THE BERKELEY ASSESSMENT SYSTEM SOFTWARE

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OVERVIEW

• BEAR Assessment system:
  – Assessment approach that emphasizes the integration of cognitive theory and assessment

• BASS (Berkeley Assessment System Software):
  – Software platform that facilitates this approach

• Example:
  – Implementing the ADM curriculum using BASS

• Demo of BASS Teacher Tools
INTRODUCTION

Connecting curriculum, instruction and assessment.
The BEAR Assessment System

Our work builds on more than a decade of research in the design of assessment tasks and measurement techniques to support evidence-based assessment in the classroom following a Construct Modeling approach (Wilson and Sloane, 2000; Wilson, 2004, 2009).
THE NRC ASSESSMENT TRIANGLE

Observation  Interpretation  Cognition

“Three foundational elements... underlie all assessments. These three elements must be explicitly connected and designed as a coordinated whole. If not, the meaningfulness of inferences drawn from the assessment will be compromised.”

NRC, 2001

EVIDENCE BASED DESIGN OF ASSESSMENTS

• The elements outlined in the NRC assessment triangle can be considered as a desirable basis to any assessment, and can be identified both on the Construct Modeling approach as well as in Evidence Centered Design (ECD; Mislevy, Steinberg & Almond, 2002)

• “[These] approaches attempt to systematize the assessment development process and provide a model for understanding the connections between these different elements.” (Wilson et al., 2012; p. 71)
The BEAR Assessment System and BASS

- The connection between curriculum design, instruction and assessment is the driving feature of BASS.

- The assessment development cycle aims to provide meaningful interpretations of student work relative to the cognitive and developmental goals defined by a curriculum.

- Accordingly, BASS is designed to be used in close alignment with cognitive theories, educational goals and instructional content.
THE BERKELEY ASSESSMENT SYSTEM SOFTWARE

Supporting the entire assessment cycle.
The Berkeley Assessment System Software (BASS)

- BASS is designed to support the entire cycle of development, delivery, analysis and reporting of assessments.
- As a Ruby on Rails web application, BASS is designed to be used on most platforms or devices.
**What is BASS About?**

- BASS allows researchers and curriculum developers to create *activities* that can be *integrated seamlessly into lesson plans*, providing teachers with embedded assessments that can inform their day-to-day classroom instruction.
- Additionally, BASS collects the responses in order to analyze them and generate reports.
THE BASS MODULES

Project Framework

- Reports
- Validity & Reliability Studies
- Accounts & Settings
- Construct Definition
- Measurement Model
- Outcome Space Definition
- Item Design
- Data Management
- Rating
- Test Assembly
- Test Delivery

Test Development
Who Can Use BASS?

- Researchers
- Curriculum developers
- Teachers
- Students
ASSESSMENT ACTIVITIES

• This system allows teachers to easily manage all kinds of assessment, including:
  – in-class activities,
  – homework assignments,
  – end-of-unit tests,
  – and more.
THE ASSESSING DATA MODELING PROJECT

A statistics curriculum for middle school students.
THE ASSESSING DATA MODELING (ADM) PROJECT

• The ADM project is dedicated to the development of a statistics curriculum for middle school students (Lehrer, Kim, Ayers, & Wilson, in press).
• ADM is a collaboration between Rich Lehrer and his team at Vanderbilt University (the content specialists) and the assessment team at UC Berkeley.
As part of its work over the past years, the project has developed seven constructs to model the hypothesized learning progressions (CCII, 2009) on this subject matter.
The ADM Constructs

Each construct map characterizes the expected levels of student understanding and the main learning performances associated with each level.

TOM Level 2 - Identify and characterize the attribute of the object to be measured.

2A - Define the attribute being measured.
2B - Distinguish or order quantities of an attribute by direct comparison.
2C - Associate measure with count.

TOM Level 3 - Explain/Justify/Demonstrate use of particular properties of a unit of measure.

3A - Tile and explain why.
3B - Use identical units and explain why.
3C - Re-use (iterate) a unit to measure.
3D - Zero serves as the origin of measure.

TOM Level 4 - Consider properties of unit in relation to goals of measurement.

4A - Use and justify standard (including conventional) unit.
4B - Consider suitability of unit.
4C - Qualitatively predict inverse relation between size of unit and measure.
4D - Partition and compose partitions by factors of 2, and use the partitions as a unit...
4E - Symbolize unit of measure as distance traveled.
Each item developed in the project targets specific construct levels. For each item, an exemplar, or scoring guide, was created describing the learning performances and sample responses.
ADM & BASS

• BASS is being developed to facilitate the following aspects in the ADM project:
  – Keeping track of the latest version of the constructs
  – Maintaining the item bank and scoring guides
  – Allowing teachers to use the items and deliver them as part of their class activities
  – Simplifying the scoring process
  – Collecting and organizing project data
**What Can BASS Do For Teachers?**

- The development of BASS as part of the ADM project emphasizes:
  - Giving teachers flexibility in designing and assigning activities for students,
  - Simplifying the scoring process, and
  - Providing teachers with useful reports to share with students and parents and to use in planning instruction.
DEVELOPING BASS

In order to make the system usable to instructors in classrooms, we have placed teachers at the center of the design process.
**Next Steps**

Project Framework

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- Rating
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- Test Delivery


Thank you!

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