42.4% Increase in Students Placing into Credited Math Courses!!!!!!

Dave Usinski: usinski@ecc.edu
Lynn Meslinsky: meslinskylc@ecc.edu
At Erie CC, students now take the algebra portion of the placement exam first, which has led to an increase in the number of students placing into credited math courses. Does this seemingly subtle change increase student retention?
Starting in a Developmental Course Leads to ???

![Pie chart showing various courses and their percentages starting from MT-001.](image-url)
Starting in a Developmental Course Leads to ???
Starting in a Developmental Course Leads to ???

![Pie chart showing distribution of courses after starting MT-007](chart.png)
Starting in a Developmental Course Leads to ???

Start MT-013

- 20% No Math
- 19% MT-125
- 11% MT-112
- 6% MT-013
- 5% MT-006
- 5% MT-143
- 5% MT-126
Previous Order:
Pass Arithmetic → Take Algebra
Fail Arithmetic → Done

New Order:
Pass Algebra → Done
Fail Algebra → Take Arithmetic
Our More Recent Question

At Erie CC, students now take the math portion of the placement exam prior to taking English. Has this additional change led to increased number of students testing into credit bearing math courses?
Our Theory

Students’ use of calculators throughout high school adversely impacted arithmetic placement test results while not affecting the results of the algebraic portion of the test.
Anecdotal Evidence

Suggests that students subjected to years of developmental math become frustrated and discouraged. This creates barriers to their learning and their investment in their educational process.
Our Goal

To shorten or eliminate the developmental path to credited mathematics courses and hopefully improve retention.
Percent Placement by Semester

Consistently higher over four semester since the change in order of the placement.

- Arithmetic (and registered)
- Elementary Algebra (and registered)
- Credited Math (and registered)

The high school math curriculum did not change during this time. Graphing calculators were required on the high school end-of-year exams.
Includes Spring and Fall 2012

- Arithmetic (and registered)
- Elementary Algebra (and registered)
- Credited Math (and registered)
Over the last four semesters, 1,530 more students passed the placement exam compared to the previous five semesters.
Includes Spring and Fall 2012

- Arithmetic (and registered)
- Elementary Algebra (and registered)
- Credited Math (and registered)

Pre Placement Test Change (n=9073)

Post Placement Test Change (n=13956)
Changing the placement testing order decreased the number of students starting in developmental algebra by nearly 40%!!!
Changing the placement testing order increased the number of students who tested for and registered in a credited math course at ECC by 42.4%.
Changing the placement testing order had no significant impact on the number of students testing at the developmental arithmetic level.
Difficult Part – Validate with Student Data

- How to efficiently sort, filter, and calculate average grades from Fall 2002 through Spring 2011?
  - 1,114,603 courses
  - 62,265 students
Number of Students in Entry Level Math Courses without Previously Taking Developmental Math

9.0% increase in number passing 08/FA to 09/FA while overall student enrollment increased 8.2%.

16.4% increase in number passing 09/FA to 10/FA while overall student enrollment increased 1.7%.
Conclusion 4

The increase in students who passed a credited math course at ECC was not due to an increase in enrollment.
The number of students enrolled in entry level math courses with a developmental math history has steadily decreased while overall student enrollment increased.
Conclusion 5

The number of students passing entry level math courses who started with a developmental math background has decreased over this 10 year period while the number of these same students who failed has remained fairly constant.
Mean Student Grade in Entry Level Math Courses

- Course average grade did not decrease significantly for passing students.
- Increase in failures lowered overall student average in entry level math courses.
Conclusion 6

Passing student averages in entry level math courses post and pre placement test change did not show a significant difference.
Overall student averages (including failures) in entry level math courses decreased slightly post placement test change. This was not unexpected.
The placement test change successfully increased retention in that it shortened time needed to complete a degree for a significant number of our students.
Special Thanks

Our Data Miners:
  Diane McLaughlin
  Marlene Arno
  Cheryl Campbell
Other Changes to Developmental

Before →

Non-credit Developmental Courses

MTLV1

MT001 (5 cr.) or
MT003 (3 cr.)

MT006
3 credits

MT007
3 credits

MT013
5 credits

Challenge Placement

MTLV2

MT006
3 credits

MT007
3 credits

MT013
5 credits

Challenge Placement

MTLV3

MT007
3 credits

MT013
5 credits

Challenge Placement

MTLV4

MT111
1 credit

MT112
3 credits

MT125
4 credits

MT143
4 credits

Placement Test Results
Other Changes to Developmental

Beginning Spring 2012

New Developmental Mathematics Flowchart

STEM (Science, Technology, Mathematics & Engineering): Requires MT118 or Higher

MT003 (MT001*) Prealgebra

MT013 (MT007*) Elementary Algebra

MT118 - Mathematics for Elementary Education Teachers I

MT121 - Technical Mathematics I

MT125 - College Mathematics

MT143 - Introductory Statistics I

Any Approved MT Course

MT111 - Mathematics of Dosage

MT112 - Survey of Mathematics

MT116 - Algebra in the Real World

Student Chooses Major with Proper Advisement

Non-STEM (not Science, Technology, Mathematics or Engineering): Requires only MT111, MT112, or MT116

MT003 (MT001*) Prealgebra

MT006** - Basic Algebra Review

* MT001 and MT007 are no longer being offered.

** Students will need to pass MT013 before enrolling in MT118 or higher
Recent Ideas

• Moved the Math Accuplacer tests ahead of English
  – Data inconclusive at this point

• Explore a stronger connection to high school regents exam scores and placement waivers. I will be working with Albany with Regents Fellows.
Probability of a C or Greater in Freshman Composition by Regents English Score

Figure 2
Probability of C or Greater in Freshman Composition by Regents English Score
Recent Graduates of New York City Public High Schools Entering CUNY in Fall 2003

Mean probability of C or higher: 85%
Students who score above an 80 on their Regents exam have a good chance of earning at least a C in college-level math
Students who score below an 80 on their Math Regents have a much greater likelihood of being placed in a remedial college course

<table>
<thead>
<tr>
<th></th>
<th>Arithmetic</th>
<th>Elementary Algebra</th>
<th>Intermediate Algebra**</th>
<th>College Algebra</th>
<th>Pre-Calculus</th>
<th>Calculus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 55</td>
<td>68.3%</td>
<td>29.7%</td>
<td>0.0%</td>
<td>1.4%</td>
<td>0.7%</td>
<td>0.0%</td>
</tr>
<tr>
<td>55 to 64.9</td>
<td>61.4%</td>
<td>33.7%</td>
<td>0.6%</td>
<td>3.2%</td>
<td>0.8%</td>
<td>0.3%</td>
</tr>
<tr>
<td>65 to 69.9</td>
<td>38.9%</td>
<td>44.7%</td>
<td>1.8%</td>
<td>8.0%</td>
<td>4.8%</td>
<td>1.8%</td>
</tr>
<tr>
<td>70 to 79.9</td>
<td>14.7%</td>
<td>24.6%</td>
<td>5.9%</td>
<td>23.5%</td>
<td>21.3%</td>
<td>8.1%</td>
</tr>
<tr>
<td>80 to 89.9</td>
<td>0.8%</td>
<td>2.8%</td>
<td>4.3%</td>
<td>17.3%</td>
<td>30.6%</td>
<td>32.3%</td>
</tr>
<tr>
<td>Above 90</td>
<td>0.0%</td>
<td>0.2%</td>
<td>0.5%</td>
<td>3.4%</td>
<td>12.7%</td>
<td>39.2%</td>
</tr>
</tbody>
</table>

**Intermediate Algebra is considered a remedial course in some schools in the CUNY system and a credit-bearing course in others.

Totals sum to 100 percent along rows, but not down columns.

Source: CUNY Office of Institutional Research and Assessment, Math A Regents; all CUNY 2- and 4-year institutions.
Our Challenge
Graduating *All* Students College & Career Ready

New York's 4-year high school graduation rate is 73.4% for All Students. However, the gaps are disturbing.

**June 2010 Graduation Rate**

<table>
<thead>
<tr>
<th>Graduation under Current Requirements</th>
<th>% Graduating</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Students</td>
<td>73.4</td>
</tr>
<tr>
<td>American Indian</td>
<td>59.1</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>82.6</td>
</tr>
<tr>
<td>Black</td>
<td>57.7</td>
</tr>
<tr>
<td>Hispanic</td>
<td>57.3</td>
</tr>
<tr>
<td>White</td>
<td>84.1</td>
</tr>
<tr>
<td>English Language Learners</td>
<td>40.3</td>
</tr>
<tr>
<td>Students with Disabilities</td>
<td>44.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Calculated College and Career Ready*</th>
<th>% Graduating</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Students</td>
<td>36.7</td>
</tr>
<tr>
<td>American Indian</td>
<td>21.4</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>56.4</td>
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<tr>
<td>Black</td>
<td>12.8</td>
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<tr>
<td>Hispanic</td>
<td>14.9</td>
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<tr>
<td>White</td>
<td>50.6</td>
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<tr>
<td>English Language Learners</td>
<td>6.1</td>
</tr>
<tr>
<td>Students with Disabilities</td>
<td>4.7</td>
</tr>
</tbody>
</table>

*Students graduating with at least a score of 75 on Regents English and 80 on a Math Regents, which correlates with success in first-year college courses.

Source: NYSED Office of Information and Reporting Services