NCSM President
2013-2015

Valerie L. Mills

Ypsilanti
Michigan
National Council of Supervisors of Mathematics

N - Network and collaborate with stakeholders in education, business, and government to ensure growth and development of mathematics education leaders.

C - Communicate current and relevant research to mathematics leaders.

S - Support and sustain student achievement through the development of leadership skills.

M - Motivate mathematics leaders to maintain a lifelong commitment to provide equity and access for all learners.
JUMP START
Formative Assessment

National Council of Supervisors of Mathematics
JUMP START Formative Assessment Webinar
Ana Floyd

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JUMP START
Formative Assessment

National Council of Supervisors of Mathematics

JUMP START Formative Assessment Webinar
## Connections to Formative Assessment

<table>
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<tr>
<th>What are your teachers doing well related to formative assessment?</th>
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The National Council of Supervisors of Mathematics (NCSM) and the Association of Mathematics Teacher Educators (AMTE) affirm the centrality of research-based, mathematically focused, formative assessment—a key element in the national effort to improve mathematics proficiency. Formative assessment needs to be intentionally and systematically integrated into classroom instruction at every grade level. This requires adequate attention in the preparation of new teachers of mathematics and in the continuing education and professional development of current teachers.
Audience for “Jump Start” Series

- Math coaches, math specialists, faculty who teach mathematics education courses, teacher leaders might use the series with professional learning communities and informal gatherings of colleagues.

- Ultimately, classroom teachers and students will implement and benefit from the strategies:
  - Teachers will know more about their students’ thinking and reasoning and students’ misunderstandings.
  - Teachers will use this knowledge to modify instruction to better meet students’ needs.
  - Students will be supported in taking greater responsibility for their own learning.
Overarching Goals for “Jump Start”

- To provide teachers with understanding that formative assessment is a *process* of gathering evidence about what students know and understand, their misconceptions, and their incomplete knowledge.

- To support teachers in using strategies that inform teaching and learning and shape their instructional decisions “in the moment” and in short and long-term planning.

- To suggest strategies for encouraging greater involvement of students.
Formative Assessment Makes a Difference!

Black and Wiliam (1998) report, based on their extensive review of research, typical effect sizes of formative assessment experiments are between 0.4 and 0.7

Effect Size = The number of standard deviations between the means of the experimental and control groups

A positive effect size indicates that the experimental group performed better than (that is, outscored) the control group

(Dynamic Classroom Assessment 2004)
Formative Assessment Makes a Difference!

- According to Black and Wiliam (1998), these gains are
  - Larger than most instructional innovation strategies,
  - Particularly helpful to pupils who have previously struggled,
  - Consistent across countries (i.e., US, Canada, England, Israel, and Portugal), across age brackets, and content areas, and
  - Sustained over extended periods of time (Wiliam, 2005)

- It's really not surprising that formative assessment works so well. What is surprising is how few U.S. teachers use the process. (Popham, 2013)
Defining Formative Assessment

Formative assessment has three key elements:

- Elicit evidence about learning to close the gap between current and desired performance
- Adjust the learning experiences to close the performance gap through useful feedback
- Involve students in the assessment learning process

Adapted from Margaret Heritage, 2008
Description of JUMP START Sessions
JUMP START

Authors

Jeane Joyner
Mari Muri
Katherine Mawhinney
Catherine Schwartz
Wendy Rich
Ana Floyd
“Jump Start” Modules

- Module 1: Overview
- Module 2: Identifying Learning Targets
- Module 3: Activating Prior Knowledge
- Module 4: The Answer is Wrong
- Module 5: Feedback to Students
- Module 6: Asking Productive Questions
Structure of JUMP START Series

- PowerPoint presentations with discussion notes, activities, and suggestions for follow-up
- Single-topic focus for each session
  - Grade-level groups, department meetings, faculty discussions, PLCs
  - Web search ideas for further information
- Technology requirements: computer and projection device; internet connection
- Leader notes for each session and discussion ideas for each slide; participant alerts (e.g., alternative ways to implement strategies, cautions)
NCTM Research Brief: Five Key Strategies

National Council of Teachers of Mathematics (2007)
Five “Key Strategies” for Effective Formative Assessment

- Clarifying, sharing, and understanding goals for learning and criteria for success with learners
- Engineering effective classroom discussions, questions, activities, and tasks that elicit evidence of students’ learning
- Providing feedback that moves learning forward
- Activating students as owners of their own learning
- Activating students as learning resources for one another
Identifying and Planning
Clear Learning Targets

Teaching begins with clear learning targets

- What do we expect students to learn?
- How are they going to learn it?
- How will we know when they have learned it?
- How will they know when they have learned it?
- How will we respond when they don’t?
- How will we respond when they do?

Learning takes place as students make sense of the mathematics in their lessons
Teaching-Learning Cycle

Plan: Clear Learning Targets

Inferences Decisions

Tasks Instruction Questions

Student Self-Assessment Feedback

This slide is an effort to be clear about how daily learning targets fit into the broader picture and how teachers go about determining their instructional priorities.

7. It is imperative that teachers imbed assessment into their instructional programs so that adjustments to plans reflect what students are learning and attend to what still needs to be learned. Assessment is not an add-on; rather it is a tool for making decisions. NCTM’s Principles and Standards for School Mathematics continues to be a resource for teachers.

8. There are many variations of a model such as this one as authors attempt to illustrate the interactions that are involved in teaching and learning. The points to be made here are that each of these cells involve teachers with content and students, that students should be heavily involved in the teaching and learning cycle, and that instruction begins with a clear understanding of the goals with adjustments made throughout the teaching-learning cycle to support students’ attainment of the learning targets. Each of the parts of the teaching and learning cycle are platforms for formative assessment.

Teaching-Learning Cycle develops the cyclic nature of teaching and learning and how formative assessment drives the cycle. The cycle highlights clear learning targets as a point of entry and develops the notion of teaching as a practice that teachers can reflect upon and improve.
Another Prior Knowledge Strategy

Pose a multiple choice discussion prompt

- There are four dogs. One of the dogs weighs 50 pounds. What is true? Explain
  A. The median could be 12, but the mean could not be 12
  B. The mean could be 12, but the median could not be 12
  C. Both the median and the mean could be 12
  D. Neither the median nor the mean could be 12
  E. There is not enough information to know

What might you infer when students choose each of these answers?
Example: “Quick Writes” As a Strategy

- Students often approach lessons involving fractions as if they had no prior knowledge
- Quick writes can get students thinking about what they learned in previous years
  - Model 3/4 in three different ways
  - Give an example to show that one-fourth is not always smaller in size than one-half
  - What do you know about whole number operations that will help you compute with fractions?
Activating Students’ Prior Knowledge

- The focus is “in the moment” assessment
- Students recall what they know about a topic
- Teachers have immediate feedback on “where the group is”
- Begins the lesson with students thinking about the topic and what they already know
- Is usually short (4-6 minutes)
- Can be introductory in nature as a launch or a quick review
When the Answer Is Wrong…

This session has two main goals:

- To consider strategies that support what is correct in students’ thinking yet address misconceptions, incomplete understanding, and wrong answers

- To identify one or more strategies that fit with each participant’s instructional practices and to plan ways to implement the strategy
What Would You Say?

Scenario: Students are working on this problem; you call on Cary

\[ 18 \div 2 - (3 \times 2) - 5 \] + 3 =

Cary has written

- \[ [9 - 6 - 5] + 3 = \]
- \[ [9 -11] + 3 = \]
- \[ 2 + 3 = 5 \]

What does Cary understand? What does Cary not understand? What might you say when Cary answers “5” to offer support but acknowledge that the answer is incorrect?
What Would You Say?

Students are working on this problem; you call on a student

- $4x(2x - 9) - 2(5x - 6)$

The student has written

- $4x(2x - 9) - 2(5x - 6)$
- $8x - 36x - 10x + 12$
- $-38x + 12$

What does the student understand? What does the student not understand? What would you say to this student to offer support but acknowledge that the answer is incorrect?
Feedback to Students

- Timely, actionable feedback helps students know what is correct and what they need to rethink.
- Either oral or written, quality feedback moves student learning forward.
- In this session there are opportunities to identify feedback that is not very helpful and turn it into comments that support student learning.
Examining Student Work

- **Students’ Task:** Draw two different triangles. Use a Venn diagram to show how they are alike and how they are different.

- With your partner discuss the student work
  - What information would you expect in a strong response?
  - What is the nature of the misconceptions or mistakes on the students’ papers?
  - Which students do you want to question?
  - What “next steps” instructionally would you plan for this class?
Writing Helpful Feedback

- After examining the student samples, consider what feedback you might give to the class
- Would you divide the students into groups?
  - If yes, how would you group them?
  - What would you say to the different groups?
- Divide the student examples so each person has at least 2 samples
- Write feedback to these students
- Share your feedback examples with others
Asking Productive Questions

- To examine different purposes for classroom questions

- To differentiate types of questions that support student learning and inform instruction

- To reflect on personal use of questions in the classroom
Conjecturing About Functions

- Video is of an 8th grade class
- Content is making conjectures about functions
- Teacher is Audra McPhillips
- URL for future viewing and reading web discussion is https://www.teachingchannel.org/videos/conjecture-lesson-plan
- Directions: Pay particular attention to the questions that the teacher asks and her comments about why she does different things
Reaction: Conjecturing About Functions

- What did you notice about the classroom environment?
- How did this lesson build on previous work?
- What evidence do you have that the teacher is using her knowledge of students’ thinking in moving this particular lesson forward?
  - Her depth of knowledge of the mathematics content?
  - Her general knowledge about students’ as they learn this content (difficulties or possible misconceptions)?
  - Real time interactions with the students?
Plans Call For Additional Topics

- Inferences About Students’ Thinking
- Student Self-Assessment
- Intentional Listening
- Using Student Data To Make Instructional Decisions
- Students Becoming Resources
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Feedback

- Please share your feedback and suggestions with the writing team

  [https://www.surveymonkey.com/s/3BQ2H8M](https://www.surveymonkey.com/s/3BQ2H8M)
JumpStart Formative Assessment

The National Council of Supervisors of Mathematics (NCSM) and the Association of Mathematics Teacher Educators (AMTE) affirm the centrality of research-based, mathematically focused, formative assessment – a key element in the national effort to improve mathematics proficiency. These professional development modules assist leaders in “jump starting” formative assessment, K–12. The collection contains an overview and modules, each highlighting one aspect of formative assessment with PowerPoints, Leaders’ Notes, and handouts as needed.

The Modules

http://www.mathedleadership.org/resources/jumpstart/index.html
References


Formative Assessment

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Catherine Schwartz
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NCSM’s PRIME companion....

It’s TIME: Themes and Imperatives for Mathematics Education
Leadership Training for Mathematics Leaders

PRINCIPLES AND INDICATORS FOR MATHEMATICS EDUCATION LEADERS
2014 NCSM FALL LEADERSHIP SEMINAR:

It’s TIME: Using Imperatives to Support and Motivate Leaders in Mathematics Education

Join Steve Leinwand, Valerie Mills, Catherine Fosnot, and other leaders in mathematics education at these one-day seminars!

THREE DATES AND LOCATIONS
The NCSM Leadership Seminar is held on Wednesday in conjunction with the NCTM Pre-Conference Meeting from 8:00AM–4:00PM

OCTOBER 29, 2014
INDIANAPOLIS, IN

NOVEMBER 12, 2014
RICHMOND, VA

NOVEMBER 19, 2014
HOUSTON, TX
NCSM Mathematics Leadership Publications

NCSM Journal
of Mathematics Education Leadership
WINTER/SPRING 2014
VOL. 15, NO. 1

NCSM 2014 Leadership Academy

LEADERSHIP IN MATHEMATICS EDUCATION
COMMUNICATE SUPPORT MOTIVATE

First Things First for the 21st Century
Dr. Mike Schmoker is this year’s annual conference keynote speaker. In his keynote address, First Things First for the 21st Century, the audience will learn precisely where to focus their precious time, efforts, and resources to ensure that all students are prepared for the 21st century demands of college, careers, and citizenship. The audience will also learn about the three most essential elements of good schooling, and how to implement them immediately and very easily, straightforwardly, directly.

Despite their unfailing power for improving performance in any and every school, these elements continue to be misunderstood and largely under-implemented; therefore, they should be our first and highest priority.

The audience will leave this session knowing both what to do and how to do it, in ways that will yield immediate and significant results. Dr. Schmoker has offered to autograph his book after the session so don’t forget to bring a copy! NCSM also began to have copies of POCSIR, Easing the Essentials to Radically Improve Student Learning. His previous book, ADEQUATE NOW, was selected as a finalist for “Book of the Year” by the Association of Education Publishers. He is also a featured author in ASCD (Association for Supervision and Curriculum Development) Master Class DVD series.

Dr. Schmoker is the author of the best-selling book entitled POCSIR. Easing the Essentials to Radically Improve Student Learning. His previous book, ADEQUATE NOW, was selected as a finalist for “Book of the Year” by the Association of Education Publishers. He is also a featured author in ASCD (Association for Supervision and Curriculum Development) Master Class DVD series.

As a former administrator, English teacher, and football coach, Dr. Schmoker has written several books and educational articles. He is also a frequent speaker at state and national conferences and continues to consult with schools and state and provincial departments of education. He has worked with McREL (Mid-Continent Regional Educational Laboratory) in Denver, Colorado as a senior consultant.

The 48th NCSM Annual Conference at a Glance

Sunday, April 6, 2014

On-line registration and conference check-in will be held at the Registration Area on the 3rd floor of the Hilton Riverside, New Orleans Hotel Conference Center from 8:00-4:00 PM.

If you have preregistered, bring your confirmation letter or picture ID to pick up your conference materials.

All meals, except Monday’s Box Lunch, will be held in the Grand Ballrooms C& D. The Sponsor Display Area is in the Hilton Conference Center on the 2nd floor.

Leadership Corner

This edition of the leadership corner comes from Derek Koeran’s 5 Traits of 21st Century Educational Leadership and can be found at: http://www.classroom.com/leadership/5traits.html
New Position Papers:

**Improving Student Achievement by Implementing Highly Effective Teacher Evaluation Practices**

“A commitment to professional learning is important, not because teaching is of poor quality and must be fixed, but rather because teaching is so hard that we can only improve it. No matter how good a lesson, we can always make it better. Just as in other professions, every teacher has the responsibility to be involved in a career-long quest to improve practices.”

Charles Darwin, 2011

**Our Position**

It is the position of the National Council of Supervisors of Mathematics (NCSM) that teacher evaluation should be a multifaceted-collaborative process between teacher and administrator informed by a variety of data sources. There is no one “evaluation-fits-all” that automatically works for every school, district, or state. However, there are common and processes that can be followed to ensure that evaluations are conducted consistently and accurately. The suggestions from this position paper are intended to offer specific mathematical requirements for inclusion into an already existing evaluation system.

NCSM defines a mathematics teacher as one who is certified to teach mathematics or as one defined as one who teaches mathematics and other subjects in elementary grades (e.g., grades 3-5). There is much at stake for the teacher in the evaluation process. Our position views evaluation as a formative, teacher-centered process where teachers are continually receiving feedback and given opportunities for targeted and specific professional learning opportunities (Ball, 2013). The United States Department of Education in the Race to the Top Program Summary (U.S. Department of Education, 2009) included as one criterion for awarding grants to “Design and Implement Rigorous, Transparent, and Fair Evaluation Systems for Teachers and Principals” that “a different performance using multiple rating scales that take into account data on student growth at a significant factor, and (b) is designed and designed with teacher and principal and involves p 8.” Our position can be accomplished when leaders help schools and districts.

- Ensure reliability (consistent results) and validity (measure of what it intended) of all rating instruments used in the evaluation process;
- Ensure classroom observation rating instruments focus on grade level content, instruction, and student response to instruction;
- Provide training for individuals who use the evaluation instruments, including the administrator, parent teachers, and third-party evaluators;
- Determine multiple data sources for the evaluation process; and
- Identify targeted professional development correlated with areas of needed growth and student teacher assessment.

The NCSM Improving Student Achievement Series is a set of position papers designed to provide research-based practices for school leaders and mathematics education leaders.

**Improving Student Achievement in Mathematics Through Formative Assessment in Instruction**

—A Joint Position Paper with AMTE—

It’s really not surprising that formative assessment works as well. What is surprising is how few U.S. teachers use the process.

Stephen, 2013

**Our Position**

The National Council of Supervisors of Mathematics (NCSM) and the Association of Mathematics Teacher Education (AMTE) offers the opportunity of research-based, mathematically focused, formative assessment—a key element in the national effort to improve mathematics proficiency. Formative assessment needs to be intentionally and systematically integrated in the classroom instruction at every grade level. This requires adequate attention in the preparation of new teachers of mathematics and in the continuing education and professional development of current teachers.

**What is Formative Assessment?**

Formative assessment is the process of gathering evidence within the stream of instruction in order to inform teaching and learning (Black & Wiliam, 2004). To be considered formative, the evidence must be “distributed, interpreted, and used by both teacher and learner” (Black, 2011, p. 43). It cannot be divided into a separate assessment tool or used at the end of the year, or at the end of the course. Formative assessment involves getting the two places to learn about student beliefs and how using this information to decide what to do next” (p. 30). It is a classroom that uses assessment to support learning, the divide between instruction and assessment. Therefore, everything student does—such as answering questions, working in groups, completing tasks, answering questions, working on projects, forming homework assignments, or evaluating student work—is potentially the source of information about how much they understand. Teacher learning (Leavy, 2005). “When classroom practice is based on formative assessment, teachers and students together develop a framework for what can be expected in students’ learning, for what it means to move toward improved instructional practice, and how they can improve their mathematics learning goals, and for a common goal of continuous and progressive learning. Formative assessment is a tool for continuously improving classroom practice and students’ performance” (Frits & Zawojewski, 2011).

**Evidence from Research and Practice That Supports Our Position**

There is a growing body of research emphasizing the use of formative assessment in classroom instruction as a means to improve student achievement. In their analysis of student achievement, Black & Wiliam (1998) note evidence of greater student achievement in classrooms where teachers use such techniques. Similar findings are reported in meta-analyses by Black & Wiliam (2004). In particular, they report the impact of formative assessment on student achievement being four to five times greater than the effect of reducing class size. Additionally, it is an analysis and synthesis of studies, Leavy et al. (2005) identify strategies supporting the use of formative assessment:

- Clarifying and sharing learning intentions and criteria for success;
-Engaging in effective classroom discussions, questions, and learning tasks;
-Providing feedback that moves learners forward;
-Activating students as resources of their learning and;
-Activating students as resources for one another.

See the next page for an explanation of the five strategies.
Great Modeling Tasks in Three Acts

- Photos & videos
- PowerPoint slides
- Lesson plans
- Teaching notes
- Extension tasks
- Student work

Andrew Stadel, Dan Meyer, Eric Milou, Gwen Zimmermann, and Robert Kaplinsky
New!

JUMP START
Formative Assessment

Professional development modules to assist leaders in “jump starting” formative assessment, K-16. The collection contains an overview and modules, each highlighting one aspect of formative assessment with PowerPoints, Leaders’ Notes, and handouts as needed.

1. Overview
2. Identifying Learning Targets
3. Activating Prior Knowledge
4. The Answer Is Wrong
5. Feedback to Students
New NCSM Webinars!
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Leading speakers presenting over 300 sessions

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- Advancing formative assessment
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- Shifting practices to effectively implement the CCSS
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✔ Disseminate NCSM member materials
✔ Present a PRIME and/or CCSS leadership session(s)
✔ Write/Review for NCSM Journal or Newsletters
✔ Conferences: review proposals; help onsite; submit speaker proposal
✔ Join a committee: Awards, Nominations, Publications, Projects
2014 NCSM
Fall Leadership Seminars

It’s TIME: Using Imperatives to Support and Motivate Leaders in Mathematics Education

October 29th Indianapolis, IN
November 12th Richmond, VA
November 19th Houston, TX
Jump Starting Formative Assessment: A Resource for Leaders

http://www.mathedleadership.org/events/webinars.html

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