Nature of Standards And Measuring Growth On a Test Based on Diagnostic Classification Modeling

Neal Kingston
SOME BACKGROUND
A Portion of the Math Map
Constructing understandings of text
<table>
<thead>
<tr>
<th>Major Claims</th>
<th>Conceptual Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students can comprehend text in increasingly complex ways</td>
<td>Determining critical elements of text</td>
</tr>
<tr>
<td></td>
<td>Constructing understandings of text</td>
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<tr>
<td></td>
<td>Integrating ideas and information from text</td>
</tr>
<tr>
<td>Students can produce writing for a range of purposes and audiences</td>
<td>Using writing to communicate</td>
</tr>
<tr>
<td></td>
<td>Integrating ideas and Information in writing</td>
</tr>
<tr>
<td>Students can communicate for a range of purposes and audiences</td>
<td>Using language to communicate with others</td>
</tr>
<tr>
<td></td>
<td>Clarifying and contributing to discussion</td>
</tr>
<tr>
<td>Students can investigate topics and present information</td>
<td>Using sources and information</td>
</tr>
<tr>
<td></td>
<td>Collaborating and presenting ideas</td>
</tr>
</tbody>
</table>
Feelings of Characters

ELA.EE.RL.3.3
Identify the feelings of the characters in a story

Items Embedded and/or at Conclusion

Items Embedded in Text

Items Embedded in Text

EE.RL.3.3-Identify the feelings of characters in a story.
Testlets in Linkage Levels

Connect the map... to the items developed.

- Initial Precursor
- Distal Precursor
- Proximal Precursor
- Target
- Successors

Behavior

Testlet IP
Testlet DP
Testlet PP
Testlet T
Testlet S
Fractions
M.EE.3.NF1-3
Differentiate a fractional part from a whole
STANDARD SETTING
DLM Guiding Principles

- Results are based on mastery classification at the linkage level rather than scale scores
  - Are the risks of false positives and false negatives unequal?
- Standard setting needs to aggregate dichotomous classifications of mastery
  - Total number of linkage levels mastered
- A student-based approach is likely more appropriate than an item-based approach
  - No use of fixed forms
Three judgments must be made

- Probability necessary to determine node mastery
- Percent of nodes that must be mastered within a linkage level
- Number of linkage levels that must be mastered for a given performance level
Proposed Approach

• Body of work
  – Parallel procedures outlined in Kingston & Tiemann, 2012

• Generalized holistic

• Profile method
Materials

- Profiles across spectrum for number of linkage levels mastered
  - Exemplars selected from among most common in data (by May 13, 2015)
  - Multiple profiles provided at each number mastered

- Node reference booklets
- Example testlets at two linkage levels
- Copies of Performance Level Descriptors
<table>
<thead>
<tr>
<th>Area</th>
<th>Grade Level Expectation</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>RL.3.1</td>
<td>Answer who and what questions to demonstrate understanding of details in a text.</td>
<td>Attend to object characteristics</td>
<td>Identify familiar people, objects, places, and events</td>
<td>Answer who and what questions and identify details in a familiar story</td>
<td>Answer who and what questions about story details</td>
<td>Answer who, what, when, and where questions about story details</td>
</tr>
<tr>
<td>RL.3.2</td>
<td>Associate details with events in stories from diverse cultures.</td>
<td>Seek absent objects</td>
<td>Identify familiar people, objects, places, or events</td>
<td>Associate details with events in a familiar story</td>
<td>Associate details with events in diverse stories</td>
<td>Recount diverse stories with key details</td>
</tr>
<tr>
<td>RL.3.3</td>
<td>Identify the feelings of characters in a story.</td>
<td>Identify feeling states in self</td>
<td>Identify feeling words</td>
<td>Identify the feelings of characters in familiar stories</td>
<td>Identify the feelings of characters in a story</td>
<td>Identify character feelings and relate to actions</td>
</tr>
<tr>
<td>RL.3.5</td>
<td>Determine the beginning, middle, and end of a familiar story with a logical order.</td>
<td>Express interest in book sharing</td>
<td>Differentiate between text and pictures</td>
<td>Identify details and beginning and end of a story</td>
<td>Determine the beginning, middle, and end of a familiar story with a logical order</td>
<td>Identify beginning and end of a story</td>
</tr>
<tr>
<td>RL.3.1</td>
<td>Answer who and what questions to demonstrate understanding of details in a text.</td>
<td>Attend to object characteristics</td>
<td>Identify familiar people, objects, places, or events</td>
<td>Identify concrete details in an informational text</td>
<td>Answer who and what questions to demonstrate understanding of details in a text</td>
<td>Identify words related to explicit information</td>
</tr>
<tr>
<td>RL.3.2</td>
<td>Identify details in a text.</td>
<td>Seek absent objects</td>
<td>Attend to object characteristics</td>
<td>Identify illustrations for familiar text</td>
<td>Identify concrete detail in informational text</td>
<td>Identify explicit details in informational texts</td>
</tr>
<tr>
<td>RL.3.5</td>
<td>With guidance and support, use text features including headings and key words to locate information in a text.</td>
<td>Seek absent objects</td>
<td>Identify familiar people, objects, places, or events</td>
<td>Identify illustrations that go with a familiar text</td>
<td>Use basic text features to find information</td>
<td>Use specific text features to locate information</td>
</tr>
<tr>
<td>RL.3.4</td>
<td>Determine words and phrases that complete literal sentences in a text.</td>
<td>Attend to object characteristics</td>
<td>Identify familiar people, objects, places, or events</td>
<td>Identify illustrated meanings that go with an informational text</td>
<td>Use words to complete a sentence from a story</td>
<td>Identify the meaning of an unknown word using basic context</td>
</tr>
<tr>
<td>EE.L.3.5.a</td>
<td>Determine the literal meaning of words and phrases in context.</td>
<td>Attend to object characteristics</td>
<td>Identify familiar people, objects, places, or events</td>
<td>Identify similar or opposite meaning words</td>
<td>Use words to complete a sentence from a story</td>
<td>Identify the meaning of words and phrases</td>
</tr>
<tr>
<td>L.3.5.c</td>
<td>Identify words that describe personal emotional states.</td>
<td>Identify feeling states in self</td>
<td>Understand common feeling words</td>
<td>Understand and identify feeling words</td>
<td>Identify feeling words for personal state</td>
<td>Describe internal and external character traits</td>
</tr>
<tr>
<td>W.3.2.a</td>
<td>Select a topic and write about it including one fact or detail.</td>
<td>Seek absent objects</td>
<td>Displays interest in making marks on paper</td>
<td>Can select a topic from familiar choices</td>
<td>Write about a topic by producing facts and details</td>
<td>Independently selects a topic and produces relevant facts and details</td>
</tr>
<tr>
<td>W.3.4</td>
<td>With guidance and support produce writing that expresses more than one idea.</td>
<td>Directs attention to objects or people</td>
<td>Displays interest in making marks on paper</td>
<td>Produce writing that expresses one idea</td>
<td>Produce writing that expresses more than one idea</td>
<td>Independently produces writing with multiple ideas</td>
</tr>
</tbody>
</table>
Process

1. Training
2. Range finding
3. Pinpointing
4. Analysis of Impact Data
5. Review of Results and Final Decisions
1. Training

• Advance training
  – Presentation of general DLM content and introduction to materials

• On-site training
  – Specific to grade/content area of panel
  – Includes discussion of PLDs and practice round with materials
2. Range Finding

• Panelists assign performance levels to each profile
• Summary information is shared and group discusses
• Panelists adjust rankings (if needed)
• Logistic regression is used to identify the probability of a profile being classified to each level
3. Pinpointing

- Profiles closest to a probability of .5 are identified to refine the cuts
- Profiles are sorted into two categories to establish cut: those higher in the category and those not
- Panelists share categories and discuss
- Staff use logistic regression to determine final cuts
4. Analysis of Impact Data

- Data collected by May 13, 2015
- Profiles are shared for each performance level using cut points determined in pinpointing
- Impact data is shared to show the number of students who would be classified to each level
- Panelists review and discuss the results within and across grades
5. Review of Results and Final Decisions

• Staff compile the final judgments of panelists and make final recommendation for each level
• DLM TAC evaluates the recommendations and provides feedback
• State partners review the results of the panel process, including recommended cut points within and across grades
TRACKING GROWTH
Tracking Growth

• Raw numbers
  – linkage level mastered
  – nodes mastered
• Student growth percentiles