SOLVE FOR X & Y
TO OPEN ACCESS AND ACCELERATE STUDENT COMPLETION
Presenters

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  CVTC District Board Member

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  Math Instructor

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  Developmental Math Instructor
Poll Time!

> Take out your phone

> Text MARGOKEYS426 to 37607

> Text your poll response!
What are the barriers students face to enter your college?
CVTC Overview:

- Two-year community & technical college
- 4,100 FTEs
- Steady decline in FTEs over three years
- Performance-based funding
- Strategic initiative to increase graduation
- Business and industry demand for more graduates
Analysis Revealed

• Some students take the COMPASS test, but do not progress to enroll
• Students in remediation path are 10-15% less likely to matriculate
• Some students start the remediation path, but do not progress through or into the next term
• Student loan debt increases without a credential (no certification or diploma)
Analysis Revealed

- National models have emerged with strong results
- State legislative mandates reform for developmental education
- Complete College America research supports change is possible
Accelerate Developmental Education
Mainstream Support

40% of CVTC students need math remediation to meet program/course requirements

18% of CVTC students need writing remediation to meet program/course requirements

<table>
<thead>
<tr>
<th>Math pathways</th>
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</thead>
<tbody>
<tr>
<td>Each program with math competency, selects an option</td>
</tr>
<tr>
<td>Quantitative reasoning</td>
</tr>
<tr>
<td>Statistics</td>
</tr>
<tr>
<td>Pre-algebra</td>
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<tr>
<td>Algebra track</td>
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<table>
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<tr>
<th>Writing</th>
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<tbody>
<tr>
<td>SI will become mainstream for English Composition courses</td>
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</table>
Math Pathway

- Carnegie Foundation for the Advancement of Teaching
  - Unique methods and network
- Standardized curriculum
  - Statway
  - Quantway
- Pathway instructional system
  - Network engagement
  - Productive persistence (engagement and motivation)
  - Rapid analytics
  - Relevant content
Why Carnegie?

- Recognition as national leader in math redesign
- Evidence based student success
- Network for improvement
- Productive persistence. Growth mindset
- Pedagogy methods
Quantway Effectiveness

- Only 21% of baseline group of developmental math students passed a traditional developmental math course within one year.

- Extending that timeframe to two years increased the cumulative pass rate to only 29%.

- Quantway 1 students achieved double the success rate with a 59% weighted average success rate.

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1 To compute this baseline success rate, we worked with institutional researchers from six of the first Quantway colleges. Analyses revealed that only 20.6% of students were able to successfully complete their developmental math sequence within a full year. Additionally, 28.5% achieved this goal after two years, 31.6% after three years, and 33.3% after four years.
Statway Effectiveness

- Typically, only 6% of baseline group of developmental math students successfully earned college-level math credit in one year.

- Even in two years, only 15% of students in the traditionally math sequence were successful.

- Students in Statway have a weighted average of 50% success rate-achieving triple the success in half the time.

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*To compute this baseline success rate, we worked with institutional researchers from 18 Statway colleges in year 1 to collect data on developmental mathematics course-taking prior to Statway implementation. Analyses revealed that only 5.9% of non-Statway developmental math students enrolled at these colleges in 2008 received credit for college-level mathematics in one year. Additionally, only 15.1% had achieved this goal after two years, 20.4% after three years, and 25.5% after four years.*
Student Feedback on Course Evaluations

• “In high school I struggled with Math. But here at CVTC I surprise myself every day. I honestly can’t tell you if it was working in groups or the way the instructor teaches but something just clicked and it all made so much more sense. Math has actually become fun, which is something I thought I’d never say.”

• “I did not want to take this class at all because I hate math, but the instructor really makes me not hate it. Class is pretty fun, and I am starting to find math less challenging. She is really good at explaining things and showing me how to do things so I can do the work on my own.”
Introductions and Experience in a Collaborative Classroom With the Carnegie Curriculum
Breaking Down the Variables

• Problem situation: Calculating the braking distance of a car

• How many feet does it take to stop a vehicle going 25 mph?
  • Approximately 24.6ft
Breaking Down the Variables

- Problem situation: Calculating the braking distance of a car
  - $d =$ braking distance (feet)
  - $V_0 =$ initial velocity of the car (feet per second)
  - $g =$ acceleration due to gravity ($32.2 \text{ ft/sec}^2$)
  - $f =$ coefficient of friction between the tires and the roadway ($0 < f < 1$)
  - $G =$ roadway grade

Note: $V_0 = 25 \text{ mph} = 36.7 \text{ ft/sec}$, $G = 0.05$, $f = 0.8$
Breaking Down the Variables

• Find your reaction time!
Breaking Down the Variables

• Find your reaction time!
  • How many inches do you think it would take you to catch a ruler?

\[ t = \sqrt{\frac{d_{\text{ruler}}}{192}} \quad \text{d}(t) = 36.7t \]

<table>
<thead>
<tr>
<th>inches</th>
<th>Time (sec)</th>
<th>Reaction Distance (ft)</th>
<th>Total Distance (ft)</th>
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<tr>
<td>5</td>
<td>0.16</td>
<td>5.87</td>
<td>30.47</td>
</tr>
<tr>
<td>6</td>
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<td>0.19</td>
<td>6.97</td>
<td>31.57</td>
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<tr>
<td>8</td>
<td>0.20</td>
<td>7.34</td>
<td>31.94</td>
</tr>
<tr>
<td>9</td>
<td>0.22</td>
<td>8.07</td>
<td>32.67</td>
</tr>
<tr>
<td>10</td>
<td>0.23</td>
<td>8.44</td>
<td>33.04</td>
</tr>
<tr>
<td>11</td>
<td>0.24</td>
<td>8.81</td>
<td>33.41</td>
</tr>
<tr>
<td>12</td>
<td>0.25</td>
<td>9.18</td>
<td>33.78</td>
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</tbody>
</table>
Breaking Down the Variables

• Making Connections
Previous Experiences with Math Classes
Pros and Cons of the Collaborative Classroom and the Carnegie Curriculum
How is it Different?
# Math Pathway List

<table>
<thead>
<tr>
<th>Quantway</th>
<th>Statway</th>
<th>STEMway</th>
<th>Techway</th>
<th>Student Choice Quantway or Statway</th>
</tr>
</thead>
</table>
| - Early Childhood Education  
- Radiography  
- Environmental, Refrigeration, Air Conditioning, and Heating Service Technician (T.D.)  
- Diagnostic Medical Sonography  
- Criminal Justice  
- Renewable Energy (T.D.)  
- Landscape Plant Turf Management  
- Animal Science Management  
- Agronomy Management  
- Industrial Mechanical Technician  
- Health Info Management and Technology  
- Library and Information Services  
- Farm Operation (T.D.) | - Paralegal  
- Manufacturing Quality  
- IT-Software Developer  
- IT-Mobile Developer  
- Professional Communications | - Air Conditioning, Heating, and Refrigeration Technology (and Quantway)  
- Automation Engineering Technology  
- Architectural Structural Design  
- Manufacturing Quality  
- Manufacturing Engineering Technologist  
- Nano Engineering Technology  
- Manufacturing Engineering Technologist (and Statway)  
- Nano Engineering Technology (and Statway) | - Automotive Maintenance Technician (T.D.)  
- Automotive Technician(T.D.)  
- Auto Collision Repair and Refinish Technician(T.D.)  
- Diesel/Heavy Equipment Technician(T.D.)  
- Electrical Power Distribution(T.D.)  
- Motorcycle, Marine and Outdoor Power Products Technician (T.D.)  
- Welding Fabrication (T.D.)  
- Machine Tooling (T.D.)  
- Industrial Mechanic (T.D.) | - Accounting  
- Accounting Assistant (T.D.)  
- Business Management  
- Sales Management  
- Marketing  
- Digital Marketing  
- Human Resources  
- Organizational Leadership  
- Executive Assistant  
- Liberal Arts Associate of Science |

<table>
<thead>
<tr>
<th>*Course Options</th>
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<th>*Course Options</th>
<th>*Course Options</th>
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</table>
| Mathematical Reasoning - 3 credit  
Quantitative Reasoning - 4 credit | Statistics I - 3 credit  
Liberal Arts Statistics II - 4 credit | College Tech Math - 5 credit + Math Success hour (SI)  
College Algebra - 4 credit | Math for Tech Trades - 2 credit  
Paired with math success hour (SI) |

Technical Diploma (T.D.) *Course Options; The Dean and Department Chair determine the course included in the degree requirements.*
Finding the Right Formula

Math Challenge + Writing Challenge = Access Challenge

\[ X + Y + \text{HS GPA} = \text{Student Access} \]

(Carnegie)  (SI for EC1)
Community Impact
Results

- First year results are positive
- Math pathway courses increased success rates year one
- College FTEs increased
Questions? Reflections?

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