Quantitative Reasoning Assessment at James Madison University and Beyond: A Progress Report

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www.jmu.edu/assessment/

NNN Annual Meeting: New York City
Quantitative Reasoning Test (QR-9):

Turning Japanese…….
General Education: Assessment of Scientific and Quantitative Reasoning

- These are among the skills most valued by employers
- What could be more important than Quantitative Reasoning?
- These are thinking skills, not math computation skills
- We want these skills to last a life time
- We had the opportunity to partner with Soka University in Japan
Our Collaboration Results:

• All measures converted to metric
• A data collection design for SOKA
• Placement of test on web server
• Review and pilot of test by SOKA faculty
• Successful administration of test to students
• Comparisons of results for several samples
QR Goes Metric

- Conversations with Soka University-Tokyo, Japan
- Conversion of items to metric scalars
  - Miles to Kilometers
  - Pounds to Kilograms
  - Inches to Centimeters
  - “Miles per gallon” to “Kilometers per liter”
- Thought about a full translation to Japanese
Results from our Studies

Three student samples

- Soka University: N=26 Honors Students
  - Global Citizenship Program: 14 First-year; 12 Sophomores

- JMU: N=1,072 Sophomore/Juniors
  - Random sample from Spring 2012 Assessment Day

- JMU: N=219 Senior STEM Majors
  - Physics, Chemistry, Biology & Psychology
Student Learning Objectives

- This is the Engine that drives assessment

- QR Learning Objectives:
  1. Use graphical, symbolic, and numerical methods to analyze, organize, and interpret natural phenomenon.
  2. Discriminate between association and causation, and identify the types of evidence used to establish causation.
<table>
<thead>
<tr>
<th>Learning Objectives</th>
<th>Items Assessing Objective</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Use graphical, symbolic, and numerical methods to analyze, organize, and interpret natural phenomenon.</td>
<td>2-13, 18-26 (21 items)</td>
<td>M = 15.12 (72% correct) SD = 1.90</td>
</tr>
<tr>
<td>6. Discriminate between association and causation, and identify the types of evidence used to establish causation</td>
<td>1, 14-17, 20, 23-26 (10 items)</td>
<td>M = 5.88 (59% correct) SD = 1.51</td>
</tr>
<tr>
<td>Quantitative Reasoning</td>
<td>1-26 (26 items)</td>
<td>M = 18.62 (72% correct) SD = 2.52</td>
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<td>5. Use graphical, symbolic, and numerical methods to analyze, organize, and interpret natural phenomenon.</td>
<td>2-13, 18-26 (21 items)</td>
<td>M = 13.68 (65% correct) SD = 3.08</td>
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<td>6. Discriminate between association and causation, and identify the types of evidence used to establish causation</td>
<td>1, 14-17, 20, 23-26 (10 items)</td>
<td>M = 6.13 (61% correct) SD = 1.88</td>
</tr>
<tr>
<td>Quantitative Reasoning</td>
<td>1-26 (26 items)</td>
<td>M = 17.59 (68% correct) SD = 3.74</td>
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<td>5. Use graphical, symbolic, and numerical methods to analyze, organize, and interpret natural phenomenon.</td>
<td>2-13, 18-26 (21 items)</td>
<td>M = 15.32 (73% correct) SD = 2.69</td>
</tr>
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<td>6. Discriminate between association and causation, and identify the types of evidence used to establish causation</td>
<td>1, 14-17, 20, 23-26 (10 items)</td>
<td>M = 7.03 (70% correct) SD = 1.76</td>
</tr>
<tr>
<td>Quantitative Reasoning</td>
<td>1-26 (26 items)</td>
<td>M = 19.59 (75% correct) SD = 3.09</td>
</tr>
</tbody>
</table>
QR-9 Scores for Soka University and JMU Students

Subscale 5
Subscale 6
Total

Percent Correct Score

Soka
JMU Sophomore / Junior
JMU Senior
Conclusions

- The Soka students performed brilliantly
- The QR Test operated effectively in Japan
- JMU seniors score a little bit higher than our sophomores—and slightly higher than Soka Honors students
- We see similar patterns in scores with students scoring slightly lower on Objective 6-discrimination between correlation and causation
- We are exploring this finding at JMU with faculty
Questions?
Comments?

The QR and SR instruments are available at Madisonassessment.com

Center for Assessment and Research Studies
James Madison University
www.jmu.edu/assessment/