Using Cognitive Theory and Technology to Improve Reading Assessment

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Overview

• Background and context
• Reading for understanding
• Design principles
• The assessments
Background and Context

• Large scale initiatives calling for change
  – Common Core (NGACBP & CCSSO, 2010)

• As well as other seminal works
  – Pellegrino, Chudowsky, & Glaser, (2001)
  – Bennett, (2011); Bennett & Gitomer (2009)

• Change in constructs and assessments
Common Themes

1. Raising the bar for what it means to be proficient
   - Integration and synthesis of multiple sources (Lawless et al., 2012)
   - Evaluation (Graesser et al., 2007; Metzger, 2007)
   - Disciplinary or content area literacy (Goldman, 2012; Lee & Spratley, 2010)
   - Digital literacy (Coiro, 2009; Leu et al., 2013)
   - Communication, collaboration (NGACBP & CCSSO, 2010)
   - Perspective taking, complex reasoning, academic vocabulary (SERP RfU project)

2. Making assessments more useful for instruction
   - Gordon commission (2013)
   - Actionable information
   - Support learning
Potential Problems

• Raising the bar- how high is too high

• Many students are not prepared

• How to make the information useful for instruction

• How to raise the target but ensure access for all
Reading for Understanding

• Initiative funded by the Institute of Education sciences in 2010
• To improve students’ reading comprehension through intervention and assessment
• Five teams charged with developing interventions for particular grade bands
  – OSU (Prek-3rd); FSU (PreK-4th); SERP (4th-8th); UIC (6th-12th); UTA (7th-12th)
• One team charged with building assessments for students in PreK-12th grade
Goals of the Project

• To develop a series of age appropriate, developmentally sensitive, and theoretically based summative reading comprehension assessments for students in prek-12th grade.

• Integrate cognitive theory and empirical findings into the assessment designs.

• Make assessments instructionally relevant for teachers and a worth while learning experience for students.
The Assessments

• All assessments computer delivered
  – Advantages for scoring and sequencing tasks to reveal more information.
• Take approximately 45-50 minutes to administer.
• Two types of assessments
Component Skills Assessment

• Discrete tasks designed to target specific reading subskills
  – Decoding, phonological awareness, word recognition, morphology, syntax, vocabulary, listening comprehension and spelling.

• To date we have developed 10 component forms.

• The components assessment is designed to help contextualize and interpret performance on the GISA.
GISA: Global Integrated Scenario-Based Assessment

- Designed to measure a set of integrated skills associated with higher level comprehension.
  - E.g., Integration, synthesis, evaluation, global understanding, perspective taking, multiple text understanding, disciplinary reading

- Effort was also given to measure constructs that are important to reading but rarely measured in standardized reading assessments.
  - Background knowledge
  - Motivation
  - Self-regulation, metacognition
  - Reading strategies
Progress to Date

• In year 5 of a 5 year project
• Developed and tested over 20 GISA forms
• Assessments have been piloted in 23 states with over 90,000 students in a mix of urban, suburban and rural areas.
• Our assessments are demonstrating good reliability (typically $\alpha=.80$ or higher), evidence of validity (e.g., eye tracking data), and are helping us answer a number of key research questions.
Scenario Based Assessment

- Fundamental technique used in our designs to implement a variety of principles
- Reading is a purpose-driven activity (Van den Broek, et al., 2001)
- Purpose should be more than to answer multiple choice questions correctly (Rupp, Ferne, & Choi, 2006)
- Provide students with a context and reason to read
- Aim of enhancing engagement (Guthrie & Davis, 2003) and providing a standard of coherence (Linderholm et al., 2004)
- Define what is and is not important to attend to
Structuring the Assessment – Modeling and Support

- New standards and other reforms may raise the bar for achievement
- Help move education forward, but likely to increase the number of students who will not meet the standards
- Structure the assessment to reveal what parts of a complex task can students manage
- Add supports
- Model desired responses
- Provide guidelines
Integrating Reading Strategies

• There are a host of empirically supported reading strategies (McNamara, 2007)

• Strategies are used in the classroom

• Our approach is to integrate them into the assessment

• Summary, graphic organizer, paraphrasing, questioning, prediction
Integrating Multimedia

• The internet and technology has impacted the construct of reading (Coiro, 2009)

• In addition to traditional text, other sources are included in the design such as websites, pictures, charts, graphs, blogs, e-mails and so forth

• Our intention is to include a range of traditional and non-traditional sources
Adding a Social Dimension - Simulated Peers

- Reading, understanding and learning is often a social process in the classroom and in non academic settings.

- Standards have elements that emphasize collaboration and discussion.

- Introduce simulated peers to add a social dimension as well to obtain more targeted information about students.
Accounting for Performance Moderators

• Performance moderators are variables that may impact the reading comprehension score.

• Background knowledge has a profound effect on how students comprehend text (Shapiro, 2004).

• Student motivation can impact effort and the validity of test scores (Braun, Kirsch, & Yamamoto, 2010).

• Rather than to ignore these effects, our approach is to provide estimates of students’ background knowledge and motivation to help contextualize the reading comprehension score.
Reading comprehension is a complex but evolving construct.

Efforts to raise the bar may be met with resistance.

Providing assessments that are geared towards learning may help support good practice and provide a starting point for further instruction.

Both the foundational and integrated aspects of reading are important.

Take advantage of advances in technology and cognitive theory (sequencing, reading strategies).
Current Directions and Future Work

• Vertical scaling study
  – 10,000 students grades 3rd to 12th grade
  – Explore development

• Build new forms that push the boundaries
  – Multiple sessions
  – Feedback
  – Metacognition
  – Timing data
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Questions?