SOUTHEAST COMPREHENSIVE CENTER
Briefing Paper

A publication of the Southeast Comprehensive Center at SEDL
January 2012

Using Formative Assessment to Improve Student Achievement in the Core Content Areas

Summary

A number of states are using or exploring the use of formative assessment in their districts and schools to improve learning outcomes for students.

Key Points

Findings from the literature suggest that formative assessment

- Is a systematic, continuous process used during instruction that provides a feedback loop to check for progress and detect learning gains, identify strengths and weaknesses, and narrow gaps in learning
- Has been shown to improve learning outcomes for students who are struggling with learning, students with disabilities, and English learners, and may increase coherence when aligned with or linked to a state's comprehensive assessment system

Introduction

Since 2001, federal laws such as the Elementary and Secondary Education Act (ESEA) and the Individuals with Disabilities Education Act (IDEA) 2004 have made raising student achievement standards the center of our national conversation. Consequently, educators have increasingly turned their attention to exploring the potential of formative assessments as one approach to increasing student outcomes (Black & William, 1998) in order to meet federal and state accountability requirements. Meanwhile, the upcoming reauthorization of ESEA and the work of the Partnership for Assessment of Readiness for College and Careers (PARCC) consortium and SMARTER Balanced Assessment Consortium (SBAC), funded through Race to the Top (RTT), are heightening and expanding the need for formative assessment practices in American classrooms (Davidson & Frohbieter, 2011; Dorn, 2010). SBAC is designing a comprehensive system that strategically balances formative, interim, and summative assessments (K–12 Center at ETS, 2011).

Procedures

To identify literature for studies on formative assessment, staff at the Southeast Comprehensive Center (SECC) conducted searches of the Assessment & Accountability Comprehensive Center Web site, EBSCO's Academic Search Elite database, the Education Resources Information Center (ERIC), and online search engines (i.e., Google, Goggle Scholar, Bing, and Yahoo). They used combinations of terms that included formative assessment, formative assessment and English learners, formative assessment and students with disabilities, formative assessment research, formative assessment principles, formative assessment policies, and learning progressions.

The literature searches focused on research completed within the last 10 years. When reference lists were reviewed, staff found that some older research provided key information on the topic, so these publications were included in the resources that were used to develop this paper.

In addition, SECC staff contacted the states served by SEDL's Southeast and Texas Comprehensive Centers—Alabama, Georgia, Louisiana, Mississippi, South Carolina, and Texas—to highlight state work in this area. Refer to the State Highlights section of this paper for information that was obtained on formative assessment efforts.

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Limitations

This briefing paper includes the following limitations:

- Most of the literature reviewed involved case studies, not randomized controlled trials.
- Due to the abbreviated length of this document, a limited number of research sources are cited.

Inclusion of programs, processes, or models within this paper does not in any way imply endorsement by SEDL.

What is formative assessment?

While there are differing definitions of formative assessment offered by experts in the field, adopted by groups such as the State Collaborative on Assessment and Student Standards (SCASS) and the Assessment Reform Group (ARG), and used by states (Gallagher & Worth, 2008), there are common elements that run through them. Formative assessment (Black and William, 1998; Clark, 2011; Heritage, 2010):

- is a systematic, continuous process used during instruction by teachers;
- evaluates learning while it is developing;
- is indivisible with instruction and integrated with teaching and learning;
- actively involves both teacher and student;
- provides a feedback loop to adjust ongoing instruction and close gaps in learning;
- involves self- and peer-assessment; and
- informs and supports instruction while learning is taking place.

Conversely, formative assessment is not a single event or measurement instrument but an ongoing, planned practice that allows teachers to evaluate learning after teaching. It also allows teachers to predict and make standardized judgments about student performance toward state content standards (Clark, 2011; Heritage, 2010).

What are the purposes of formative assessment?

Herman, Osmundson, and Dietel (2010) emphasized that formative assessment information is mainly for teacher and classroom use, but can serve different purposes in local educational agencies, and may also be used by schools and districts to make databased decisions at different levels of the system. Formative assessment is part of the family of assessments, and therefore, its purposes can sometimes overlap with interim/benchmark and summative assessments. However, it is important to distinguish these different assessments as they clearly serve uniquely different purposes (Davidson & Frohbieter, 2011; Black & William, 1998), and the quality of information provided differs (see Table 1., Types of Assessments). The purposes of formative assessment are to help teachers target instruction that meets specific learning goals, support student learning, check for progress and detect learning gains, identify strengths and weaknesses, check for misconceptions following instruction, differentiate instruction, evaluate the effectiveness of instructional methods or programs, and transform curriculums (Gallagher & Worth, 2008).

Why should teachers and other stakeholders use formative assessment practices?

Classroom teachers use formative assessment because it has been shown to improve learning outcomes for all students, especially those struggling with learning, students with disabilities, and English learners; promote effective instructional practices; and increase coherence when aligned with or linked to a state's comprehensive assessment system (Gallagher & Worth, 2008; Black & William, 1998). Furthermore, federal laws, such as ESEA and IDEA 2004, as well as state policies have promoted the use of formative assessment practices in schools and districts as an approach to narrow learning gaps and improve student outcomes. For example, schools and districts in Louisiana have access to an online formative assessment system and training via a state grant from the Louisiana Department of Education (Gallagher & Worth, 2008).

What do the research findings indicate about formative assessment?

Overarching within research findings are policy implications that should be considered by entities employing formative assessment practices within their systems and schools for students and teachers. The National Council of Teachers of English (NCTE) also

alludes to policy implications for formative assessment in its 2010 publication, deeming that high-quality formative assessment policy should include recognizing the need for varying assessment according to the difficulty of "the task and the varying abilities of students, linking assessment to instruction so that both teachers and students benefit, and adjusting assessment so that students move beyond just completing the work to actually excelling at it" (p. 4).

An additional noteworthy set of formative assessment policy principles, according to the Centre for Educational Research and Innovation (CERI, n.d., p. 11), are to:

1. Keep the focus on teaching and learning.
2. Align summative and formative assessment approaches.
3. Ensure that data gathered at classroom, school, and system levels are linked and are used formatively.
4. Invest in training and support for formative assessment.
5. Encourage innovation.
6. Build stronger bridges between research, policy, and practice.

Extensive research findings are prevalent regarding formative assessment and its connectedness with improving student learning and outcomes. Pinchok and Brandt (2009) referenced Benjamin Bloom, one of the earliest researchers of formative assessment, and his groundbreaking work on the need to address the variance in student achievement by differentiating instruction and assessment of students. Bloom's "mastery learning" work incorporated feedback processes after students took brief unit assessments to guide their individual and group learning needs (Pinchok & Brandt, 2009, p. 8). After these initial assessments, students received appropriate and differentiated follow-up instruction or activities, followed again by more formative assessment, until the class completed a unit. Research regarding such mastery learning showed evidence of academic gains and improved student learning attributes, such as improved confidence and attitudes toward learning.

Kingston and Nash's (2009) findings from their meta-analysis of studies in the K–12 arena pertaining to formative assessment deemed that formative assessment could be a significant and readily achievable source of improved student learning. In a related study, Hattie and Temperley (2007) found that when effective communication principles were employed, positive student outcomes resulted. They found that feedback to students was most beneficial during processing, such as when students are analyzing their strategies for completing assigned tasks and that feedback at the self-regulation level helps students to internalize their thinking, get better at self-assessment, and know when to ask for assistance.

In addition to aforementioned research findings that validate the worth of the feedback cycle, formative assessment, according to Heritage, Kim, Vendlinski, and Herman (2009), is a process that is composed of four essential elements:

- Identifying the gap involves understanding the difference between what students know and what they need to know. Once a teacher identifies this gap, the necessary instructional support can be provided to help the student progress toward the learning goal.
- Feedback flows between the teacher and students. Feedback provides critical information that the teacher needs to determine the current status of a student's learning and informs the next steps in the learning process. Clear and detailed feedback is provided to the student for improving learning. Feedback should be designed to close the instructional gap.
- Students must be actively involved in their own learning and the assessments in which they are engaged. This happens best through collaboration between the teacher and students to develop a shared knowledge about their current learning status and what they need to do to progress. Doing so builds skills within students that are needed for self-monitoring their learning and determining when they need assistance.
- Learning progressions break down a larger learning goal into smaller parts. This is necessary for helping teachers locate students' current learning status in relation to a continuous set of skills needed to master ultimate learning standards. Once the points at which students are on the learning progression continuum have been identified, the teacher can work with the students to set short-term goals that will help them progress to the ultimate position along the continuum.

Similarly, Wolf (n.d.) indicates that three essential principles of formative assessment are practical application, feedback, and adjustment of instruction.

1. Practical application. Teachers incorporate formative assessment into their daily lesson plans by including time for students to practice skills they have learned or to demonstrate their understanding of a concept presented in the lesson. For example, formative assessment of a lesson about addition and subtraction of decimals could include an exercise in purchasing items from a store

during which students use fake money and goods to complete the exercise.

2. Feedback. Whereas summative assessments are mostly one-sided in that the teacher finds out what the students know through a standardized or written test, formative assessments are utilized by both the teacher and the student and provides feedback they can apply immediately and in the future. For example, if a teacher is using the example of making a purchase mentioned above and the student is unable to count the amount of money needed, the teacher can ask the student questions to pinpoint the area of difficulty for the student. The teacher can then explain the process in more detail or in a different way. The feedback provided using formative assessment lets the teacher know immediately if a lesson is reaching the student in the intended manner or if it needs adjusting for better understanding. Because formative assessment is more interactive, students experience firsthand mastery of the material and do not have to wait to pass or fail an exam to check their own understanding level.
3. Adjustment of instruction. Just as students learn differently, they also demonstrate mastery differently. Formative assessment provides students various opportunities to show whether or not they have mastered the material beyond their performance on a standardized or written test based on their abilities. The immediate feedback these methods provide allows the teacher to adjust instruction to meet the needs of individual students. For example, a student with a kinesthetic learning style might benefit from learning decimal addition and subtraction with math manipulatives such as fake money or decimal bars. Knowing this, the teacher can adjust his lesson plans to include hands-on activities, allowing this student many opportunities to solve the problems with the manipulatives before asking the student to perform decimal addition and subtraction in writing. As students practice the concept with manipulatives, the teacher gets a more authentic measurement of each student's mastery of the skill. In this sense, formative assessment can provide teachers with a deeper understanding of and connection with each student.

Along with the principles of formative assessment, decision makers should consider the various forms of formative assessment and recommendations regarding their use. For instance, NCTE (2010) deemed that high-quality formative assessment practice takes many forms, but it always does the following (p. 2):

- emphasizes the quality rather than the quantity of student work;
- values giving advice and guidance over giving grades;
- avoids comparing students in favor of enabling individual students to assess their own learning;
- fosters dialogues that explore understandings rather than lectures that present information;
- encourages multiple iterations of an assessment cycle, each focused on a few issues; and
- provides feedback that engenders motivation and leads to improvement.

Regarding application, Huinker and Freckmann (2009) provide a specific example of utilizing formative assessment in the context of mathematics, pointing to 10 principles that can be applied with any content, not just mathematics.

Moreover, it is recommended that formative assessment be considered for application with special populations, particularly students with disabilities (SWD) and English learners (ELs).

Duke (2010) declares that with SWD, teachers should plan a range of options for all students so they can demonstrate their learning. The author suggests that every child maintains a portfolio of work and that each should receive feedback about his achievement on every task in that portfolio so that the student can see how he is progressing toward a particular standard. Duke contends that students should also have the opportunity to resubmit some items after feedback for a better mark. Teams of teachers should determine the criteria for these assessment items so that measurement is parallel across teachers, and the items should be judged against the standard being assessed. It is crucial to ensure that students' achievement is compared against achievement of the standard not against each other, which would allow students to challenge themselves to increase personal performance rather than compete with each other.

The World-Class Instructional Design and Assessment (WIDA) Consortium deems that English learners should also be afforded the opportunity of formative assessments that have the following attributes: "be of sound technical quality; be an ongoing, classroom-based process that is embedded in instruction; focus students on learning goals; provide examples of good work; highlight gaps in student learning and provide directions for addressing those gaps; seamlessly integrate with external standards and summative assessments; be dynamic enough to accommodate classroom realities (e.g., be easily administered, account for disruptions, adjust to student heterogeneity), yet uniform in data collection, interpretation, and reporting; and incorporate a rigorous, sustained professional development program for teachers" (WIDA, 2009, p. 2). The principles above can serve to benefit any and all student groups, since they focus on determining students' learning needs and adjusting instruction to meet these needs.

How does formative assessment differ from other types of assessments?

There is no one size fits all when it comes to formative assessment. Heritage (2011) asserts that formative assessments come in different forms and formats, with no single method for collecting data. The type of formative assessment used by a teacher should be selected based on the learning goals and indicators, as long as it is planned, systematic, and yields actionable information that can be used by the teacher and student to improve learning. Hence, formative assessment can include structured, formal observations; informal observations; classroom discussions; analysis of student work samples; strategies for monitoring progress; strategies for checking student understandings or skills; curriculum-based measurement (frequent probes in academic areas); self-assessment measures; and peer-assessment activities (see Table 1).

Table 1. Types of Assessments

	Formative Assessment	Interim/Benchmark Assessment	Summative Assessment (End-of-Year or End-of-Course)
Purpose	Short-range assessments that inform daily instruction Diagnose where students are in learning and find gaps in knowledge and understanding Adjust, plan, guide, and inform daily instruction	Mid-range assessments that allow for the aggregation of results Test learning of recent content towards long-term goals Evaluate and monitor educational programs, curricular, and pedagogical methods Predict, anticipate, or track student performance on specific academic goals within a limited time frame	Long-range assessments that gauge mastery of content toward state content standards
Frequency	Immediate, constant, steady stream of evidence, e.g., daily, weekly Short-cycle; takes a few minutes	Administered several times each year. A snapshot between intervals of predetermined periods, e.g., three times a year (fall, winter, spring) Medium-cycle; falls in between formative and summative Administration time is often controlled by school/district	Administered annually or yearly; a snapshot in time Generally given one time at the end of specified amount of time, e.g., end of semester/year
Grain size (refers to breadth or scope, Popham, 2007)	Fine-grained; sand-like; small-scale	Medium-sized pebbles; medium-scale; given schoolwide or grade-wide	Big rocks; large-scale; given statewide
Utility	Yields both formal and informal, specific evidence of student learning Embedded within the learning activity	Yields formal evidence of students' general strengths and weaknesses against state content standards Inform decisions at classroom levels and beyond	Used as part of accountability program Yields formal evidence of students' general strengths and weaknesses against state content standards

Note. Source Clark (2011); Davidson and Frohbieter (2011); Gallagher and Worth (2008); Herman, Osmundson, and Dietel (2010); Heritage (2010); and Perie, Marion, Gong, and Wurtzel (2007).

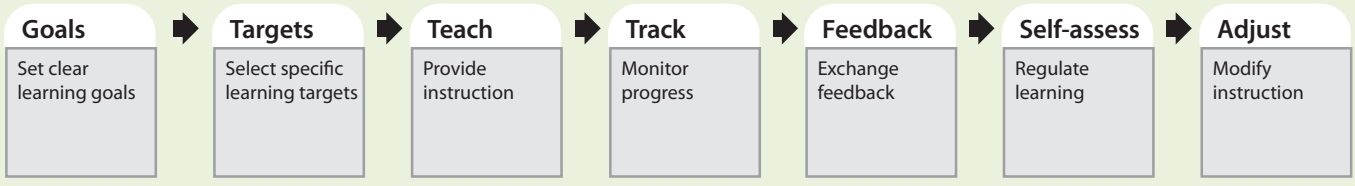
How does formative assessment fit into a core curriculum and instruction?

To promote effective implementation of formative assessment at the classroom level, it is recommended that teachers take the following actions:

1. Set clear learning goals that are attainable and linked to the state's content standards and district's curriculums. Pay particular attention to what students will learn as opposed to what they will do (Heritage, 2011).
2. Select specific learning targets based on the learning needs of individual students. Students can only self-assess if they have a sufficiently clear picture of the learning target that they are supposed to attain (Black & William, 1998).
3. Provide classroom instruction based on the learning goals and the identified specific learning targets.
4. Track progress to monitor students' current learning status in the learning progression (learning continuum).
5. Give planned and spontaneous feedback that explicitly communicates to the student the desired learning goal, data about the student's present level of functioning, and the strategy for closing the gap between the two. A student should be the primary user of personal formative assessment information (Black & William, 1998), if the student is expected to play an active role in improving learning. Often, teacher feedback seems to serve a social and managerial function, instead of learning functions about academic strengths and weaknesses. Additionally, include opportunities for students to give feedback to their classmates based on the indicators of learning progress provided by the teacher.
6. Include opportunities for self-assessment to help students think critically about their own thinking and learning during instruction (meta-cognition). Students are more likely to be actively engaged with learning if they know how to monitor and regulate their thinking (Clark, 2011). The link between formative assessment and self-assessment is inevitable, for this reason, engaging students in self-assessment can improve student motivation (Black & William, 1998). Also, feedback becomes formative when students use meta-cognitive strategies.
7. Adjust instruction immediately based on formative assessment data in order to enhance learning. For formative assessment to function properly, the results must be used to adjust instruction (Black & William, 1998). Furthermore, Clark (2011) asserted that what makes formative assessment formative is that it is immediately used to make adjustments to instruction.

Refer to Figure 1. Implementing Evidence-Based Formative Assessment Strategies in the Classroom, for a summary of the recommended steps in the formative assessment process.

Figure 1. Implementing Evidence-Based Formative Assessment Strategies in the Classroom



In addition, it is important to understand that formative assessment is a continuous process that cyclically focuses on learning progressions. McManus (2008, pp. 4–5) detailed learning progressions to include the following components:

- Learning progressions should clearly articulate the sub-goals of the ultimate learning goal.
- Learning goals and criteria for success should be clearly identified and communicated to students.
- Descriptive evidence-based feedback that is linked to the intended instructional outcomes and criteria for success should be provided to students by teachers.
- Self- and peer-assessment are important for providing students an opportunity to reflect on their learning.
- A collaborative classroom culture in which teachers and students are partners in learning should be established.

Heritage (2008) describes learning progression as the process in which teachers begin to meet the students where they are developmentally at the beginning of a year, semester, or lesson/unit, and through continual evidence gathering and fine tuning of student instruction teachers help students move toward the specific learning goals they have for them. This process should allow

for the reduction of individual differentiation over time. Although it is impossible to have all students at the exact same level, it is important to understand that properly articulated learning progressions will bring many students more in tune to the intended outcomes set forth for them.

As teachers and students are engaged in a continuous process of gathering evidence, making judgments, and adjusting/differentiating instruction with all students when a class, course, or unit begins, the frequency with which students are assessed, are engaged in forms of self-assessment, and teachers are making adjustments forward or backward are all part of effectively teaching and assessing with learning progressions. Pinchok and Brandt (2009), among a number of experts, "believe that the timeliness, flexibility, and ongoing nature of formative assessment techniques are most helpful in informing instruction for teachers and closing achievement gaps for students and for preparing students for the short- and long-term formative and summative benchmarks they must meet" (p. 10).

State Highlights

A staff member of the South Carolina Department of Education (SCDE) provided the information below on the state's use of formative assessment.

South Carolina

Overview

Dr. Susan Creighton, education associate in the Office of Assessment in the SCDE, manages the formative assessment support provided to the schools and districts of South Carolina.

South Carolina Code Ann. 59-18-310 (Supp. 2007) provided for the creation of a statewide adoption list of formative assessments in English language arts (ELA) and mathematics. This section was amended in May 2008 to include grades one through nine. However, the 2010–2011 and 2011–2012 Appropriations Bills suspend the formative assessments for grades one, two, and nine. The legislation requires that each formative assessment satisfy professional measurement standards and align with the South Carolina Academic Standards. Subject to appropriations by the General Assembly for the assessments, districts will be allocated funds to select and administer formative assessments from the adoption list for use in improving student performance in accordance with district improvement plans.

Products on the Approved Adoption List of Formative Assessments

The following products were approved by the State Board of Education for use in the districts: *Blending Assessment with Instruction Program (BAIP-MATH)*, published by Computerized Assessment and Learning, LLC; *STAR Reading and STAR Mathematics*, published by Renaissance Learning; and *Measure of Academic Progress (Reading and Mathematics)*, published by Northwest Evaluation Association.

Evaluation and Approval Process for Adoption List

In 2008, a two-stage process was approved by the State Board of Education to evaluate and select products for the Adoption List of Formative Assessments. When funded, the SCDE sends (and posts to its Web site) a Call for Submissions to publishers, independent and public companies, school districts, and other interested entities. Publishers can submit interim assessments, benchmark assessments, item banks, or classroom assessments for consideration.

In the first stage, a panel of measurement experts convenes to review the research studies submitted as a result of the Call for Submissions. The panel of experts uses the evaluation criteria developed jointly by the Education Oversight Committee and the SCDE to determine if the products positively impact student achievement. The evaluation criteria conform to professional measurement standards as specified in the *Standards for Educational and Psychological Tests* published by a joint committee of the following associations: the American Psychological Association, the American Educational Research Association, and the National Council on Measurement in Education. Products meeting all criteria (or the appropriate number of criteria depending on the type of product) receive approval for addition to the Adoption List.

During the second stage of the adoption list process, publishers submit the items used on each approved product, if appropriate. Two committees of curriculum specialists—one for ELA and one for mathematics—are convened to evaluate each item for alignment to the South Carolina academic standards and indicators. Upon completion, alignment tables, by subject and grade-level, are produced showing the extent to which all items on the selected assessments are aligned with the academic standards and indicators. Alignment information is posted to the Web page.

District Funding Process

Each year, districts complete a participation survey that requests information regarding formative assessments administered in their schools and the number of students, by grade level, tested in reading/language arts and mathematics. Districts are required to submit this completed survey plus an invoice indicating the amount of funds expended to purchase adoption list test materials and training services.

This information is used to determine the amount of funding awarded to each district for use of one of the approved products on the Adoption List. The funding formula for these products includes two variables (a) the number of students tested in either reading/language arts or mathematics and (b) the poverty index for the district. Funding for each district is capped by the amount of the expenditures for one of the approved formative assessments.

Conclusion

Findings from the literature suggest that formative assessment, when planned and implemented in a systematic, continuous manner, can provide feedback during the learning process to identify students' strengths, weaknesses, and gaps in learning. Formative assessment also has been shown to improve learning outcomes for various student groups, such as those who are struggling with learning, English learners, and students with disabilities. Regardless of the type of formative assessment practice utilized, it should be aligned with a state's comprehensive assessment system and should be seen as only one approach among many that may be used to improve student achievement.

Resources

Note. Open hyperlinks using Adobe Reader. If a hyperlink does not open after it is clicked, copy and paste the entire hyperlink into the Internet browser window to access the resource.

Assessment Reform Group (ARG) Association for Achievement & Improvement Through Assessment
While the work of ARG is now finished, its publications on Assessment for Learning continue to provide ideas and insights central to the development of formative assessment practices. Its publications specifically relating to assessment for learning are housed on this Web site, http://www.aaia.org.uk/afl/assessment-reform-group/

Formative Assessment for Students and Teachers (FAST), State Collaboratives on Assessment and Student Standards (SCASS), Chief Council of State School Officers (CCSSO)
The Formative Assessment for Students and Teachers (FAST) SCASS works to expand the implementation of formative assessment in the classroom to positively impact teaching and learning. To access formative assessment videos, professional development guides, and other resources, visit http://www.ccsso.org/Resources/Programs/Formative_Assessment_for_Students_and_Teachers_%28FAST%29.html

National Center for Research on Evaluation, Standards, and Student Testing (CRESST), University of California–Los Angeles (UCLA)
CRESST conducts research on assessment and evaluation. To access numerous research articles on the topic, click on this link, http://www.cse.ucla.edu/about/mission.php, and type in "formative assessment" in the search window at the top right corner of the Web site.

National Center for the Improvement of Educational Assessments (NCIEA), also known as the Center for Assessment

The center's mission is to contribute to improved student achievement through enhanced practices in educational assessment and accountability. The Publications Home Page has over 100 assessment articles, including information on learning progression frameworks, an important concept in formative assessment. Access resources at this link: http://www.nciea.org/about.php

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Note. Open hyperlinks using Adobe Reader. If a hyperlink does not open after it is clicked, copy and paste the entire hyperlink into the Internet browser window to access the resource.

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Briefing Papers are prepared to provide information to the departments of education of the states served by SEDL's comprehensive centers. They address topics on education issues related to the requirements and implementation of the Elementary and Secondary Education Act (ESEA).

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