COMMON-SENSE APPROACHES to Math Curriculum and Assessment Success

Content provided by DreamBox Learning
Common-Sense Approaches to Math Curriculum and Assessment Success

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McDaniel College

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DreamBox Learning
Perspectives on Math Education

REGARDLESS OF WHERE YOU LIVE
Topics

• Mathematics curriculum and instruction
• Assessment: Formative and Summative
• Strategies to support achievement for all student populations
• Leveraging Technology
What’s important to you?

• Mathematics Content?

• Which students?

• How much time is needed?

• What to assess? How to assess?
Mathematical Practices

Doing the math; rolling sleeves up, gettin’ dirty – it’s all good!
Monitoring Progress

• Students progressing toward understanding and proficiency with important content standards.
• Student confidence and engagement in mathematics learning is increasing.
• A daily record of progress is guided by formative assessment.
• Target – performance on class and school assessments improves.
Common Core
IMPLEMENTATION
Standards & Curriculum

Differences and Disconnects

• Standards – expectations (targets)
• Curriculum
  – Sequence
  – Developmental Trajectories
  – Focus
  – Coherence
• Learning Experiences & Instruction
  – What’s this look like EVERY day

Here’s the issue: Distinguishing between alignment and quality (Heck, Weiss, Pasley, 2011)
CCSS Assessment
SBAC & PARCC
The influence of the CCSS will be strongly mediated by the consortia assessments.

Heck, Weiss, Paisley, 2011
ASSESSMENT CONSORTIA MEMBERSHIP

$360 million in federal grants has gone to groups of states developing common assessments.

(As of 4.5.14)

Smarter Balanced Assessment Consortium (23)
Partnership for Assessment of Readiness for College and Careers (16 plus D.C.)
Both (1)
None (12)

SOURCES: Smarter Balanced Assessment Consortium; Partnership for Assessment of Readiness for College and Careers
• The term **formative assessment** has been with us for close to 50 years…

• Regular use of classroom formative assessment would raise student achievement by 0.4 to 0.7 standard deviations – enough to raise the U.S. into the top five countries in the international rankings for mathematics (Natriello, 1987; Crooks, 1998; Black and Wiliam, 1998).
BUT, Aside from teacher-made classroom tests, the integration of assessment and learning as an interacting system has been too little explored.

Glaser & Silver, 1994
We know it is more informative to observe a student during a mathematical activity than to grade his papers.

Freudenthal, 1973
Formative Assessment - Research

• Regular Assessment (two-five times per week) with follow-up action produced a substantial increase in student learning.

• When teachers set rules about how they would review the data and the actions that were to follow before they assessed their students, the gains in achievement were twice as great as those cases in which the follow up action was left to the judgment of the individual teacher.

Fuchs & Fuchs, 1986
Formative Assessment - Research

In an experimental design in which teachers regularly used formative assessment to drive instruction, their students made *almost twice as much progress over the year* as measured by externally scored standardized tests than their counterparts in other classrooms.

William, Lee, Harrison & Black, 2004
Formative Assessment Strategies

1. **Clarifying** learning intentions and sharing criteria for success.

2. **Engineering** effective classroom discussions, questions, and learning tasks that elicit evidence of learning.

3. **Providing** feedback that moves learners forward.

4. **Activating** students as the owners of their own learning.

5. **Activating** students as instructional resources for one another.

William and Leahy, 2007; William and Thompson, 2007, and NCTM Research Brief
Formative assessment is:

- Students and teachers,
- Using evidence of learning,
- To adapt teaching and learning,
- To meet immediate learning needs,
- Minute-to-minute and day-by-day.

Thompson and William, 2007

Love this...
How can this be communicated and shared with others – teaching teams? Parents?
Links to SMARTER/PARCC, OTHER?
Teacher Growth
PRE-SERVICE, IN-SERVICE, & NATIONAL ORGANIZATIONS
<table>
<thead>
<tr>
<th>PROJECT SPONSORS</th>
<th>ONLINE EMS CLEARINGHOUSE</th>
<th>EMS PROFESSIONAL DEVELOPMENT</th>
<th>LEADERSHIP MODULES &amp; MATERIALS</th>
<th>EMS&amp;TL PROJECT IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Brookhill Foundation</strong></td>
<td>Established in 2009, <a href="http://www.mathspecialists.org">www.mathspecialists.org</a> has been expanded to include a monthly project blog related to leadership challenges for specialists and also contains professional development considerations related to implementation of the Common Core State Standards. The ems&amp;tl Clearinghouse will also maintain and expand its “This Worked” online feature and discussion forum.</td>
<td>The ems&amp;tl Project staff regularly presents at regional and annual NCTM and NCSM conferences. Such presentations will continue to focus on leadership issues and transitioning to and implementation of the Common Core State Standards. The Project is also considering national elementary mathematics specialist events at regionally hosted sites.</td>
<td>The project continues to develop print, pencast, and online case-based leadership modules to advance the dialogue related to challenges specialists face. Such challenges include: mathematical content knowledge, pedagogy, mentoring, and professional relationships, as well as other aspects of the role of the mathematics specialist/instructional leader.</td>
<td>The ems&amp;tl Project is focusing on the location and development of documentation efforts which analyze and support elementary school mathematics specialists, while continuing to identify leadership issues and related challenges elementary mathematics specialists face in their work with teachers, students, other professionals, and the school community.</td>
</tr>
<tr>
<td><strong>McDaniel College</strong></td>
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</tr>
</tbody>
</table>

**Project Staff**
- Francis (Skip) Fennell, director
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  jonwray@hcpss.org
- Beth Kobett, lead consultant
  bkobett@stevenson.edu
Personal, Personalized, & Digital Learning
Fullan: Alive in the Swamp

"Technology–enabled innovations have a different problem, mainly pedagogy and outcomes. Many of the innovations, particularly those that provide online content and learning materials, use basic pedagogy – most often in the form of introducing concepts by video instruction and following up with a series of progression exercises and tests. Other digital innovations are simply tools that allow teachers to do the same age-old practices but in a digital format."

(p. 25)
The SAMR Model

SAMR Model by Dr. Ruben R. Puentevedra, www.hippasus.com/rrweblog
Angle Measurement – Common Core

4.MD.6
• Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

4.MD.7
• Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.
When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts.
Angle Measurement – Common Core

4.MD.5a
• An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a “one-degree angle,” and can be used to measure angles.

4.MD.5b
• An angle that turns through n one-degree angles is said to have an angle measure of n degrees.
4.MD.5a

- An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through $1/360$ of a circle is called a “one-degree angle,” and can be used to measure angles.

4.MD.5b

- An angle that turns through $n$ one-degree angles is said to have an angle measure of $n$ degrees.
Angle Measurement in DreamBox

One rotation has already been made. Enter a second angle measure that will rotate the Webmaker and hit the target.

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Thank You!

http://www.mathspecialists.org
ffennell@mcdaniel.edu
Personalized Learning

Joanna Bannon
West Allis West Milwaukee
School District
Background

• Located outside of Milwaukee, Wisconsin
• Approximately 10,000 students
• 11 elementary, 3 intermediate, 3 high schools
• 1 to 1 iPad initiative began three years ago
• 80% complete
What prompted the iPad initiative?

Next Generation Learning Communities (NxGLC)
• Personalized learning that occurs anytime, anywhere and results in world-class knowledge and skills for all students.

• Facilitate and inspire student learning and creativity by guiding learner-centered activities

• Design and develop digital-age learning experiences and assessments linking curriculum benchmarks to 21st century learning standards

• Model digital-age work and learning

• Promote and model digital citizenship and responsibility

• Engage in collaboration, professional growth and leadership
Six pillars define the foundation of Next Generation Learning

1. **College and Career Readiness**
   - Graduates have the essential skills, including academic, technical, employability and interpersonal, to succeed at the next level in a post-secondary education or career pathway.

2. **Student Centered Learning Environments**
   - Learning environments are varied and flexible to accommodate the needs of learners and provide ongoing opportunities to build a collaborative community of students and staff.

3. **Competency Based Progression**
   - Learners demonstrate evidence of deep learning along a continuum based on the rigor of the Common Core Standards.

4. **Student Voice in Learning**
   - Learners have significant and meaningful influence in co-designing their educational experience through the use of goal setting and rigorous personal learning paths.

5. **21st Century Skill Set**
   - Students will collaborate, communicate, think critically and problem-solve using creativity, innovation, and technology as a tool for personalized learning.

6. **Family and Community Partnership**
   - Meaningful relationships with parents and community provide expertise and contributions that are leveraged to support student success.
Initial concerns

- Parent support and concerns related to management
- Effective training for teachers to utilize technology / transforming instructional practices
- Financial sustainability and tech support
- Instructional support in buildings
Successes

• 100% staff and 80% of students have iPads for individual use; remaining students will receive their iPad by April 1.
• Adoption of multiple adaptive, online programs to support learning
  • *DreamBox (4K-5 all students)
• Significant parental support
• Ongoing, effective professional development for staff and parents
• Local, state and national recognition for innovative work in personalized learning and technology integration
DreamBox Learning Math

• Provides engaging learning opportunities and conceptual understanding that has been lacking

• All elementary buildings are consistently meeting our district goal related to DreamBox usage (1 hour per week)

• Students LOVE DreamBox Learning and choose it more than any other program or activity during math workshop

• DreamBox reports provide extensive information about student progress

• Data provided by classroom summaries and progress reports drive small group instruction and intervention

• Support RtI efforts in closing the achievement gap and increasing conceptual understanding
Questions?
3 Essential Elements

Rigorous Mathematics

- Common Core State Standards, Texas TEKS, Virginia SOL, Canada WNCP & Ontario Curriculum
- Standards for Mathematical Practice

Motivating Environment

- Motivating and empowering environments
- Gaming fundamentals, rewards

Intelligent Adaptive Learning™ Engine

- Millions of personalized learning paths
- Tailored to each student’s unique needs
# Classroom Summary Report

<table>
<thead>
<tr>
<th>Student</th>
<th>Grade</th>
<th>Kindergarten Curriculum</th>
<th>1st Grade Curriculum</th>
<th>2nd Grade Curriculum</th>
<th>3rd Grade Curriculum</th>
<th>Time on Task (HH:MM)</th>
<th>Notifications</th>
<th>Student Reports</th>
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<td>Alexander F</td>
<td>1</td>
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<td>Alexi K</td>
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<td>Billy R</td>
<td>1</td>
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<td>Brianna S</td>
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<td>Linda C</td>
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<td>Ramona G</td>
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<td>Rilee L</td>
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<td>Roberta A</td>
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<td>Sakurah P</td>
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<td>Solomon O</td>
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</tbody>
</table>

**Symbol Legend**

- [ ] Skipped based on initial placement
- [ ] Passed in unit pretest
- [ ] Completed curriculum
- [ ] Pending assessment
- [ ] Needs assistance
- ° Working inefficiently

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# Strong Support for Differentiation

**Concept: Multiplication: Double & Halve**

Students use known basic facts and double one factor and halve the other to determine the product of a more challenging problem.

<table>
<thead>
<tr>
<th># Completed with Proficiency</th>
<th># In Progress</th>
<th># Not Started</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 students</td>
<td>10 students</td>
<td>9 students</td>
</tr>
<tr>
<td>John P (about 1 month ago)</td>
<td>Avaneesh S (71%)</td>
<td>Anthony P</td>
</tr>
<tr>
<td>Jacob C (about 1 month ago)</td>
<td>Charles K (71%)</td>
<td>Brittany B</td>
</tr>
<tr>
<td>Rebcah D (about 1 month ago)</td>
<td>Emmanuel M (71%)</td>
<td>Christina P</td>
</tr>
<tr>
<td>Julian B (about 1 month ago)</td>
<td>Luke R (71%)</td>
<td>Emily C</td>
</tr>
<tr>
<td>Edgar H (about 1 month ago)</td>
<td>Alanna M (64%)</td>
<td>Karly H</td>
</tr>
<tr>
<td>Pedro S (2 months ago)</td>
<td>Domenic G (64%)</td>
<td>Leah P</td>
</tr>
<tr>
<td>Daniel C (3 months ago)</td>
<td>Daniel S (57%)</td>
<td>Michael D</td>
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<tr>
<td>Dominique S (28%)</td>
<td>Samantha S</td>
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<tr>
<td>Suna C (28%)</td>
<td>Vanessa C</td>
<td></td>
</tr>
<tr>
<td>Caitlin S (21%)</td>
<td></td>
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</tr>
</tbody>
</table>
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www.dreambox.com/free-trial