Practices Worthy of Attention

Local Assessment System

Lamoille South Supervisory Union

Morrisville, Vermont

Summary of the Practice. Lamoille South Supervisory Union consists of three school districts serving students in grades K–12. They are creating a local, balanced assessment system in mathematics that is aligned with the districts' K–12 mathematics curriculum. To support that work, they are training teachers to understand assessment for learning and how it can provide them the information they need to improve their practices.

Need. Teachers in Lamoille South Supervisory Union had access to summative assessments that provide information about what students know at a certain point in time, but they had no valid and reliable information about how to modify their instruction in response to increase student learning.

Goal. The goal of Lamoille South Supervisory Union's balanced assessment system is to increase the assessment literacy and instructional design skills of all mathematics teachers so that they can create and use formative assessments to provide responsive instruction.

Demographics

The Lamoille South Supervisory Union (LSSU) consists of three districts serving students in grades K–12. As seen in Table 1, a shift in demographics has begun to appear since 2002–2003: Enrollment has dropped by 140 students (about 3%), the graduation rate has declined, and the dropout rate has risen. Breakout data on race/ethnicity and limited English proficiency are not included due to the low number of students in subgroups. On the aggregate level, the data indicate that LSSU students are predominantly white and do not have limited proficiency in English. Approximately 19% of LSSU students are classified as economically disadvantaged.

Table 1. Lamoille South Supervisory Union Enrollment, Graduation, and Dropout Rates

Academic Year	Enrollment	Percentage Graduating	Percentage Dropping Out
2002–2003	3,967	91	2.21
2003–2004	3,902	85	2.25
2004–2005	3,816	78	2.40
2005–2006	3,827	*	*

Note: The asterisk (*) notes that data were not yet available.

Description of the Practice

LSSU's main goal is to create a balanced assessment system in mathematics that will coexist with and complement the overall local assessment system. Balanced assessment systems—that use both assessment *for* learning and assessment *of* learning—maximize the role that assessment can play in improving mathematics teaching and learning (Stiggins, 2002) and minimize the role of polarizing rhetoric that demonizes one or another kind of assessment. It is a *both/and* versus *either/or* instructional design paradigm. The availability and transparency of a balanced assessment system enables teachers to learn what their students know, assess student achievement, and use these assessment results as part of ongoing reform in improving instruction and consequently improving student learning (Fullan, Hill, & Crévola, 2006; National Education Association, 2003).

Several years ago, LSSU chose to begin the development of the balanced assessment system with a systemic focus on English language arts. At the core of this work was a focus on helping teachers develop "assessment literacy," which LSSU defines as gathering dependable information about student achievement and using assessment results to inform instruction. LSSU wanted teachers to begin thinking of assessment as part of instruction rather than as a separate activity. LSSU found success with this approach in their English language arts programs, and teachers even demonstrated their assessment literacy by creating district-level on-demand writing prompts and reading assessments.

The LSSU leadership team plans to use what they learned in that process and create a balanced assessment system across all content areas. The district mathematics assessment system is being developed in three phases. LSSU has divided assessments into grade spans: K–2, 3–5, 6–8, and 9–10. The K–2 assessments measure additive reasoning; grades 3–5 assessments measure multiplicative reasoning; grades 6–8 assessments measure proportional reasoning; and grades 9–10 assessments measure algebraic reasoning.

In spring 2006, phase I began with the development of grade-span assessments, to be administered in the second semester of the last level of each grade span (i.e., grades 2, 5, 8, and 10). In phase 2, which began in summer 2007, LSSU mathematics teachers started to develop grade-level screening assessments for all grades from grade 1 through Algebra II. These assessments were to be administered as pre/post tests at the beginning and end of the 2007–2008 academic year. In phase 3 (summer 2008), mathematics teachers will develop common grade-level assessments for all students.

LSSU began implementation of phase 1 of the mathematics assessment system in 2006–2007. They are using a project-planning tool to help them meet milestones. More specifically, this tool identifies the tasks to be completed at each phase, designates who is responsible for the task, and helps keep track of the status of each task and the target dates for initiation and completion. Built into this planning tool is a component that helps identify resources and materials needed for professional development, development tasks for the assessments, data collection and reporting, and analysis of results for both local and state assessments.

LSSU has taken great care to identify and develop leaders from within the three districts who will assume curriculum development and implementation roles. LSSU leadership has been

very purposeful and intentional in training teacher leaders who will lead the implementation of this work. LSSU is a part of the Lamoille Area Professional Development Academy (LAPDA), a regional professional development academy that uses both external and internal approaches to systems improvement efforts. LAPDA identifies and brings in outside consultants to help design and customize professional development to meet local teaching and learning goals. LSSU believes that professional development is the key strategy necessary to enhance teacher growth. They see it as a leverage point for systemic change in the district, as it enriches teachers' understanding of the interrelationship between content knowledge and assessment. LSSU professional development workshops are intentional and specific to Vermont mathematics standards. They focus on the content knowledge needed in mathematics; however, 75% of the professional development of the balanced assessment work focuses on assessment literacy and 25% is specific to mathematics content.

Professional development for phase 1 began with a work session followed by a two-day workshop on assessment literacy. LSSU reported that the impact of the workshop was monumental—even a 16-year veteran teacher said he had to rethink the way he assesses students, realizing he had spent years doing it "wrong."

LSSU then held a three-day mathematics summit in August 2006. Teachers spent part of each day either learning or reviewing content alignment using Webb's concepts (1997, 1999) of "depth of knowledge" and "balance of representation," and then aligning assessments in these two areas. Aligning standards and assessments is a crucial piece in standards-based reform (Ainsworth & Viegut, 2006; Webb, 1997, 1999). In Webb's system, teachers learn about depth of student knowledge required in each assessment content item. Webb identifies four levels for depth of knowledge. In level 1, students are expected simply to recall, while in level 2, students must use skills and knowledge of some procedures. Level 3 requires students to engage in strategic thinking, as the assessment items have some complexity, generally taking more than 10 minutes to solve. A level 4 item involves nonroutine thinking and solving with multiple steps. Webb also provides a framework for balance of representation of content across a test, helping teachers think about the emphasis of different topics, instructional activities, and tasks that should be represented in instruction as well as assessment.

Teachers reviewed and rated the assessment items they aligned using depth of knowledge in teams, and spent time drafting assessments using balance of representation, to ensure that a variety of content and item difficulties were represented. Teachers can now build better assessments, as they now choose items based on reliability issues, psychometric properties, and relation of the items to Vermont's mathematics standards. Teachers have learned how to choose items that measure what they purport to measure.

Grade-span assessments are the first layer of mathematics assessments in LSSU (phase 1). Using Webb's ratings, LSSU wants to design these assessments to consist of levels 3 and 4 items, meaning higher-order mathematics items meant to challenge students. On the tests for grades 6–8 and 9–10, LSSU is thinking about including extended tasks as well, so as not to administer a "watered-down" test, but they also do not want to overburden students with too much testing. Teachers agree with this mindset and, since they are developing the assessments, they are providing the expert knowledge of mathematics instruction and content and gauging what they believe their students can do.

LSSU wants to use levels 1 and 2 complexity assessments (basic skill–type items) as pre- and post-measures of mathematics for the phase 2 work. Levels 1 and 2 items represent the skills students need to successfully solve more complex mathematics item types. Levels 3 and 4 items would be used as a diagnostic assessment, or an assessment of learning tool, where concepts are broken down and teachers can learn from what students conceptually understand. These items can be used in the grade-span assessments as well as in the common assessments to be developed and used districtwide, starting in phase 3 (summer 2008).

LSSU's mathematics assessment system incorporates the use of ongoing and embedded professional development structures, including professional learning communities, to help increase mathematics teachers' professional capacity. The teachers are learning more about the development and use of assessments, and will learn how to create and analyze future assessments across all phases of the system's development. Teachers are involved in writing assessment items because LSSU leaders believe teachers need to understand what is expected at a district level to affect instruction at the classroom level. They also believe that teachers need to be involved in the kinds of conversations that help them reflect on their practice. In developing items, teachers are talking about formative assessments and benchmark assessments, learning how to make judgments about student learning depending on the type of student work or data they have available. The two main professional development areas for developing the assessment system include training on assessment literacy and Webb's alignment tool.

LSSU uses a mathematics laboratory model (math lab school) to provide teachers with an authentic opportunity to learn about new assessment and instructional strategies that they can immediately apply in the classroom. The districts have conducted three summer lab schools in mathematics. In summer 2007, teachers worked with at-risk students entering grades 5–7 on multiplicative and proportional reasoning. Lab school students attended lab every weekday for two-and-a-half hours for a total of one or two weeks. Teachers worked with lab school students in large-group and small-group tutorials to provide intensive instructional support. Teachers new to the district are strongly encouraged to participate in the summer lab school training. The district covers all training expenses and provides each participating teacher with a summer stipend.

Results

Beginning in fall 2004, Vermont administered the New England Common Assessment Program (NECAP), which is being used across Vermont, New Hampshire, and Rhode Island. The NECAP is administered during the first three weeks of October in grades 3 through 8 in reading and mathematics, and in grades 5 and 8 in writing. Results indicate student proficiency on the grade-level expectations they should have mastered the previous academic year. Results are reported only for groups with 10 or more students and are not disaggregated by grade.

There are two secondary schools in LSSU; their scores are compiled here to show the aggregate performance of middle school students in LSSU over the past two years compared with Vermont middle school state data. Given only two years of data and no disaggregation,

the only thing that can be noted is that LSSU students outperformed Vermont students both years (see Table 2).

Table 2. New England Common Assessment Program Results for Lamoille South Supervisory Union Secondary Schools

Academic Year	LSSU Percentage At or Above Proficient	Vermont Percentage At or Above Proficient
2004–2005	68	63
2005–2006	63.5	63

Prior to NECAP, Vermont's standardized testing program consisted of the New Standard Reference Exam, which was administered in English language arts and mathematics for grades 4, 8, and 10. Table 3 lists the results for LSSU students on the statewide mathematics test in grade 10 broken down by Math Concepts, Problem Solving, and Math Skills. The performance of all students in all areas remained stable over the three years listed in the table, while economically disadvantaged students have made gains in all areas and appear to be closing the achievement gap, especially in mathematics skills.

Table 3. Lamoille South Supervisory Union Grade 10 Mathematics Test Results

Demographics	Academic Year	Percentage At and Above the Proficient Level		
		Math Concepts	Problem Solving	Math Skills
All Students	2003–2004	44	42	66
	2004–2005	43	48	70
	2005–2006	44	43	67
Economically Disadvantaged	2003–2004	23	19	38
	2004–2005	25	14	46
	2005–2006	34	28	59

Conclusions

Lamoille South Supervisory Union implemented a balanced assessment system in its English language arts programs, and now they are using what they learned to implement similar programs across all content areas. Development of their mathematics balanced assessment system is moving more quickly than they expected, and the first two of three phases have been implemented. LSSU believes that the development and implementation of a full-scale assessment system requires targeted professional development and active participation of teachers to secure buy-in and successful implementation. By design, teachers are developing all of the local assessments for all three phases of the mathematics work. LSSU believes that when more than one teacher uses an assessment, the teachers can collaborate to analyze the results and then plan interventions and modifications. Having such information and practices will allow teachers to best serve their students in improving their understanding and performance in mathematics from grades K–12.

References

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About *Practices Worthy of Attention: Local Innovations in Strengthening Secondary Mathematics*

Practices Worthy of Attention is a joint initiative of Achieve, Inc. (www.achieve.org), and the Charles A. Dana Center at The University of Texas at Austin (www.utdanacenter.org). The initiative is led by Pamela L. Paek, a research associate at the Dana Center, who, in 2006, examined 22 program, school, and district practices that showed promise—based on early evidence and observation—of strengthening secondary mathematics teaching and learning.

Our goal was to document practitioners' descriptions of *what is really happening* in the field to strengthen secondary mathematics education around the country. Thus, while the practice highlighted may be common, the specific structures and strategies used to implement the practice are worthy of attention. These initial investigations set out to mark these practices for future rigorous scientific inquiry by Dana Center and other researchers.

Ultimately, we hope to create a community of inquiry made up of university researchers working with administrators and teachers from featured schools and districts to more rigorously research how effectively these practices improve secondary mathematics learning for all students.

Reports and practice profiles. An executive summary details the methods for this initiative and analyzes themes. Two cross-case analyses discuss specific strategies for raising student achievement and building teacher capacity. Brief profiles describe each practice. All of these publications are available on our website at www.utdanacenter.org.

Data. In all cases, data about the practice were provided by the program, school, or district studied as part of a description of their practice. We did not independently analyze data gathered through a consistent assessment tool, and we did not evaluate their uses of data for measuring effectiveness. Thus, the data in the practice profiles are intended not to prove the practice's effectiveness from a research perspective, but to paint a detailed picture of the practice and what data were used by the program, school, or district to gauge how well it was working.

Theoretical frameworks. In some cases, district staff mentioned specific literature on theory or practice that they used when they developed the practice we highlight. In those cases, we cite that literature in our discussion of the practice.

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