

# 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)
  - Partnership for 21<sup>st</sup> Century Skills (2004, 2008)
  - The Gordon commission (2013)
- 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-3<sup>rd</sup>); FSU (PreK-4<sup>th</sup>); SERP (4<sup>th</sup>-8<sup>th</sup>); UIC (6<sup>th</sup>-12<sup>th</sup>); UTA (7<sup>th</sup>-12<sup>th</sup>)
- One team charged with building assessments for students in PreK-12<sup>th</sup> 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-12<sup>th</sup> 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 provide estimates of students' background knowledge and motivation to help contextualize the reading comprehension score.

# Summary

- 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 3<sup>rd</sup> to 12<sup>th</sup> grade
  - Explore development
- Build new forms that push the boundaries
  - Multiple sessions
  - Feedback
  - Metacognition
  - Timing data

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Questions?