116A will be offered for the first time in fall 2012, but development of the a new single survey course and it's "A" version was stalled due to recent changes in the degree requirements by UMUC which will impact transferability of the new course. The Task Force also altered its initial recommendation to eliminate MA 101 (now MA 097), opting instead to significantly reduce the number of sections offered.

III. First Year MA 094 Outcomes

The primary intended outcome for MA 094 was to increase in the percentage of students starting at the first year developmental level who succeed in intermediate algebra or a hybrid intermediate algebra/college level math course, i.e. MA 115A or MA 116A. Data is presented below which assesses the degree to which this outcome has been achieved to date. It is critical to note, however, that given the magnitude of change implemented, as well as the availability of only one semester of post-MA 094 data, any conclusions in this regard are preliminary at best.

MA 094 - Major Findings:

PreAlgebra Students:

- In AY 2011-12, slightly more than half as many MA 094 students who started at the beginning of PreAlgebra completed the PreAlgebra content in one semester as did PreAlgebra students in AY 2009-10.
- Students who completed PreAlgebra in MA 094 in fall 2011 performed significantly better on the Elementary Algebra content than did their counterparts in fall 2009.
- In AY 2011-12, 159 students were able to complete both the PreAlgebra and Elementary Algebra content in one semester, thus realizing significant savings in time and tuition.
- Only 14% of students who did not complete the MA 094 PreAlgebra content MA 094 in fall 2011, completed one semester's worth of material after reenrolling in the spring.

Elementary Algebra Students:

- 39.2% of MA 094 students who started at the beginning of Elementary Algebra in AY 2011-12, completed this content in one semester as compared to 51.8% of students who enrolled in MA 091/A in AY 2009-10.
- 19.6% of students who started at the beginning of Elementary Algebra in fall 2011 completed intermediate algebra by the end of the spring semester as compared to 28.9% of the MA 091/A students in fall 2009.
- Students were slightly more successful in intermediate algebra after passing MA 094 in fall 2011 than were there students who attempted intermediate algebra after passing MA 091/A/D in fall 2009.
- 41.5% of students who did not complete the MA 094 Elementary Algebra content in fall 2011 completed the course after reenrolling in the spring.

Student Effort:

- Only 1 in 3 students had logged onto MyLabsPlus more than 40 hours during the first 11 weeks of the fall and spring semesters. At that point in the semester, the typical

student should have at been logged on at least 55 hours in order to progress at a reasonable pace.

Discussion and Conclusions:

The rationale for the change to a self-paced, technology based format for first year developmental mathematics remains sound and feedback from students and faculty reinforce the discipline's decision to move in this new direction. That said, the percentage of MA 094 students who managed to complete one semester's material in a semester was unacceptably low. This was particularly true for students starting at the beginning of the PreAlgebra.

The high academic standard in MA 094 was a factor in the lower than anticipated one semester completion rates. Students had to have 100 % on all homework before being allowed to take a test and then had to pass all tests with a score of 80 % or higher before moving on to new material. However, mastery level component of MA 094 also resulted in the positive outcome of drastically reducing the percentage of students who earn a marginal passing grade of C and then continue onto the next math level with a low probability of success. This was particularly true of the MA 094 PreAlgebra students – those that earned the right to move on to Elementary Algebra did significantly better than in fall 2009, the comparison semester for this report.

However, an analysis of student effort in MA 094 strongly suggests that the primary reason behind the low completion rates was the great majority of students who simply did not devote enough time to the course to be successful. Furthermore, the overwhelming majority of students who did not devote sufficient time to the course to avoid a grade of U or W in their first semester of MA 094 exhibited that same behavior when they enrolled for the second time.

Recommendations:

1. Provide the students with hard deadlines that have consequences when not met.
2. Experiment with offering some sections in a classroom setting only.
3. Consider lowering the mastery level.
4. Provide students with a more comprehensive orientation to the course.
5. Provide more focused assistance for students who fail to pass a test by the 3rd attempt.
6. Establish an intervention program for students who fail to make significant progress in their second semester of MA 094.
7. Seek greater involvement and input from discipline faculty in how to improve success rates.
8. Resolve issues associated with the format, content, and use of the student workbook without increasing the course demands on the student.
9. Significantly improve advising for MA 097 and MA 099.
10. Resolve the transferability issues that have stalled implementation of a single college level survey course

Full Report

I. Brief History

In July, 2009 a Collegewide Developmental Math Task Force was formed and charged with reforming the developmental math program on a collegewide basis. The goal of this initiative was to increase the percentage of students starting at the developmental level who go on to successfully complete a college level math course (and eventually a degree), and to provide students the opportunity to reduce the time needed to accomplish this than had been the case previously. The Task Force, comprised of current and former math faculty from all three campuses, met more than 30 times until completing its work at the end of the spring 2012 semester.

The Task Force's first year of work focused on gathering and analyzing developmental math outcomes data from prior years and researching best practices around the nation. In addition, input was sought from students, colleagues in developmental reading, math and English, counselors, administrators, and representatives from MCPS, as well as from the business community. By year's end, this effort resulted in the following five recommendations, leading to a sea change in the Developmental Mathematics Program at Montgomery College:

1. **Combine/Integrate MA 090 (PreAlgebra) and MA091 (Elementary Algebra) into one "Developmental Math" course anticipated to take two semesters** to complete address the lack of continuity in early developmental coursework and facilitate the self-paced approach in Recommendation 2.
2. **Implement an *emporium-style*¹ course redesign model for the new "Developmental Math" course** to address the lack of student engagement, time on task, and mastery of basic math and the inconsistent academic standards.
3. **Create a 5-hour MA116A integrating MA101 (currently MA 097) and MA116 (Elementary Statistics)** to shorten the path from developmental to college level math for liberal arts majors. The structure of the new course would be analogous to MA115A –Mathematical Ideas.
4. **Eliminate MA 101 (Intermediate Algebra for Liberal Arts)** to address the continuity of math coursework and shorten the path from developmental to college level math for liberal arts majors. Students who completed the combined MA090/MA091 course or who placed into

¹ An Emporium-style course redesign model makes use of a self-paced, technology based instructional delivery system and a large, open, dedicated developmental math lab staffed by faculty (and possibly student tutors.) Students are required to spend a specified amount of time each week in the lab working on and learning the course content. Montgomery College eventually adopted a hybrid emporium model in which students met once a week in a classroom with the same instructor and were also required to work on course content a specified number of hours in the developmental lab each week.

MA101 would enroll in MA116A or MA115A or the equivalent new survey course resulting from Recommendation 5.

5. **Offer only one college-level survey course** to eliminate unnecessary confusion for students in deciding which course to take and the need to create a second hybrid survey math course which includes intermediate algebra.

Year 2 of the Task Force's work was devoted to implementation of the above recommendations, particularly Recommendations 1 and 2. Combining and integrating the first two developmental math courses, which previously had been offered in both three and five contact hour one-semester versions, into one self-paced course to be completed within two semesters – students reenroll in the second semester but continue from where they left off - represented an undertaking never before been attempted at the College. The creation of Mathematics Prep (MA 094) required approvals from both the Curriculum and Academic Regulations Committees – the latter for the use of a new and unique grading system - and support from nearly every major area of the College, including Financial Aid, Athletics, Counseling and Advising, the Banner Team, Advancement, Facilities, and Information Technology. After careful evaluation, the Task Force selected Pearson Learning Solution's "My Labs Plus" as the software platform for the course, and also oversaw the creation of the course within My Labs Plus, training of the faculty in their new role in this technology based learning environment, and the development of a student workbook to supplement the software. Furthermore, more than \$300,000 in grant funding was secured from Pearson, the Cafritz Foundation, and the Maryland Higher Education Commission to help fund the implementation and further development of this innovative approach to first year developmental mathematics,

Concurrently, non-Task Force math faculty were recruited for two committees charged respectively with developing MA 116A and a new single college-level math survey course, the latter to be offered in both a 3 credit and a 5 credit "A" version that incorporated MA 097 (formerly MA 101) intermediate algebra concepts for liberal arts.

MA 094 or Math Prep was successfully launched in fall 2011, the Task Force's final year, and nearly 2700 students enrolled in the course that semester. While work continued as well on the development and approval of MA 116A and a new single college level survey math course, almost all of the Task Force's energy in the third year was understandably focused on monitoring and making necessary adjustments to the totally new course structure and instructional approach inherent to MA 094.

II. Status of the Recommendations

Recommendations 1 and 2 were successfully implemented and approximately 5200 students across the College enrolled in MA 094 in the 2011-12 academic year. Key characteristics of the newly redesigned course include:

- Course structure: In general, students register for a 75 minute class meeting with the same instructor once a week and are expected to spend an additional 2 ½ hours weekly

in a newly created or expanded dedicated developmental math lab on each campus. The lab is staffed by math faculty and additional instructional staff to provide continuity of coverage in the labs. (Evening and Saturday classes on all campuses were structured somewhat differently and Rockville students met a second scheduled 75 minute period with their designated instructor in the lab each week.)

- Self-paced learning: This permits students to learn first year developmental material at their own pace, spending less time on concepts that they already know or can absorb quickly and more on concepts that take longer for them to understand and master.
- Time on task: Students spend more time working math problems than was the case in a lecture-based setting.
- Mastery level learning: Students must demonstrate mastery level of key concepts and skills by scoring at 80% or higher on each of the 11 tests before moving on to new material.
- A comprehensive web-based instructional delivery system: Instructional videos and power points on all course topics, extensive problem sets, and tests are incorporated within the My Labs Plus software and, except for the tests, can be accessed anywhere where there is internet capability.
- One-on-one attention from faculty: Faculty work one-on-one with students in the classroom and the lab, mentoring, advising, answering questions, and providing additional explanations of the material.
- Continued forward progress: Students who do not complete the course in a given semester can re-enroll and continue from where they left off, provided they do so within one year.

Considering the magnitude of the change and the number of students and faculty involved, the launch of the new course went remarkably smoothly.

Recommendations 3,4 and 5, which dealt with intermediate algebra and the college level math requirement for liberal arts majors have been only partially implemented at the time of this report . A new hybrid MA 116A was developed and approved by the Curriculum Committee in spring 2012 and will be offered for the first time in fall 2012. A curriculum for a new single college level survey course was also developed, but progress on this front was stalled due to recent changes in the math requirement for liberal arts majors at University of Maryland , University College (UMUC), an important transfer institution for many Montgomery College students. As of this report, plans are for a small contingent of discipline faculty to meet with the Chair of the UMUC math department in hopes of resolving the issue. In the meantime the number of MA 115A sections offered will be increased starting in fall 2012, thus providing an option for more students coming out of MA 094 to complete their college level math requirement in one semester instead of two.

The Task Force reconsidered its recommendation to eliminate MA 097 (formerly MA 101) from the discipline's offerings, and instead decided to offer a few sections each semester to accommodate those students concerned about attempting a combined intermediate algebra

and college level math course in one semester. Additional data is need to determine if this should be a recommended or required path for some students based on their performance in and time to complete MA094.

III. First Year MA 094 Outcomes

The primary intended outcome for MA 094 was to increase in the percentage of students starting at the first year developmental level who succeed in intermediate algebra or a hybrid intermediate algebra/college level math course, i.e. MA 115A or MA 116A. Data is presented below which assesses the degree to which this outcome has been achieved to date. It is critical to note, however, that given the magnitude of change implemented, as well as the availability of only one semester of post-MA 094 data, any conclusions in this regard are preliminary at best. One year is simply not enough time to judge the success or failure of such a major initiative. In fact, most of the outcome benchmarks associated with the Task Force’s first year recommendations were timed for fall 2013 or later.

That said, the first year results presented below are instructive and hopefully will provide useful guidance for course modifications that will lead to improved results longer term.

A. Comparison of Outcomes for Fall 2011 MA 094 Students With Fall 2009 First Year Developmental Students

Although course redesign was fully implemented for the first time at Montgomery College with the introduction of MA 094, some redesign principles had previously been piloted at the developmental level in academic year 2010-11 year at the Germantown and Rockville campuses. Therefore, in order to compare the effectiveness of MA 094 with the traditional lecture-based approach used in developmental mathematics courses for many years, students enrolled in MA 090/A and MA 091/A/D in AY 2009-10 were used as a basis of comparison with MA 094 2011-12 students. (The “A” versions of MA 090 and MA 091 were 5 contact hours per week as compared to 3 for the standard version. MA 091D was a 5 contact hour course that combined the PreAlgebra and Elementary Algebra curricula that, in general, attracted a more highly motivated student.)

Since the results below are based on a census approach (all students were included) as opposed to random sampling of the data from the two fall populations, no statistical tests of significance were performed on the data. It is also critical to note that because the grading approach used in MA 094 is vastly different than what was used in MA 090 and MA 091, comparative results should be interpreted with caution. Every student in MA 094 must meet a very high and uniform standard – 80% on all 11 tests and 60% on a comprehensive final exam (with no partial credit available on any questions) -in order to progress and successfully complete the course, whereas grading in previous years was instructor determined and in many cases included a subjective component.

1. Comparison of Outcomes for Students Starting at the PreAlgebra Level

Outcomes for students who started at the PreAlgebra level, i.e. at Test 1 in MA 094, in Fall 2011 were compared to students who enrolled for MA 090, MA 090A, or MA 091D in Fall 2009.

Data Limitations: It is important to note that the number of students who started MA 094 at Test 1 could not be precisely determined, since, of the 2683 students enrolled, 384 did not attempt a test during the semester. Using Accuplacer scores and prior math grades, however, it was estimated that 162 of these students most likely would have started the course at the PreAlgebra or Test 1 level.

Students who enrolled in MA 091D in Fall 2009 are not included in the Elementary Algebra data in Table 3, because the number of students who had successfully completed the PreAlgebra content during the fall semester could not be determined.

Major Findings:

- Of the students who started at the PreAlgebra level in fall 2009, 51.6% completed the PreAlgebra content within one semester as compared to only 28% of the PreAlgebra level students enrolled in MA 094 in fall 2011 (Table 1).
- Twice as many students (51.0 %) who started at the PreAlgebra level in spring 2010 completed the PreAlgebra content within one semester as compared to the PreAlgebra level students enrolled in MA 094 in spring 2010 (25.4%) (Table 2).
- Students who completed the PreAlgebra content at the required 80% mastery level in MA 094 in fall 2011 performed much better on the Elementary Algebra content (71.4% completed the Elementary Algebra content; 62.2% with an A or B) than did students who completed the PreAlgebra content in MA090/A in fall 2009 (53.7% completed the Elementary Algebra content; 30.9% with an A or B) (Table 3)
- By the end of the spring semester, a higher percentage of fall 2009 MA 091/A/D students had completed Elementary Algebra (27.5%) than fall 2011 MA 094 PreAlgebra level students (21.0%) (Table 1).
- Of the 2318 AY 2011-12 PreAlgebra level (Test 1) students in MA 094, 159 (6.9%) were able to complete both PreAlgebra and Elementary Algebra in one semester. As a result, these students realized a combined tuition savings of about \$50,000 (Tables 1 and 2).

**Table 1: Comparison of Fall 2011 MA094 PreAlgebra (Test 1) Cohort
With Fall 2009 MA90/A and MA091D Cohorts**

Students Who Started In:	N	Completed PreAlgebra Content Within One Semester	Completed Elementary Algebra (MA091/094) Content in One Semester	Completed Elementary Algebra (MA091/094) Content By End of Spring Semester
MA094 PreAlgebra Level (Test 1) Students	1402*	393 (28.0%)**	99 (7.1%)	295 (21.0%)***
MA090/A (Fall 09)	961	501 (52.1%)	0 (0.0%)	189 (19.7%)
MA091D (Fall 09)	255	126 (49.4%)	126 (49.4%)	146 (57.3%)
All PreAlgebra Level (Fall 09) (Row 2 +Row 3)	1216	627 (51.6%)	126 (10.4%)	335 (27.5%)

*Estimated

**H, A, B, or C grade

***Includes Winter session

**Table 2: Comparison of Spring 2012 MA094 PreAlgebra (Test 1) Cohort
With Spring 2010 MA90/A and MA091D Cohorts**

Students Who Started In:	N	Completed PreAlgebra Content Within One Semester	Completed Elementary Algebra (MA091/094) Content in One Semester
MA094 PreAlgebra Level (Test 1)	916	233 (25.4%)**	60 (6.6%)
MA090/A (Fall 09)	783	412 (52.6%)	0 (0.0%)
MA091D (Fall 09)	192	85 (44.3%)	85 (44.3%)
All PreAlgebra Level (Fall 09) (Row 2 +Row 3)	975	497 (51.0%)	85 (8.7%)

*Estimated

**H, A, B, or C grade

Table 3: Comparison of Student Performance in Elementary Algebra for Students Who Completed PreAlgebra in the Fall Semester

Students Who:	# Completing PreAlgebra and Continuing With Elementary Algebra	# Completing Elementary Algebra in Fall* or Spring	% Completing Elementary Algebra in Fall* or Spring	% Completing Elementary Algebra in Fall* or Spring With A or B Grade
Completed PreAlgebra in MA 094 in fall 2011 (A,B, C, or H grade)	336	240***	71.4%***	62.2%***
Completed MA090/A in fall 2009 with A,B, or C	356	191	53.7%	30.9%

*Students who earned an A,B,or C in MA 094 in the fall semester completed PreAlgebra and Elementary Algebra in one semester.

**Students who enrolled in MA 091D in Fall 2009 are NOT included in this table, because there was no way to accurately determine how many students had successfully completed the PreAlgebra content during the semester.

***Includes Winter session

2. Comparison of Outcomes for Students Starting At the Elementary Algebra Level

Outcomes for students who started at the Elementary Algebra level, ie. at Test 6 in MA 094 in Fall 2011 were compared to students who enrolled for MA 091 or MA 091A in Fall 2009

Data Limitations : As was the case at the PreAlgebra level, the number of students who started MA 094 at Test 6 could not be precisely be determined, since, of the 2683 students enrolled, 384 students never attempted a test during the semester. Using Accuplacer scores and prior math grades, however, it was estimated that 181 of these students most likely would have started the course at the Elementary Algebra or Test 6 level.

Major Findings:

- 40.6 % of fall 2011 students who started MA 094 at the Elementary Algebra level (Test 6) were able to complete the course in one semester as compared to 53.1% for fall 2009 MA091/A students (Table 4).
- 80% of Elementary Algebra level (Test 6) who passed MA 094 in fall 2011 did so with a grade of A or B as compared to only 60% for those that passed MA 091/A in fall 2009 (data not in the tables).
- 19.6% of fall 2011 students who started MA 094 at the Elementary Algebra level (Test 6) completed intermediate algebra (MA 097/099) by the end of the spring 2012; 28.9% of

the fall 2009 MA091/A students completed intermediate algebra (MA 101/103) by the end of spring 2010 (Table 4).

Table 4: Comparison of Fall 2011 MA094 Elementary Algebra (Test 6) Cohort With Fall 2009 MA91/A

Students Who:	n	Completed Elementary Algebra (MA091/094) Within One Semester	Completed Elementary Algebra (MA091/094) By End of Spring Semester	Completed Inter. Algebra Level** By End of Spring Semester
MA094 Elementary Algebra Level (Test 6) Students	1226*	498 (40.6%)**	625 (51.0%***)	240 (19.6%***)
MA091/A (Fall 09)	1274	676 (53.1%)	776 (60.9%)	278 (28.9%)

*Estimated

** Includes students who passed MA 115A

***Includes Winter session students and students who completed intermediate algebra in the same semester as MA 094 but did not receive credit for it on their transcript.

3. Comparative Performance in Intermediate Algebra for Students Who Completed Elementary Algebra

Major Findings:

- 68.2% of students who attempted MA 097 after passing MA 094 in fall 2011 successfully completed MA 097 by the end of the following spring semester as compared to 63.2% of students who attempted MA 101 after passing MA 091/A/D in fall 2009 (Table 5).
- 51.2% of students who attempted MA 099 (after passing MA 094 in fall 2011) successfully completed MA 097 by the end of the following spring semester as compared to 46.9% of students who attempted MA 103 after passing MA 091/A/D in fall 2009 (Table 5).

Table 5: Comparison of Spring Semester Student Performance in Intermediate Algebra for Students Who Passed Elementary Algebra in the Fall Semester

Students Who:	Performance in MA097/101 by End of Spring Semester			Performance in MA099/103 By End of Spring Semester		
	# Attp	# Passed	% Passed	# Attp	# Passed	% Passed
Completed MA094 in Fall 11	173	118	68.2%	258	132	51.2%
Completed MA091/A in Fall 09	231	147	67.4%	262	120	45.8%
Completed MA091D in Fall 09	27	16	59.3%	58	30	51.2%
All MA 091 Fall 09 Completions (Row 2 +Row3)	258	163	63.2%	320	150	46.9%

* Includes students who completed intermediate algebra in the same semester as MA 094 but did not receive credit for it on their transcript.

4. Comparative Full Academic Year Performance of All First Year Fall Enrolled Developmental Students

The outcomes at the end of AY 2011-12 for all students enrolled in MA 094 in fall 2011 were compared to those at the end of AY 2009-10 for students enrolled in all versions of MA 090 and MA 091 in fall 2009.

Data Limitations:

AY 2011-12 included a winter session; AY 2009-10 did not.

PreAlgebra students comprised a slightly larger percentage (53.3%) of first year developmental students in fall 2011 than was the case in fall 2009 (48.8%).

Major Findings:

- 35.2% of the fall 2011 MA 094 cohort was able to complete Elementary Algebra by the end of the following spring semester as compared to 57.0% of the fall 2009 MA 090/MA 091 cohort (Table 6).
- 12.6% of the fall 2011 MA 094 cohort was able to complete Intermediate Algebra by the end of the following spring semester as compared to 12.2% of the fall 2009 MA 090/MA 091 cohort (Table 6).
- 62 students from the fall 2011 MA 094 cohort were able to complete a college level math course by the end of the following spring semester as compared to only 11 from the fall 2009 MA 090/MA 091 cohort (Table 6).

Table 6: Comparison of Fall 2011 MA094 Cohort With Fall 09 MA90/A and MA091/A/D Combined Cohort: A One Year Snapshot

First Year Developmental Students (Fall Semester) Who Started In:	N	Completed Elementary Algebra (MA091/094) By End of Spring Semester	Completed Inter. Algebra* By End of Spring Semester	Completed College Level Math By End of Spring Semester
MA094 (Fall11)**	2683	944 (35.2%)	338 (12.6%)**	62 (2.3%)
MA090/A and MA091/A/D (Fall 09)	2490	1419 (57.0%)	305 (12.2%)	11 (0.4%)

*Includes students who passed MA 115A

** Students who completed MA 097 or MA099 during the fall semester but did not receive official credit for those courses are included in this table.

5. Performance of MA 094 Spring 2012 Students

Of the 2479 students enrolled in MA 094 in spring 2012, 1364 (55.0%) were first time MA 094 students and 1115 (45.0%) were continuing students who had enrolled in MA 094 in fall 2011 and started the spring semester from where they had finished in the fall.

Data Limitations:

There were 100 students who did not attempt a test during the semester and consequently their starting point in the course could not be determined.

Major Findings:

- Of 916 students who started at Test 1A, 215 or 23.5 % completed at least the PreAlgebra part of the course (Table 7) .
- 60 (6.6%) of students who started at Test 1A completed both the PreAlgebra and Elementary Algebra parts of the course (not shown in the tables).
- Of 712 students who started at Test 6, 262 or 36.8% completed the course. (Table 7)
- Of 435 students who started at Test 2, 3, 4, or 5, only 61 (14%) completed at least 6 tests, which constitute one semester’s worth of content. (Table 7).
- Of 316 students who started at Test 7A, 8, 9, or 10, 131 (41.5%) completed the course. (Table 7).
- A higher percentage of students who earned a U or W in MA 094 in the fall reenrolled in the spring as compared to students who earned those grades in MA 090/A and MA091/A/D in fall 2009 (46.4% vs. 38.7%). However, 80% of these students earned another U or W in their second semester of MA 094 as compared to about half of the 2009 reenrolling students (Table 8).

Table 7: Spring 2012 Student Performance in MA 094

	Starting Test in Spring 2012									
	T1A	T2	T3	T4	T5	T6	T7A	T8	T9	T10
# of Students*	916	110	135	60	130	712	194	79	36	7
# Completing 6 Tests or the entire curriculum	215	15	18	7	21	262	54	44	29	4
% Completing 6 Tests or the entire curriculum	23.5%	15.5%	13.3%	11.7%	16.2%	36.8%	27.8%	55.7%	80.6%	71.4%

* 70 students who are still included in MLP data, but are no longer officially registered in MA 094 or who had an MLP and MC email address that didn't match, are **not** included in the above table.

Table 8: Spring Semester Performance of Students Who Earned a U or W in the Fall

	# of Students Who Earned a U or W in the Fall Semester*	# (%) of Fall Semester U or W Students Reenrolled in the Spring Semester	# (%) of Fall Semester Students Who Earned a Second U or W in the Spring Semester
MA 094	1477	685 (46.4%)	549 (80.0%)
MA090/A or MA 091/A/D	1098	455 (38.7%)	233 (51.2%)

*Some students earned a U or W in the fall and then attempted a higher level course in the spring. These students are not included in the table.

6. Outcomes by Campus

Unlike at the other two campuses, students on the Rockville Campus were required to register for a specified once a week, 75 minute block of lab time with their classroom instructor in addition to the 75 minute weekly classroom meeting with that same instructor. Because of this arrangement, data for the fall 2011 and spring 2012 semesters were combined in order to determine whether MA 094 outcomes differed by campus.

Major Finding:

- The percentage of students who completed at least a semester's worth of material in one semester was only slightly higher (3 percentage points) for Rockville students than at the other two campuses. (Table 9)

Table 9: Combined Fall 2011 and Spring 2012 Outcomes for MA 094

Campus	N*	% of A,B,C, or H Grades	% of M1 or M2 Grades	% of U Grades	% of W Grades
Distance	114	26.3%	6.1%	54.4%	13.2%
Germantown	1183	29.0%	11.5%	50.5%	8.6%
Rockville	2574	31.9%	10.6%	50.6%	6.8%
TP/SS	1281	28.9%	9.9%	53.4%	7.5%

*Students who audited the course are not included in the table

B. MA 094 Student Satisfaction Surveys

A thirteen question online student survey was conducted in MA 094 during the fall 2011 and spring 2012 semesters. Responses to two key questions were combined for the two semesters and are summarized below.

- Students were asked to estimate the total number of hours, on and off campus, that they spent engaged in MA 094 each week. Of the 1013 responses over the two semesters,

12.0% were “less than 2 hours”
45.8% were “between 2 and 4 hours”
25.6% were “between 4 and 6 hours”
16.8 % were “more than 6 hours”

- Students were also asked whether learning math was easier in a self-paced, technology based environment or in a traditional, lecture-based environment. Of the 1004 responses to this question over the two semesters,

56.2% indicated that learning math was easier in a self-paced, technology based environment
25.0% indicated that learning math was easier in a traditional, lecture-based environment
18.8% indicated that one environment provided no advantage over the other.

C. Student Effort in MA 094

Students are expected to spend a classroom/lab combined total of at least 225 minutes per week on-campus actively engaged in MA 094. It is widely accepted that in most case, students will need to devote more time to the course than this, regardless of whether they work on or off-campus, if they are to successfully complete one semester’s worth of material in one semester. It is important to note that, except for tests, all aspects of the the My Labs Plus instructional software are available to the student anywhere where internet access is available. At a minimum, the typical developmental math student likely will need to spend at least 5 to 6 hours per week working on MA 094 if he/she hopes to complete at least one semester’s worth of content in one semester (defined as passing 6 tests at the mastery level.)

Time a student spends working on MA 094 is reflected, for the most part, in the total time a student is logged onto the My Labs Plus software, a statistic that can be captured in the My Labs Plus software. (In fact, for some students, this number likely represents an overestimate of the time actually spent working on MA 094 material, given instances where they take breaks from working on the course while remaining logged on the software.)

Data on total time logged onto My Labs Plus was collected for all students after 11 weeks in the fall 2011 and spring 2012 semesters. Based on the required 225 minutes per week, at that point in the semester students should have been logged onto My Labs Plus for a minimum of 40

hours total; using the 5 to 6 hour per week benchmark noted above, the total logon time should have approximated 55 hours.

Major Findings:

- Only about 1 in 3 students enrolled in MA 094 were logged on My Labs Plus at least 40 hours during the first 11 weeks of the semester of either semester (Tables 10 and 11).
- Fewer than 1 in 5 (18%) were logged on My Labs Plus for at least 60 hours in the fall or 55 hours in the spring semester(Tables 10 and 11).
- There is a strong correlation between the time students spend on homework and their progress in the course (Table 12).

Table 10: Student Effort in MA 094 Through 11 Weeks of Fall 2011 Semester

Total HRs Logged On MLP Since the Start of the Semester	# of students	% of students	Cumulative %
< 20	839	31%	31%
>= 20 and < 40	904	34%	65%
>= 40 and < 60	434	16%	81%
>= 60 and < 80	225	8%	89%
> = 80	281	10%	100%
Total	2683	100%	

Median Time = 29.5 hours

Table 11: Student Effort in MA 094 Through 11 Weeks Of Spring 2012 Semester

Total HRs Logged On MLP Since the Start of the Semester	# of students	% of students	Cumulative %
< 20	945	38%	38%
>= 20 and < 40	721	29%	67%
>= 40 and < 60	375	15%	82%
>= 60 and < 80	212	9%	91%
> = 80	220	9%	100%
Total	2473	100%	100%

Median Time = 27.5 hours

Table 12: Relationship Between Student Progress and Time Spent on Homework in Fall 2011²

# of Students	# of Tests Passed	Avg Hrs/Wk on Homework
494	0	1.01
512	1	1.83
388	2	2.45
171	3	2.98
233	4	3.65
677	5	3.75
40	6	4.76
161	6+	5.79

D. MA 094 Faculty Satisfaction Surveys

All faculty teaching MA 094 in the fall and spring semesters were given the opportunity to provide feedback about the course through an online faculty survey. Responses to selected questions were combined for the two semesters and are summarized below.

- Faculty were asked how satisfied they were with the self-paced, technology and mastery learning based approach to teaching pre-algebra and algebra in MA 094. Of the 79 responses,
 - 30.4% were “extremely satisfied”
 - 49.4% were “moderately satisfied”
- Faculty were asked whether students needed a more extensive orientation for MA 094 than was currently being provided. Of 77 responses, 58% were “yes”.
- In the fall survey only, faculty were asked whether it would be worthwhile for MA 094 faculty to meet as a group once or twice during the semester. Of the 41 responses, 63% were “yes”.
- In the fall survey only, faculty were asked also for their opinion about the 80% mastery level required on each tests. Of the 41 responses,
 - 9.8% said that the level was “too low”
 - 75.6% said that the level was “just right”
 - 14.6 % said that the level was “too high”

² Data from an analysis of MA 094 by Professor Dina Yagodich, Germantown Campus

E. Discussion and Conclusions: The rationale for the change to a self-paced, technology based format for first year developmental mathematics remains sound and feedback from students and faculty reinforce the discipline's decision to move in this new direction. Only 1 in 4 students surveyed indicated that they preferred learning mathematics with a traditional lecture based approach, while the majority stated that they found the new methodology more conducive to success in mathematics. Similarly, 80% of faculty respondents claimed to be moderately or extremely satisfied with the change. Therefore, it does not appear that a negative attitude toward the new instructional format by students or faculty contributed to learning outcomes that were not as good as expected.

In fact, the percentage of MA 094 students who managed to complete one semester's material in a semester was unacceptably low. This was particularly true for students starting at the beginning of MA 094, i.e., at Test 1, where approximately one in four students finished the PreAlgebra course content, with the comparable rate being twice that for PreAlgebra students in fall 2009. Undoubtedly, the high academic standard of an 80% mastery level on all tests (except the comprehensive final exam) was a major contributor to this disparity. This is evidenced by the fact that 19% (data not in the Tables) of the MA 090/A students in fall 2009 passed with a grade of C, whereas no MA 094 student is permitted to move on to the Elementary Algebra content with less than a B average. Historically, students who had earned a marginal passing grade of C in MA 090/A had a low probability of passing MA 091/A, so the fact that so few MA 094 find themselves in that situation is a very welcome note. The value of requiring students to demonstrate mastery of the content before being allowed to move on is further reinforced by the fact that successful MA 094 PreAlgebra students had a much higher completion rate in Elementary Algebra, and with higher grades, than did the MA 090/A students.

Nonetheless, unless the percentage of PreAlgebra level students who complete Test 5 or higher in their first semester of MA 094 is significantly increased, the level of student success envisioned with the redesign of first year developmental mathematics will not be achieved.

Students who started at the Elementary Algebra level fared much better in MA 094 than did PreAlgebra level students. The combined fall and spring semester data shows that approximately two of every five students were able to finish the course in one semester. However, this number still trailed the combined one-semester completion rate of 51.8% of all fall 2009 and spring 2010 MA 091/A students. Again, a likely contributing factor to the disparity in success rates is the significant number of students who, because of the 80% mastery level, were unable to complete MA 094, but who would have completed MA 091/A with a with a marginal passing grade of C. In fact, 21% of fall 2009 MA 091/A students were awarded a grade of C as compared to only 4% of fall 2011 MA 094 students (and even these students actually had a B average for the entire semester, before falling to a C level due to a grade on the final exam that brought their course average below 80%.)

In general, students who passed Elementary Algebra in the fall and continued on in intermediate algebra (either MA097/101 or MA099/103) did perform slightly better in those

courses when their preparation was MA 094 as opposed to MA 091/A. Still, the overall percentage of students who started Elementary Algebra in the fall semester and completed an intermediate algebra course by the end of the spring semester was still lower for MA 094 students than it was for MA 091/A students two years earlier.

The opportunity for a student in MA 094 to continue in the next semester from where they left off in the prior semester seemed to encourage a higher percentage of students (46.4%) earning a U or W in the fall to reenroll in the spring than was the case previously. Only 38.7% of developmental students who earned a U or W grade in fall 2009 reenrolled for the same course in the spring semester. This positive data was mitigated, however, by the fact that 80.0% of the reenrolling students in MA 094 earned a second U or W in the spring, as compared to only 51.2% of the reenrolling students in MA 090/A and MA 091/A/D in spring 2010. The performance of students who started the second semester of MA 094 at Test 2, 3, 4, or 5 was particularly dismal in this respect. The simple, yet distressing conclusion is that the overwhelming majority of students who did not devote sufficient time to the course to avoid a grade of U or W in their first semester of MA 094 exhibited that same behavior when they enrolled for the second time.

The self-paced structure of MA 094 offers the serious student the opportunity to accelerate through the developmental program, and over the two semesters 159 students took advantage of this by completing both the PreAlgebra and Elementary Algebra parts of the course. It must be noted, however, that this number was still lower than expected, given that in fall 2009 211 students were able to accomplish this in MA 091D (albeit not all at the mastery level required in MA 094), a course that enrolled a relatively small percentage of all PreAlgebra students, many of whom who were advised to take the course based on their placement test scores and motivation. A very bright MA 094 outcome was the fact that 66 first year developmental students from fall 2011 completed their college level math requirement in just two semesters, as opposed to only 11 from the fall 2009 cohort.

In summary, the one semester completion rates (grade of A, B, C, or H) in this initial year of MA 094 were significantly lower than anticipated, although, in general, those students who completed PreAlgebra and/or Basic Algebra performed better at the next level of mathematics than had been the case in prior years. Although the high academic standards in the course - 80% mastery level on tests and 100% on homework - were a contributing factor to the low completion rates, the primary reason for this outcome was that most students devoted considerably less time to the course than was needed to progress at a satisfactory rate. This is strongly evidenced by the data showing that the median number of hours that students logged onto MyLabsPlus was about half of what was expected and that there was a strong correlation between time spent on homework and the number of tests passed during the semester. In other words, and not surprisingly, time on task matters greatly.

IV. Recommendations:

As noted at the outset of this report, a one year follow-up is insufficient time to draw definitive conclusions about the success of the instructional delivery approach embodied in MA 094. Not enough data is available to confidently assess how students perform in their next math course(s) and certainly more time is required to create a culture of success in this vastly different learning environment for both students and faculty. Similarly, discipline faculty need more time to master their non-lecture role, and the MA 094 Course Oversight Committee, which will continue the work of the Task Force, needs time to respond to issues that could not have been foreseen when the course was being designed. In fact, the Task Force has already made a number of modifications, starting with the spring 2012 semester, including:

- splitting Tests 1 and 7, which covered too material, into two tests each (Tests 1A, 1B, 7A and 7B),
- eliminating some topics from the curriculum that were not deemed essential
- introducing a point system to reward student steady progress and penalize lack of attendance in the classroom sessions

Nonetheless, the first year data points to the need for additional new strategies, particularly ones that will encourage students to consistently spend more time actively engaged in the course than is currently the case.

1. Provide the students with hard deadlines that have consequences when not met. Offering developmental math in a self-paced format is a double-edged sword, for while it permits students to spend as much time as they need on concepts and skills that are difficult for them to grasp, it also plays into one of their greatest weaknesses –a lack of academic discipline. (In fact, it's not unreasonable to believe that many of these students are at the developmental level primarily because of they lack this behavior.)

In MA 094's current format, other than the final grade at the end of the semester, there are no hard deadlines in the course that students must meet – it is 100% self-paced. The following true story about the behavior of one particular student, Carlos (not the student's real name), demonstrates the unintended consequence of allowing the developmental level student to completely determine their rate of progress in the course.

Carlos enrolled in MA 094 in fall 2011, starting at the beginning of Part II; in other words, the first test he would have to complete at the mastery level was Test 6. Carlos did not even attempt Test 6 until 6 weeks into the semester, but fortunately was able to pass it on the first try with an 86. However, he did not attempt another test for the rest of the semester and consequently was awarded a grade of U. Carlos re-enrolled in MA 094 in the spring, starting from where he left off. Yet once again, he attempted only one test, Test 7A, in the first 10 weeks, which he passed on his second try with a score of 96. Fortunately, Carlos finally came to the realization that he quickly needed to start applying himself if he was to avoid a third semester for what was supposed to be a one-semester experience. In the next 4 weeks, after

taking 24 weeks of class to pass two tests, Carlos attempted and passed Tests 7B, 8, 9, and the Final Exam and finished the course with a solid B average.

Although this anecdotal evidence involves the behavior of only one student, the data in Tables 8 and 9 strongly suggest that, like Carlos, the approach many developmental students take towards mathematics is best described by one word - avoidance. And currently it's just too easy for the MA 094 student to take long breaks from doing something they don't enjoy or have confidence with, and delude themselves into thinking that there's plenty of time to catch up later.

Providing students with mileposts that have deadlines will not change behavior in all cases, but it would afford many the course structure they need to make sufficient and steady progress during the semester. As one example, students might be required to *complete* 3 tests by midterm, and should they fail to do so, they would be blocked from My Labs Plus until they meet with their instructor to discuss the situation. If this meeting did not occur within some specified period of time, say 1 week, the student should expect to be dropped from the class.

Except in rare instances, there should be no reason that students could not meet this type of requirement. One of the great benefits of the MA 094 course design is that students no longer need worry about falling behind the learning pace of an entire class, as is the case in a lecture based model. Instead, every student has the opportunity to put in as much time as he/she needs to master the material, and to take advantage of plenty of individual faculty support to help them do so. In other words, the self-paced format of MA 094 gives them full control of and responsibility for their success in the course.

2. Experiment by offering some sections in a classroom setting only. Given the avoidance mentality of many in this population, the current scheduling format of MA 094 provides them with too much flexibility and freedom. Students meet in a classroom setting with their instructor only once a week and are expected to work an addition 2 ½ hours in the lab *at their own convenience*. (Rockville students had less freedom in scheduling their lab time than students at the other two campuses, as they were required to meet a second time with their instructor for 75 minutes each week, albeit in a sectioned off area of the lab.) Furthermore, there was no effective system for monitoring lab attendance, making it even easier for students not to take their 2 ½ hour weekly lab requirement seriously.

As soon as feasible, the discipline should begin offering some sections that meet all 225 minutes per week in a classroom with the same instructor; for example, M, W, F for 75 minutes each, in order to see whether a more prescribed class schedule leads to greater student. In fact, data from this past year points to this outcome, since the one semester completion rate (A,B, C or H grade) for Rockville students, who had less flexibility in scheduling their lab time, was 3 percentage points higher than at the other two campuses (This equates to a success rate that was approximately 10% higher at Rockville.)

The discipline may also want to consider the possibility of *requiring* who fail to complete 6 tests over two semesters to enroll in a section in which all sessions are held in a classroom with the same instructor and is also linked to a DS 102 (Study Habits Development) class.

3. Consider lowering the mastery level. The compelling reason for requiring a mastery level of 80% on all tests (except the final exam) and 100% on the assignments leading up to these tests was the disappointing past performance in intermediate algebra of students who had passed Elementary Algebra (MA 091/A/D). But as seen in the data earlier in this report, students who completed MA 094 succeeded in MA 097 and MA 099 (formerly MA 101 and 103 respectively) at only a slightly higher rate than before.

Requiring students to achieve 80% on each test before they are permitted to move on to new material represents a high benchmark, particularly since no partial credit is awarded for any test questions. In fact, most, if not all, schools that have implemented redesign in developmental math have set their mastery level at 70 or 75 %.

The downside of maintaining a higher than necessary mastery level is that it keeps some students from making more steady progress in the course than they otherwise might.

For example, an M1 or M2 grade is currently awarded to students who “make significant progress” during the semester, defined as completing 5 tests instead of the minimum 6 required to earn an H, A, B or C grade. An analysis of the 241 students who earned an M1 or M2 grade in fall 2011 indicates that 103 scored between 75 and 80 on at least one test that they attempted. In each instance, -and there were students who were in this situation more than once - the student had to complete a set of test corrections and then retake the test. Given a 75% mastery level, it’s possible that many of these students would have completed one more test and earned either an A,B,C, or H for the semester. Notwithstanding the fact that students should be able to find the time to meet the current conditions for moving forward in the course, there should be solid evidence that the mastery level is necessary to successfully progress to new material and that it also leads to higher success rates in the math courses that follow.

Since the data shows that successful MA 094 PreAlgebra students performed significantly better in Elementary Algebra than in years previous, one option to consider is maintaining the 80% mastery level in the first half of the course, particularly with respect to critically important topics such as operations with signed numbers, but lowering it in the second half of the course or when assessing topics that may carry less weight, such as factoring quadratic expressions.

4. Provide students with a more comprehensive orientation to the course. It is worth noting that 58% of the faculty respondents to the fall semester survey stated that students require a more extensive orientation to the course than they are currently given. The class structure, course format, and grading system used in MA 094 are all totally new to students (and to faculty teaching the course for the first time) and it is essential that students fully understand how the course functions and the level of responsibility required to progress and succeed. It’s

particularly critical that they understand that *to be successful they must put in whatever time is necessary for them to stay on or ahead of the suggested test schedule*. Of course, they need to understand what “staying on schedule” means, since some students may think that when the posted suggested test schedule indicates a date for a specific test, they need only have *attempted* Test 3 by that date to be on schedule. Unfortunately, if they do not achieve the 80% mastery level on the first attempt, as many don’t, they are behind schedule. In fact, data from fall 2011 semester show that students averaged 2.5 attempts per test.

Students should also be exposed to prior MA 094 outcomes data, not as a discouraging message, but rather to impress upon them how critically important it is for them to invest whatever time is necessary on a consistent week in, week out basis to not fall behind schedule.

5. Provide more focused assistance for students who fail to pass a test by the 3rd attempt. As note earlier, a significant number of students require multiple attempts to achieve the 80% mastery level on a test. For example, in fall 2011, of the 948 students who eventually passed Test 2, 28.8% required 3 or more attempts and 13.3% required at least 4 attempts. On Test 8, those percentages were 39.8% and 18.7% respectively and on Test 9, they were 42.9% and 22.7%. The consequence of requiring repeated attempts to pass a test is a diminished likelihood of completing the course in a reasonable amount of time. In addition, the frustration experienced from repeated attempts on the same test is discouraging to the student and, in some instances, may well lessen their motivation to keep working. When a student fails to pass a test on the 2nd or 3rd attempt, their instructor should proactively intervene to determine why that student is satisfactorily completing all the work necessary to sit for the test, but yet is repeatedly unable to pass it. One available option is to use the course workbook that students are required to purchase to provide additional work with a slightly different approach.

6. Establish an intervention program for students who fail to make significant progress in their second semester of MA 094. There will always be a significant number of students who, because they lack sufficient responsibility, maturity, or motivation at this point in their lives, will perform poorly in developmental mathematics, regardless of the instructional delivery system or level of support from faculty. Currently, the College does not intervene in any systematic or consistent way, and many of these students either drop out of school or blindly continue on the same academic path based on advice to simply “work harder. They would be better served if a faculty member or counselor had an “honest conversation” with them about their current direction and about positive alternative paths, such as a certificate program in a career specialty, that might match their interests and abilities, provide them with tangible employment options, and put them on a more successful academic and life course.

7. Seek greater involvement and input from discipline faculty in how to improve success rates. In the fall 2011 faculty survey, 63% of the respondents saw value to meeting once or twice a semester as a group. Such meetings would promote a greater sense of involvement for those who teach the course, by encouraging possible solutions to addressing the lower than desired rate of progress for most of the students. They would also ensure that all faculty understand the complicated new grading and student progress/attendance point systems and the

importance of proactive intervention with students who do not log sufficient time on My Labs Plus and fall behind.

8. Resolve issues associated with the format, content, and use of the student workbook without increasing the course demands on the student. There was significant dissatisfaction with first edition of the workbook, as well as confusion about its integration into the course; more specifically, what student work to check and when it should be checked. The Task Force spent considerable time discussing these issues, including whether the workbook should be used to encourage greater quantitative reasoning in the course or as a summary review of the key concepts and skills in the course, or both. While no recommendation is made here on the specific content or use of the workbook, given the already high academic standards in the course and the fact that many students are already struggling to complete it time expect, any modifications to the content of the workbook and its use should be made in ways that *do not* increase the course demands on the student.

9. Significantly improve advising for MA 097 and MA 099. MA 099 (formerly MA 103) is the significantly more demanding of the two intermediate algebra courses offered at the College and is intended for students who need MA 130, MA 160 or MA 180 for their major. Not surprisingly, the success rate for students who attempt MA 099 (formerly MA 103) after completing Elementary Algebra is significantly worse than the success rate for students who attempt MA 097 (formerly MA 101). What is surprising is that many students who require MA 097 for their major are being mistakenly advised (or are making the decision on their own) to enroll in MA 099 instead. For example, 53% of the 274 students who passed MA 091/A/D in Fall 2009 and subsequently completed MA 103, then registered for MA 110, MA 115, or MA 116, and never attempted MA 130, MA 160, or MA 180. Based on this data, it's reasonable to infer that many of the students who *unsuccessfully* attempted MA 099, should have enrolled in MA 097 instead. Remediating this situation would likely improve the percentage of developmental students who successfully complete their college math requirement, and certainly would save many students the frustration and extra tuition associated with having to take intermediate algebra more than once.

10. Resolve the transferability issues that have stalled implementation of a single college level survey course (Recommendation # 5 of the Task Force). The rationale for this Task Force recommendation remains intact. Liberal Arts students do not have a sound basis for deciding whether to enroll in MA 110 or MA 115, and unless the discipline is willing to create a 5 credit version of MA 110 that integrates intermediate algebra topics into the curriculum as it has with MA 115A, many students unnecessarily will need an additional semester to complete their college level math requirement.

Members of the Task Force invested a tremendous amount of time, energy, and thought into leading the reform of the developmental math program at Montgomery College. Although the first year of MA 094 yielded some disappointing results, the goal they envisioned – a higher percentage of students completing developmental math and a first level college math course in the same or less time than before – remains realistic and achievable. This will require, however,

a commitment by the newly formed MA 094 Course Oversight Committee to monitor results and make course adjustments accordingly, particularly ones which will lead students to change their work ethic and behavior with respect to studying mathematics.