A Collaborative Approach to Assessing Quantitative Literacy within Carnegie’s Quantway Pathway for Developmental Mathematics

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An Alternative Pathway

QW1

QW2 or College Level QR Course

Alg 1

Alg 2

College Math

Semester 1

Semester 2

Semester 3
Quantway

- A Developmental quantitative literacy course embodied in the contextualized curriculum
- Design Principles:
  - Productive Struggle
  - Explicit Connections
  - Deliberate Practice
- Appropriate for students in programs that require a general education mathematics course
- Launched in Spring 2012 semester
Traditional Approach

- Theory, then applications if time
- Each strand done separately to completion
- Algebra is primary focus
- Skill based
- Examples of every possible variation of skill (problem recognition)
New Approach

- Applications to motivate, then theory as needed
- Strands addressed each unit in an integrated fashion going deeper each time
- Equal time on each strand
- Concepts-based
- Fewer skills, more connections

Undercurrent of geometry, statistics, student success, mathematical success
Quantway
Network Improvement Community (NIC)

21 Community Colleges

10 States (CT, GA, HA, MA, MN, NJ, NY, OH, WV, WI)
Quantway: Learning Outcomes

- Multiple Literacies
- Numerical Skills
- Proportional Reasoning
- Mathematical Modeling
- Algebraic Reasoning
- Statistical Thinking
Assessment Building Process

1. Item Writing
2. Measurement Review and Content Check: Faculty; Carnegie
3. Field Testing / Piloting
4. Psychometric Analysis
5. Dissemination and Administration
6. Language & Literacy
7. Assessment Assembly
8. Performance Analysis
Examples of Items

• **Learning Outcome**
Read and use information presented in a two-way table

• **Item**
Suppose 3200 women received a mammogram to test for breast cancer. The mammogram provides test result information about whether the women do or do not have breast cancer. The table below summarizes the mammogram results. The table shows how often the mammogram correctly detected the presence of breast cancer in the 3200 women.

<table>
<thead>
<tr>
<th></th>
<th>Women with Breast Cancer</th>
<th>Healthy Women (no Breast Cancer)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive test result</td>
<td>11</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>Negative test result</td>
<td>17</td>
<td>3167</td>
<td>3184</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>3172</td>
<td>3200</td>
</tr>
</tbody>
</table>

a. 31%  b. 40%  c. 57%  d. 69%
Implementation

Successes

• Demonstrates the level of knowledge for Pathways students following each course
  – Program improvements
  – Validity of curriculum / content

• Universal measure for all students across the Networked Improvement Community

Challenges

• Only multiple choice - we need a wider variety of item types

• Need more assessment capacity within the NIC as the NIC continues to expand
Quantway at BMCC

• Overview
  – Largest offering of Quantway course (17 sections each semester)
  – Faculty and tutor training
  – Weekly Quantway faculty meetings
  – Lesson Studies

• Final Assessment
  – All sections administer the Quantway Assessment as a Final Examination
  – 20% of the final course grade
  – 60% of 40 items must be answered correctly to demonstrate minimum proficiency
  – Strong correlation between performance on the Final Assessment with other course grades
Expansion

Opportunity

• New online platform
• Assessment Expert Convening next week at Carnegie (Jan. 22\textsuperscript{nd} and 23\textsuperscript{rd})

Goals

• Designing a method for creating and implementing a wider range of item types
• Building the assessment literacy and responsibilities of the Networked Improvement Community
  – E.g. growing assessment leadership, item writers, interactive item bank
Thank you

Questions