Curriculum and Degree Programs of Study

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Nick Shay, Central Ohio Technical College

October 26, 2018
Symposium on Co-Requisite Approaches in Math
Sinclair Community College

Campuses in Dayton, Mason, Huber Heights and Englewood

David Hare
Sinclair Community College

- 30 Full-time faculty in the math department
- 1624 FTE in math department (2017)
- 322 math courses running (fall, 2018)
- 49 sections of co-requisite courses (fall, 2018)
Math Co-requisite Courses

• Created for:
  – MAT 1445 - Quantitative Reasoning
  – MAT 1450 - Introductory Statistics
  – MAT 1460 - Finite Mathematics for Business Analysis
  – MAT 1470 - College Algebra

• Model:
  – Paired
Goal of Co-requisites

• Increase number of students successfully completing MAT 1445/1450/1460/1470 each term

• Make it possible for all students to reach a college-level math class by their 2nd semester

• Avoid negatively impacting success rates

• Reduce overall student cost
## Enrollment – Fall, 2018

<table>
<thead>
<tr>
<th>College Level Class</th>
<th>Enrollment</th>
<th>Co-requisite enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 1445—Quantitative Reasoning</td>
<td>108</td>
<td>52 (48%)</td>
</tr>
<tr>
<td>MAT 1450—Introductory Statistics</td>
<td>297</td>
<td>103 (35%)</td>
</tr>
<tr>
<td>MAT 1460—Finite Mathematics</td>
<td>140</td>
<td>54 (39%)</td>
</tr>
<tr>
<td>MAT 1470—College Algebra</td>
<td>504</td>
<td>180 (36%)</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>1049</strong></td>
<td><strong>389 (37%)</strong></td>
</tr>
</tbody>
</table>
## Success Rates AY 2017-2018
### Quantitative Reasoning

<table>
<thead>
<tr>
<th>Course Description</th>
<th>Enrolled</th>
<th>C or better</th>
<th>% successful</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 1445 and Co-Req</td>
<td>178</td>
<td>110</td>
<td>62%</td>
</tr>
<tr>
<td>MAT 1445 with no Co-Req</td>
<td>199</td>
<td>131</td>
<td>66%</td>
</tr>
</tbody>
</table>
# Success Rates AY 2017-2018

## Introductory Statistics

<table>
<thead>
<tr>
<th>Course</th>
<th>Enrolled</th>
<th>C or better</th>
<th>% successful</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 1450 and Co-Req</td>
<td>239</td>
<td>146</td>
<td>61%</td>
</tr>
<tr>
<td>MAT 1450 with no Co-Req</td>
<td>638</td>
<td>449</td>
<td>70%</td>
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</table>
## Success Rates AY 2017-2018

**College Algebra**

<table>
<thead>
<tr>
<th></th>
<th>Enrolled</th>
<th>C or better</th>
<th>% successful</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 1470 and Co-Req</td>
<td>600</td>
<td>281</td>
<td>47%</td>
</tr>
<tr>
<td>MAT 1470 with no Co-Req</td>
<td>691</td>
<td>358</td>
<td>52%</td>
</tr>
</tbody>
</table>
Student Success

– Global Comparison: CY 2016 vs. CY 2017
– Includes MAT 1440, 1445, 1450, and 1470.
– “Success” means C or better

<table>
<thead>
<tr>
<th></th>
<th>CY 2016</th>
<th>CY 2017</th>
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</thead>
<tbody>
<tr>
<td># of students successfully</td>
<td>1124</td>
<td>1544</td>
</tr>
<tr>
<td>completing a college-level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>course</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Success Rate</td>
<td>55%</td>
<td>56%</td>
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</table>
MAT 1470-College Algebra

<table>
<thead>
<tr>
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<th>CY 2016</th>
<th>CY 2017</th>
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<tbody>
<tr>
<td># of students successfully completing a college-level course</td>
<td>437</td>
<td>706 (+62%)</td>
</tr>
<tr>
<td>Success Rate</td>
<td>44%</td>
<td>48%</td>
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</tbody>
</table>
## MAT 1450-Intro Stats

<table>
<thead>
<tr>
<th></th>
<th>CY 2016</th>
<th>CY 2017</th>
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</thead>
<tbody>
<tr>
<td># of students successfully</td>
<td>332</td>
<td>472 (+42%)</td>
</tr>
<tr>
<td>completing a college-level</td>
<td></td>
<td></td>
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<tr>
<td>course</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Success Rate</td>
<td>78%</td>
<td>68%</td>
</tr>
</tbody>
</table>
### MAT 1440 & MAT 1445-QR

<table>
<thead>
<tr>
<th></th>
<th>CY 2016</th>
<th>CY 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td># of students successfully completing a college-level course</td>
<td>355</td>
<td>366 (+3%)</td>
</tr>
<tr>
<td>Success Rate</td>
<td>58%</td>
<td>61%</td>
</tr>
</tbody>
</table>
# Placement Parameters

<table>
<thead>
<tr>
<th>Class</th>
<th>ACT score for College-Level course only</th>
<th>ACT score for Co-requisite course</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 1445—Quantitative Reasoning</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td>MAT 1450—Introductory Statistics</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td>MAT 1460—Finite Mathematics</td>
<td>22</td>
<td>20</td>
</tr>
<tr>
<td>MAT 1470—College Algebra</td>
<td>22</td>
<td>20</td>
</tr>
</tbody>
</table>
Alignment to Majors

• These courses affect our AA degree students.

• Every AA degree program provides students with a recommended MAP (My Academic Plan) and thus a recommended math course.

• Even though there is a recommended math course for every degree program, all but one of our AA degree programs offer students a choice of at least 2 math courses to meet their math requirement.
A brief introduction to Wright State
We are a regional, access oriented 4-year institution located in Dayton, OH.
A total enrollment of 15,558 grad and undergrad combined (not including our medical school).
Approximately 9,000 undergrad across 7 colleges.

My role is to develop curriculum for developmental math courses and teach those as well as gateway mathematics courses.
Introducing Co-Requisite Remediation at WSU

In 2016-2017, we were awarded two Bridges to Success grants from the Ohio Department of Higher Education to change the way we deliver developmental mathematics, which was using the Math Emporium model.

We have used these to design and implement co-requisite remediation in three of our pathways:

QR, Statistics, and College Algebra

We have taken QR and Stats co-reqs to scale this fall.

We are still piloting the College Algebra co-req.
Our co-requisite remediation model

MTH yyyy-12:
20 Students
(Co-Req)

MTH yyyy-14:
20 Students
(Co-Req)

DEV xxxx-12
20 Students
(Co-Req)

DEV xxxx-14
20 Students
(Co-Req)

MTH yyyy-02:
20 Students
(Direct Placement)

MTH yyyy-04:
20 Students
(Direct Placement)
Who is eligible for co-req remediation?

- **MTH 1450** - Quantitative Reasoning (mostly Liberal Arts majors)
  - No pre-req. Pilot contained many students who succeeded who had previously tried traditional remediation multiple times.

- **STT 1600** – Statistical Concepts (mostly Nursing and Psychology majors)
  - No pre-req. Almost all students in our pilot were first time admits, direct from high school.

- **MTH 1280** – College Algebra (STEM and Business majors)
  - Our existing developmental math requires 5 modules of ALEKS (through intermediate algebra) to enter MTH 1280. Most students finish 3 in one semester. These students were admitted to MTH 1280 and co-req DEV. So, no students new to WSU.
Quantitative Reasoning Success Rates

MTH 1450
All Classes Fall 2017 - Spring 2018

Group

Coreq (n = 71)
Direct (n = 302)

Percent
0 20 40 60 80 100

C or Better Yes No
Statistical Concepts Success Rates

![Graph showing success rates for Coreq and Direct groups in STT 1600 classes from Fall 2017 to Spring 2018. The graph compares success rates by group and indicates the number of students in each group (Coreq: n = 57, Direct: n = 684). The success rates are categorized by grade (C or Better, Yes, No).]
College Algebra Success Rates

MTH 1280
All Classes Fall 2017 - Spring 2018

Coreq (n = 75)

Direct (n = 652)

Percent

C or Better
Yes
No
The University

Approximately 45000 students

Average 7000 enrollments in 200 mathematics sections per semester

Courses range from Quantitative Reasoning to graduate level

ACT score 27.7 average on 2018 entry class
Supplementary Recitation Session

1 credit/2 contact hours

SRSs are prepared by faculty teaching the course

Delivered by a peer tutor trained by LAC (Learning Assistance Center)

Small groups 20 students maximum
<table>
<thead>
<tr>
<th>Course</th>
<th>Placement</th>
<th>DWF</th>
<th>SRS DWF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stem Prep I with Algebra</td>
<td>ACT 22</td>
<td>?</td>
<td>Auto Enrolled</td>
</tr>
<tr>
<td>Quantitative Reasoning</td>
<td>ACT 22</td>
<td>20%</td>
<td>No data</td>
</tr>
<tr>
<td>Elementary Statistics</td>
<td>ACT 22</td>
<td>19%</td>
<td>No data</td>
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<tr>
<td>Stem Prep I</td>
<td>ACT 25</td>
<td>46%</td>
<td>10%</td>
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<tr>
<td>Precalculus</td>
<td>ACT 26</td>
<td>43%</td>
<td>32%</td>
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<tr>
<td>Applied Calculus</td>
<td>ACT 26</td>
<td>30%</td>
<td>19%</td>
</tr>
<tr>
<td>Calculus with Precalculus</td>
<td>ACT 28</td>
<td>53%</td>
<td>Auto Enrolled</td>
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<tr>
<td>Calculus</td>
<td>ACT 29</td>
<td>35%</td>
<td>32%</td>
</tr>
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</table>
Spring Semester SRS Schedule

What is an SRS (MATH1096)?
SRS stands for Supplemental Review Session. Students will be part of a small group working with an SRS Leader once per week on problem sets designed by faculty teaching the course.

Sessions start on Tuesday, January 22. Students can register for MATH 1096 online until January 20.

To “Late Add” after January 20, students can visit the MASS Center Monday-Thursday 9am-8pm or Friday 9am-4pm.

Session locations can be found by searching for MATH 1096 on Catalyst and locating the appropriate section.

* Denotes section being held for a Learning Community.

<table>
<thead>
<tr>
<th>MATH 1026</th>
<th>Section</th>
<th>Call #</th>
<th>Day</th>
<th>Time</th>
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<tr>
<td>101</td>
<td>45427</td>
<td>Monday</td>
<td>4:40pm-6:00pm</td>
<td></td>
</tr>
<tr>
<td>102</td>
<td>45428</td>
<td>Tuesday</td>
<td>4:40pm-6:00pm</td>
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<table>
<thead>
<tr>
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<th>Section</th>
<th>Call #</th>
<th>Day</th>
<th>Time</th>
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<tbody>
<tr>
<td>201*</td>
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<tr>
<td>202</td>
<td>45430</td>
<td>Monday</td>
<td>4:40pm-6:00pm</td>
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<tr>
<td>203</td>
<td>45431</td>
<td>Tuesday</td>
<td>4:40pm-6:00pm</td>
<td></td>
</tr>
<tr>
<td>204*</td>
<td>45432</td>
<td>TBD</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>205</td>
<td>45433</td>
<td>Wednesday</td>
<td>4:40pm-6:00pm</td>
<td></td>
</tr>
<tr>
<td>206*</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
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<table>
<thead>
<tr>
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<th>Section</th>
<th>Call #</th>
<th>Day</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>301</td>
<td>45434</td>
<td>Monday</td>
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<td></td>
</tr>
<tr>
<td>302*</td>
<td>45435</td>
<td>TBD</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>303</td>
<td>45436</td>
<td>Tuesday</td>
<td>4:40pm-6:00pm</td>
<td></td>
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<tr>
<td>304*</td>
<td>45437</td>
<td>TBD</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>305*</td>
<td>TBD</td>
<td>TBD</td>
<td>TBD</td>
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<table>
<thead>
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<tbody>
<tr>
<td>401</td>
<td>45438</td>
<td>Monday</td>
<td>4:40pm-6:00pm</td>
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<tr>
<td>402</td>
<td>45439</td>
<td>Tuesday</td>
<td>4:40pm-6:00pm</td>
<td></td>
</tr>
<tr>
<td>403</td>
<td>45440</td>
<td>Wednesday</td>
<td>4:40pm-6:00pm</td>
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<table>
<thead>
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<th>Section</th>
<th>Call #</th>
<th>Day</th>
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<tbody>
<tr>
<td>501</td>
<td>45441</td>
<td>Sunday</td>
<td>3:30pm-4:30pm</td>
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</tr>
<tr>
<td>502</td>
<td>45442</td>
<td>Monday</td>
<td>4:40pm-6:00pm</td>
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<tr>
<td>503</td>
<td>45443</td>
<td>Tuesday</td>
<td>4:40pm-6:00pm</td>
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</tr>
<tr>
<td>504</td>
<td>45444</td>
<td>Tuesday</td>
<td>6:10pm-7:30pm</td>
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<tr>
<td>505</td>
<td>45445</td>
<td>Wednesday</td>
<td>4:40pm-6:00pm</td>
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</tr>
<tr>
<td>506</td>
<td>45446</td>
<td>Wednesday</td>
<td>6:10pm-7:30pm</td>
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<table>
<thead>
<tr>
<th>MATH 1024</th>
<th>Section</th>
<th>Call #</th>
<th>Day</th>
<th>Time</th>
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<tbody>
<tr>
<td>601</td>
<td>45454</td>
<td>Tuesday</td>
<td>6:10pm-7:30pm</td>
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<table>
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<th>Section</th>
<th>Call #</th>
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<tbody>
<tr>
<td>701</td>
<td>45455</td>
<td>Monday</td>
<td>4:40pm-6:00pm</td>
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<table>
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<tr>
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<th>Section</th>
<th>Call #</th>
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<tbody>
<tr>
<td>801</td>
<td>45456</td>
<td>Monday</td>
<td>4:40pm-6:00pm</td>
<td></td>
</tr>
</tbody>
</table>
Implementation Overview

Nicholas Shay
Associate Professor of Mathematics
In developing the correct math pathway for students, the majority of the non-stem programs chose Statistics for their plan of study.

Intermediate Algebra was the prerequisite course for statistics.
### Algebra Skills needed for Statistics

#### Table of Contents from a traditional Elementary & Intermediate Algebra text

- **Chapter 1: Some Basic Concepts of Arithmetic and Algebra**
  - 1.1. Numerical and Algebraic Expressions (23)
  - 1.2. Prime and Composite Numbers (22)
  - 1.3. Integers: Addition and Subtraction (21)
  - 1.4. Integers: Multiplication and Division (21)
  - 1.5. Use of Properties (21)

- **Chapter 2: The Real Numbers**
  - 2.1. Rational Numbers: Multiplication and Division (20)
  - 2.2. Rational Numbers: Addition and Subtraction (21)
  - 2.3. Real Numbers and Algebraic Expressions (21)
  - 2.4. Exponents (22)
  - 2.5. Translating from English to Algebra (22)

- **Chapter 3: Equations, Inequalities, and Problem Solving**
  - 3.1. Solving First Degree Equations (20)
  - 3.2. Equations and Problem Solving (21)
  - 3.3. More on Solving Equations and Problem Solving (23)
  - 3.4. Equations Involving Parentheses and Fractional Forms (2)
  - 3.5. Inequalities (21)
  - 3.6. Inequalities, Compound Inequalities, and Problem Solving

- **Chapter 4: Formulas and Problem Solving**
  - 4.1. Ratio, Proportion, and Percent (21)
  - 4.2. More on Percent and Problem Solving (21)
  - 4.3. Formulas: Geometric and Others (21)
  - 4.4. Problem Solving (21)
  - 4.5. More About Problem Solving (22)

- **Chapter 5: Coordinate Geometry and Linear Systems**
  - 5.1. Cartesian Coordinate System (22)
  - 5.2. Graphing Linear Equations (22)
  - 5.3. Slope of a Line (22)
  - 5.4. Writing Equations of Lines (21)
  - 5.5. Systems of Two Linear Equations (25)
  - 5.6. Elimination-by-Addition Method (20)
  - 5.7. Graphing Linear Inequalities (19)

- **Chapter 6: Exponents and Polynomials**
  - 6.1. Addition and Subtraction of Polynomials (20)
  - 6.2. Multiplying Monomials (22)
  - 6.3. Multiplying Polynomials (22)
  - 6.4. Dividing by Monomials (20)
  - 6.5. Dividing by Binomials (20)
  - 6.6. Combining Like Terms and Negative Exponents (21)

- **Chapter 7: Factoring, Solving Equations, and Problem Solving**
  - 7.1. Factoring by Using the Distributive Property (21)
  - 7.2. Factoring the Difference of Two Squares (22)
  - 7.3. Factoring Trinomials of the Form x^2 + bx + c (21)
  - 7.4. Factoring Trinomials of the Form ax^2 + bx + c (21)
  - 7.5. Factoring, Solving Equations, and Problem Solving (20)

- **Chapter 8: A Transition from Elementary Algebra to Intermediate**
  - 8.1. Equations: A Brief Review (20)
  - 8.2. Inequalities: A Brief Review (21)
  - 8.3. Equations and Inequalities Involving Absolute Value (21)
  - 8.4. Polynomials: A Brief Review and Rational Equations (21)
  - 8.5. Factoring Polynomials: A Systematic Division (20)
  - 8.6. Factoring: A Unit Review and a Step Further (20)

- **Chapter 9: Rational Expressions**
  - 9.1. Simplifying Rational Expressions (21)
  - 9.2. Multiplying and Dividing Rational Expressions (21)
  - 9.3. Adding and Subtracting Rational Expressions (20)
  - 9.4. More on Rational Expressions and Complex Fractions (21)
  - 9.5. Equations Containing Rational Expressions (21)
  - 9.6. More on Rational Equations and Applications (20)

- **Chapter 10: Exponents and Radicals**
  - 10.1. Integral Exponents and Scientific Notation Revisited (21)
  - 10.2. Roots and Radicals (20)
  - 10.3. Simplifying and Combining Radicals (21)
  - 10.4. Products and Quotients of Radicals (21)
  - 10.5. Radical Equations (19)
  - 10.6. Making Exponents and Radicals (20)

- **Chapter 11: Quadratic Equations and Inequalities**
  - 11.1. Complex Numbers (21)
  - 11.2. Quadratic Equations (20)
  - 11.3. Completing the Square (21)
  - 11.4. Quadratic Formula (22)
  - 11.5. More Quadratic Equations and Applications (21)
  - 11.6. Quadratic and Other Nonlinear Inequalities (20)

- **Chapter 12: Coordinate Geometry: Lines, Parabolas, Circles, Ellipses, and Hyperbolas**
  - 12.1. Distance, Slope, and Graphing Techniques (24)
  - 12.2. Graphing Parabolas (20)
  - 12.3. More Parabolas and Some Circles (20)
  - 12.4. Graphing Ellipses (20)
  - 12.5. Graphing Hyperbolas (17)

- **Chapter 13: Functions**
  - 13.1. Relations and Functions (21)
  - 13.2. Functions: Their Graphs and Applications (19)
  - 13.3. Graphing Model Curves Via Transformations (20)
  - 13.4. Composition of Functions (20)
  - 13.5. Direct Variation and Inverse Variation (20)

- **Chapter 14: Exponential and Logarithmic Functions**
  - 14.1. Exponents and Exponential Functions (20)
  - 14.2. Applications of Exponential Functions (20)
  - 14.3. Inverse Functions (22)
  - 14.4. Logarithms (19)
  - 14.5. Logarithmic Functions (20)
  - 14.6. Exponential Equations, Logarithmic Equations, and Problem Solving (20)

- **Chapter 15: Systems of Equations: Matrices and Determinants**
  - 15.1. Systems of Two Linear Equations: A Brief Review (20)
  - 15.2. Systems of Three Linear Equations in Three Variables (23)
  - 15.3. A Matrix Approach to Solving Systems (20)
  - 15.4. Determinants (20)
  - 15.5. Cramer's Rule (20)
  - 15.6. Systems Involving Nonlinear Equations (20)
Essential components of implementation.

- Advising Staff
- Administration
- Admissions
- Testing center tutoring center
- Professional Development for part time faculty
**Paired Course Model:** Provides support skills in a separate course aligned to the learning objectives of the gateway course. The separate course is paired with the gateway course and delivered in the same semester.
## Preliminary data.

<table>
<thead>
<tr>
<th>Semester</th>
<th>013 Success</th>
<th>013 Fail</th>
<th>013 Withdraw</th>
<th>013 Total 15th Day Enroll</th>
<th>130C Success</th>
<th>130C Fail</th>
<th>130C Withdraw</th>
</tr>
</thead>
<tbody>
<tr>
<td>17AU</td>
<td>53 (82%)</td>
<td>7 (11%)</td>
<td>5 (8%)</td>
<td>65</td>
<td>45 (70%)</td>
<td>12 (19%)</td>
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<tr>
<td>18SP</td>
<td>70 (75%)</td>
<td>10 (11%)</td>
<td>13 (14%)</td>
<td>93</td>
<td>57 (61%)</td>
<td>23 (25%)</td>
<td>13 (14%)</td>
</tr>
</tbody>
</table>
Curriculum: Participant Discussion

• What curricular issues do you face? What might you tack differently?
• What ideas do you want to hear more about?

✓ Clarifying questions for the panel
✓ Discuss at your tables
✓ Have someone take notes
✓ Feel free to list questions for panel after discussion period
Pedagogical and Instructional Choices
David Hare, Sinclair Community College
Design of Co-requisites

• 1 credit hour labs
• 2 or 3 contact hours per week
• Meet just prior to College-Level Course
• Paired courses with the Same Instructor
• Just-in-time Remediation
MAT 0470
( College Algebra Co-requisite)

• Flipped Classroom approach with MyMathLab

• Students pay for a 1 credit-hour lab

• Students receive 3 contact-hours of instruction per week with their same College Algebra instructor

• Students work through a Sinclair developed workbook containing just-in-time pre-requisite remediation for each lesson
MAT 0445
(Quantitative Reasoning Co-req)

- Extended class time approach
- Students pay for a 1 credit-hour lab
- Students receive 3 contact-hours of instruction per week with their same Quantitative Reasoning instructor
- Students work in teams through a Sinclair developed workbook containing lessons on the same topics as the college-level class
MAT 0450
( Introductory Statistics Co-req)

- Just-in-Time Paired Classroom approach
- Students pay for a 1 credit-hour lab
- Students receive 2 contact-hours of instruction per week with their same Introductory Statistics instructor
- Students work through a Sinclair developed workbook containing just-in-time pre-requisite remediation for each lesson and complete written assignments each week outside of class
Student considerations for Co-requisite courses

- Students pay for a 1 credit-hour co-requisite course instead of a 3 credit-hour pre-requisite course

- Students receive course specific instruction instead of general algebra instruction in class with a smaller student to faculty ratio

- Students complete the co-requisite course and the college-level course in the same semester instead of completing the pre-requisite course in one semester and the college-level course in the next
Sinclair considerations for Co-requisite courses

• Co-requisite courses are about 5-6 times more expensive for the college to offer than pre-requisite courses (and they account for 15% of all math courses offered this fall)

• If there is a financial payoff for the college it only exists if students persist at a higher rate than without the co-requisite courses (Sinclair does not currently have any data on this)

• Co-requisite courses need to be structured in such a way so as to be easy to coordinate with multiple and changing adjunct instructors
Pedagogical and Instructional Choices

- Peggy Kelly, Wright State University
How do the co-req courses complement the gateway courses?

- **MTH 1450/DEV 0450 – Quantitative Reasoning**
  - Each course is 3 credit hours
  - The DEV course delivers just-in-time remedial concepts and procedures, and introduction to the context of the problems BEFORE the MTH course meets

- **STT 1600/DEV 0600 – Statistical Concepts**
  - STT course is 4 credit hours. DEV course is 2 credit hours
  - The DEV course delivers just-in-time remedial concepts and procedures BEFORE the STT class meets the first half of the course.
  - The second half of the course, DEV switches to more of an SI model – so assisting with understanding of the concepts and procedures taught in the STT course AFTER they are taught.

- **MTH 1280/DEV 0280 – College Algebra**
  - MTH course is 4 credit hours. DEV course is 2 credit hours
  - The DEV course delivers intermediate algebra concepts and procedures days or weeks BEFORE the MTH course uses the material and reinforces the topics AFTER they are used in the MTH course.
Who is teaching our courses?

- **DEV Co-Req**
  - 20 Students
  - Taught by GTA

- **MTH/STT Co-Req**
  - 20 Students
  - Taught by Instructor 1

- **MTH/STT direct placement**
  - 20 Students
  - Taught by Instructor 2

- **DEV Co-Req**
  - 20 Students
  - Taught by GTA
Communication, communication, communication!

Since we have 3 people on each co-req team

- Math & Stats Chair sent out a document to each member of the team explaining the program and discussing communication
- Some teams meet weekly, some never meet but communicate via email
- I am co-teaching with the new GTAs and meet with them weekly to discuss what and how to teach
- A daily recommended schedule with DEV and gateway course was given to all instructors before the semester began.
Shift in understanding DEV courses

- No longer exists to fill in gaps in K-12 math, but rather to assist students in succeeding in the gateway course.
- Focus is more inquiry-based and active learning
- Student success skills need to be addressed
  - Time management
  - Test taking
  - Getting help
  - Classroom behavior
Recommendations

• If possible, select new curriculum for the gateway course and get all instructors of the course to have input in that selection.
  • Those that were not involved from the beginning of curriculum selection were much more resistant to all the changes that this would entail.

• Those instructors of courses where there was not a new curriculum selected don’t seem to be as likely to follow the schedule. Additionally, instructors had developed MANY different ways to teach ideas over the years and a new curriculum could “reset” some of that variation.
Other notes

- Attendance policy in the DEV course (only 3 unexcused absences)
- Students ideally pass both courses but can pass the DEV or the gateway course
- DEV courses for QR and Stats do not have tests or quizzes. Grades are determined by a combination of
  - Attending class
  - Participating in class activities
  - Online homework
- DEV course for College Algebra does have tests in addition to the components of the other two courses
Going to Scale

Current faculty conversations are focused on:

- Soft skill issues: We see students in our classroom at least a year before we normally would. Classroom management looks different now.
- Literacy issues: many students in the co-req are also in co-req English
- Teaching/learning community vs independent teaching
- How are students doing in successor courses?
- What assumptions have we built into our courses that form barriers to equity?
Pedagogical and instructional choices.

Nicholas Shay
Associate Professor of Mathematics
Guiding Questions

• Is there a baseline competency that students need before they begin?

• What are the specific process that we are asking students to understand? When are those skills applied in the supported course?

• Will a student who already has knowledge of the tool or process benefit?
The approach.

• In future activities, we focus on specific procedures.

• Students practice picking out key terms and familiarize themselves with the structure of a problem.

• Begin to introduce some of the concepts that will be explored later.
Compute the following problems using the 1-prop z int in your calculator. Write your answer in inequality notation, in the $p \pm e$ notation and graph the interval.

11. $x=12 \ n=33 \ c\text{-level}: 0.90$

12. $x=12 \ n=33 \ c\text{-level}: 0.99$

13. How did the c-level affect the results?
1. A car company is planning to design a sports car. They have identified men between the ages of 39 and 50 as those most likely to purchase such a car. In a random sample of 175 men between the ages of 39 and 50, it was found that 98 of them were interested in purchasing a sports car. Use this information and a significance level of 0.05 to test the hypothesis that the majority of men between the age of 39 and 50 are interested in purchasing a sports car.

Find

\[ x = \]

\[ n = \]

Significance level: \( \alpha = \)

Population proportion we are “hypothesizing” \( p_0 = \)

State what the claim is that we are being asked to test in the original problem:

Which value will we highlight based on the claim above? Circle the correct answer.

\[ \neq p_0 \quad < p_0 \quad > p_0 \]

Enter the values above into the 1-PropZ test and list the following values:

\( z \) (test statistic):

\[ p = \]

\[ \hat{p} = \]

Based on your results, circle the correct answer.

\[ p > \alpha \quad p < \alpha \]
Example

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<tbody>
<tr>
<td>1</td>
<td>Hypothesis Testing for the Mean with $\sigma$ Known</td>
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<td>3</td>
<td>Null Hypothesis</td>
<td>$H_0$: $\mu = 48.8$</td>
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<td>Right Tailed Test</td>
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<td>4</td>
<td>Alternative Hypothesis</td>
<td>$H_1$: $\mu &gt; 48.8$</td>
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<td>Sample Mean</td>
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<td>Sample Size $n$</td>
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<td>Level of Significance $\alpha$</td>
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<td>11</td>
<td>$z$-Test for Mean</td>
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Curated Collections

Digital librarians develop our curated collections to bring you the best of our digital library offerings.

OhioLINK Collections

- Introductory Statistics
  - 20 Resources
- Ohio Open Ed Collaborative Introductory Statistics
  - 18 Resources
- Introduction to Sociology
  - 13 Resources
- Collaborative Introduction to Sociology COMING SOON
- Ohio Open Ed Collaborative Writing
  - 2 Resources
- Collaborative Ordinary Differential Equations COMING
- Ohio Open Ed Collaborative Macroeconomics COMING SOON
- Elementary Linear Algebra
  - 57 Resources
- Writing
  - 14 Resources
Successes.

- Ties to the supported course is essential.
- Collaboration lifted all ships.
- Students were more able to focus on the concepts rather than the calculation process.
Challenges.

• At times teaching a process, without a complete understanding of where you are headed with this process can be difficult.

• Students who are absent for these sections often never come to a complete understanding of the problem.

• Issues with technology and accessibility.
Instructional Choices: Participant Discussion

• What professional development or peer sharing may your campus explore regarding instruction for co-requisite math?

✓ Clarifying questions for the panel
✓ Discuss at your tables
✓ Have someone take notes
✓ Feel free to list questions for panel after discussion period
Thank You

David Hare, Sinclair Community College
Peggy Kelly, Wright State University
Ricardo Moena, University of Cincinnati
Nick Shay, Central Ohio Technical College

October 26, 2018
Symposium on Co-Requisite Approaches in Math