Planning Co-Requisite Support for a Quantitative Reasoning Course

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Questions to Ask Yourself

• What are the big QR topics we are covering?
• What basic math skills are needed to UNDERSTAND these topics?
  • Are there topics we need to teach ALL co-requisite students?
  • OR
  • Can we run this class on an as-needed basis for topics/depth of topics?
Poll

Have you designed the structure of the support course?
• Yes
• No
Poll

Is your support course:

• New
• Pre-existing
Ivy Tech’s Co-Requisite Model

• Math 123 – QR (3 credit, 4 contact)
• Math 080 – Mathematical Principles (3 credit, 3 contact)
  • STATEWIDE, standardized courses
Our Process...Year 1

• Math 080 – LECTURE based
  • Pre-determined topics, readying students for Math 123
• Was NOT effective
• Students have different levels of skills
  • Lecturing put them all in a ‘box’
Our Process...Year 2

• Math 080 became student-centered
  • No lecture or pre-set agenda
  • Higher student engagement (and pass rates)

• Added soft skills
  • Time Management
  • Their Math ‘Story’
  • Study Skills
  • Exam Reflection
Year 2 Class Example

• Start with student questions (Including homework questions)
• Reinforce previously taught topics
  • Focus on meaning, interpretation
• Preview upcoming topics
  • Vocabulary
• Project help
  • Excel work
• Practice Exams
• Exam reflection
Instructors in This Model

• **Flexibility**

• Must be prepared to:
  
  • Teach mini lessons on any topic covered in the course
  • Answer homework questions (Excel knowledge)
  • Preview upcoming lessons
    • Methods the QR instructor uses
  • Go back further than expected (adding, subtracting...)
    • Student needs!
  • Knowledge of every known calculator
  • Communication with the College-Level instructor
How this is possible...

• Math 080 is capped at 12* students
  • Individualized learning
  • 1 instructor

• *this is half of total students in the Math 123 course
Student Structure

- **Co-Mingle**
  - Keeps rigor
  - Champions in the course (college-ready students)

- Cohort
  - Be careful to keep the rigor
Discussion in the Q&A Pod

• Have you thought about how you’re going to service the needs of all the students in your course?
Content?

• **Backmapping!**
  • Start with QR learning outcome
  • What skills are needed to successfully complete
  • Go back as far as you want...
Learning Objectives for Math 123...

5. Use and interpret percentages in various forms: probability, risk, rates of return, percentiles, and relative frequency.
Learning Objectives for Math 080...

6. Convert between fractions, decimals and percents. Recognize and solve percent and proportion problems.
So They Need…?

• Changing between fractions, decimals, and percents
• Setting up/solving proportions
• Vocabulary – “of” – to multiply, “is” – equal
• Recognition of problems/methods for setting up the problems
Demonstrate procedural fluency with real number arithmetic operations

<table>
<thead>
<tr>
<th>In the QR course, students will be able to:</th>
<th>To do that, they need to be able to do:</th>
<th>Where do these skills fall?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculate absolute change</td>
<td>Subtraction, word association</td>
<td>Skills taught in 080</td>
</tr>
<tr>
<td>Calculate relative change</td>
<td>Division, percentages, word association</td>
<td>Skills taught in 080, interpretation reinforced in 123</td>
</tr>
<tr>
<td>Compare rent prices over time</td>
<td>Absolute and relative change, interpret results</td>
<td>Taught in 123</td>
</tr>
</tbody>
</table>
Coordinating Activities between 123 and 080

• Start with 123 Activity/Project
  • What will HELP students be successful

• Example:
  • Statistics Project in Math 123
    • 100 data points, calculate basic statistics, convert to z-scores, create frequency distributions, create histogram/bar graph
  • Math 080 Help Areas
    • Using formulas in Excel, creating graphs, differentiating between histograms/bar graphs
Materials

• Math 123 homemade workbook (27 mini-lessons)
  • 27 homework lessons in Webwork (online homework system)
  • 7 Excel assignments
  • 3 projects (Excel based)
  • Videos

• Math 080, 27 mini-lessons covering pre-requisite material added to back of workbook
Materials - Standardized

• All Math 123 students receive the pages for Math 080

• Every Math 123 course in the state uses this workbook, online courses included
Resources

• Faculty continue to make:
  • Videos to go with the workbook/content (www.youtube.com/beckymoening)
  • Additional practice pages, activities

• Statewide organizations in Canvas
  • All resources housed in orgs for all faculty to access

• Statewide shell in Canvas
  • Everyone starts with the same shell with common pieces
Poll

• What is your confidence level with creating and implementing engagement activities?
  • Very comfortable
  • Somewhat comfortable
  • I’m not sure where to begin
Other Textbook Options

• Many current texts have INTEGRATED MATERIAL included
  • Online homework systems could be utilized in both courses
    • BUT – you don’t want the support course to ADD work to the students, it’s there to help!
    • AND – you don’t want the support course to be students working on computers at their own pace...

• Even if a text has integrated material, you may need to go back further, depending on student needs
A Few Other Options:

• *Quantitative Reasoning* by The Dana Center (co-requisite materials available Fall 2018)
• *Pathways to Math Literacy* by Sobecki/Mercer (McGraw-Hill)
• *Using and Understanding Math* by Bennett/Briggs (Pearson)
• *Viewing Life Mathematically* by Denley/Hall (Hawkes)

*These are the only books I have previewed...there are plenty more!*
Support Course Should Look Like…

• Engaged students – Conversations! Collaborative learning!
• Hands on activities

• Example:
  • Stock Market
    • For one week, record stock’s value
    • Absolute change, relative change
      • Day to day, beginning to end of week
      • Discussion/interpretation
Support Course Should Look Like...

- Soft skills (Time management, study skills, growth mindset, etc)

- Example:
  - Calendar Activity
  - Exam Reflection
Support Course Should Look Like...

• Reinforcing newly learned skills
• Previewing upcoming content
• Vocabulary work
• Question/answer time
• SUPPORT for the credit-bearing course
Faculty Buy-In?

- Change the perception of teaching mathematics
- Quantitative Reasoning is NOT Calculus
- This is math for competent citizens, not math for math majors
  - Different courses require different teaching methodologies
Faculty Buy-In?

- Be open to making small changes
- Include faculty in the development process
- If all else fails...
  - **Data**: After the first 5 semesters of full implementation, Ivy Tech pass rates in the QR increased 36.5%.
  - And, consider the increased number of students with access to the course.
Helpful Hints

• IF – you are standardizing to some extent
  • Appoint/volunteer a (or multiple) campus expert(s)
    • Organization of course
    • Organization of extra material
    • Training new faculty/TA’s/GA’s (or organize the training)
  
• If everyone is doing their own thing, this isn’t helpful 😊
Ivy Tech’s Standardization

• Statewide leads for: 123 (F-F), 123 (online), 080, Webwork, Assessment
• Campus leads (123 and 080 - training, campus champions)
  • Statewide meetings of the leads each semester (GTM, in person)
  • Subcommittees created for large changes (GTM)
Initial Faculty Training

• Statewide committee members went “On Tour”
  • Over 3 weeks in between spring and summer semester
  • Full/part time faculty present
  • Best practices/examples
  • “Where to”
  • “How to”
Training Now

• Campus Driven
  • Campus leads organize training
In the Open Chat Pod:

• Which QR course are you working on?
Questions?
Upcoming Webcasts

February 27, 10AM
From Prerequisite to Co-Requisite Statistics
Markus Pomper

March 6, 2PM
Identity and Mathematics
Bill Zahner

March 8, 2PM
Modeling with Math in Co-Requisite Algebra
Christine Herrera and Mark Newton

http://www.calstate.edu/professional-development-calendar
Mathematics/Quantitative Reasoning Supportive Course *Workday*

Friday, March 9
10:00AM to 3:00PM

Crowne Plaza
Los Angeles International Airport
April 13-14, 2018

Uri Treisman
- Keynote
- Breakout for Math & STEM faculty

http://www.cpp.edu/~csusymposium
Support Models “How To” Center

http://www.calstate.edu/app/mathqr/how-to-center.shtml
Join a Listserv

Send an email with no subject or message to:

Statistics:

subscribe-stats@lists.calstate.edu

Quantitative Reasoning:

subscribe-quantreasoning@lists.calstate.edu

Path to Calculus (including college algebra):

subscribe-pathtocalc@lists.calstate.edu