Students Step Up When Teachers and Leaders Transform Classrooms

Literacy Design Collaborative and
Mathematics Design Collaborative

SREB | High Schools That Work

The Southern Regional Education Board's Literacy Design Collaborative and Mathematics Design Collaborative implementation efforts are led by Senior Vice President Gene Bottoms, LDC-MDC Manager Dan Mollette and Lead Literacy Consultant Carol Ann Duke.

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Inside

Literacy and Math Strategies That Raise Student Achievement

The Southern Regional Education Board (SREB) is passionate about improving students' reading, writing and math skills so they will graduate from high school ready to succeed in college and careers and compete in a global workforce. One SREB effort is employing a new approach to professional development that is bringing powerful teaching and learning tools into classrooms statewide.

Literacy Design Collaborative (LDC) and Mathematics Design Collaborative (MDC) are strategies that will help improve how teachers teach and students learn. The designs encourage teacher collaboration and creativity and offer flexible frameworks and strategies for building lessons in all disciplines that will engage students to read challenging text, express their understanding in writing and become problem-solvers.

Following is more information about LDC and MDC and about how the Southern Regional Education Board (SREB) works with schools to implement the strategies.

What are LDC and MDC and how do they work?

The Literacy Design Collaborative (LDC) is a vehicle for incorporating rigorous literacy standards into middle grades and high school content areas. LDC provides a system for developing reading, writing and thinking skills within a variety of academic disciplines, not just in English/language arts courses.

LDC's basic building block is a module, two to four weeks of instruction comprising a "teaching task," standards, "mini-tasks," and other instructional elements including an instructional plan and assessments. Working with LDC's framework and tools, teachers develop a literacy-rich task and design instruction to help students complete that task. The result is high-quality assignments that provide students with the literacy skills they need to succeed and to master academic and technical content.

The Mathematics Design Collaborative (MDC) provides schools with instructional tools needed to help teachers understand and implement the college- and career-readiness math standards effectively while allowing them the flexibility to select topics and adapt assignments to their specific instructional plans.

Central to MDC are sets of formative assessment lessons (FALs), which are aligned to the college- and career-readiness standards and designed to be embedded within courses. The FALs represent a major innovation in teaching and learning math by focusing on student understanding of math concepts, allowing students to have a productive struggle and make sense of math concepts. They also assist teachers in determining what changes in content and instructional strategies are needed to enable students to master rigorous standards and engage students in reasoning thus increasing their ability to think through math problems.

How does SREB work with schools to implement LDC and MDC?

SREB uses a three-year approach to prepare teachers, schools and districts to implement the LDC and MDC frameworks in classrooms.

Year One: Building Capacity

SREB works with districts to identify a core group of teacher-leaders in each of the participating schools to take part in LDC and MDC training. After a semester, this core group of teacher-leaders will begin to support other teachers in their schools to grow LDC and MDC, and they will continue to develop their abilities to use these tools and strategies effectively. The core group should be made up of teachers who are open to change, are coachable, have a record of having taught ordinary students to extraordinary levels, have deep content knowledge, and have the ability to lead others.

High school principals choose six outstanding ninth- and 10-grade teachers: one from English/language arts, one from social studies, one from science and one from career-technical (CT) for the LDC group, and one algebra and one geometry teacher for the MDC group.

Middle grades principals select six outstanding teachers from the seventh and eighth grades: one from English/language arts, one from social studies, one from science and one from an exploratory course for the LDC group, and two math teachers for the MDC group.

The core LDC and MDC teachers and their school administrators attend nine days of intensive off-site training over several months. In this training, teachers learn to use the LDC and MDC tools and strategies in their classrooms.

The off-site training is augmented with four days of on-site support by SREB, district, or school coaches.

The ideal SREB professional development plan for LDC and MDC begins year one in the summer before the start of school. The plan includes two options: Option one (preferred) includes three contiguous days of initial training followed by six days of professional development and four days of on-site coaching spread over several months. Option two includes two contiguous days of initial training followed by three rounds of two-day professional development sessions and four days of on-site coaching.

Sometimes situations dictate that implementation begins during the middle of a school year. The plan for these situations includes two contiguous days of initial training in winter, followed by two days of professional development during the second half of the year. Professional development continues into the summer with three days of training, and into first semester with two days of training. Four days of on-site coaching are scheduled: two during second semester and two during first semester.

The expectation for the core LDC and MDC teachers in year one is that LDC teachers will create and implement a minimum of three modules and MDC teachers will implement a minimum of six FALs. Also, after one semester the core LDC and MDC lead teachers will begin working with a team of teachers in their content area.

Years Two and Three: Growing and Sustaining LDC and MDC

In years two and three the focus is on schoolwide adoption of LDC and MDC strategies and on building capacity in schools by preparing core LDC and MDC teachers to be school trainers. The teacher trainers form **Professional Learning Communities** (**PLCs**) with the teachers in their content areas for the express purpose of guiding them through the LDC and MDC processes.

In their PLCs math teachers will learn how to use FALs to engage students in a productive struggle that builds fluency with their procedural skills and deepens mathematical reasoning and understanding and application of math concepts. They will learn to engage students in both individual and group learning as they use FALs and correct common misunderstandings. Rather than giving students predetermined steps to find an answer (the "GPS" approach), they will learn to support students to deepen their math reasoning to solve problems. All math teachers in year two are expected to implement at least six FALs.

English/language arts, social studies, science, exploratory, and CT teachers will work in their own PLCs to learn how to create and implement LDC modules. They will learn how to incorporate rigorous literacy standards into their content by developing high-quality assignments that develop students' literacy skills as they master the content, knowledge and skills of the discipline area — biology, American history, etc.

As the capacity of the LDC and MDC teachers increases, the level of support provided by SREB begins to decrease. Year two includes four days of off-site professional development and two days of on-site coaching. On-site coaching focuses on developing the teachers' ability to orient other teachers in successful adoption of LDC and MDC. Year three includes two days of professional development and one day of coaching.

The Role of School Leaders

In year one, SREB provides two days of training for school leaders that will focus primarily on how to establish and support effective PLCs. School leaders will receive special training at the initial three-day training and other sessions to further their understanding the LDC and MDC strategies, learning the "look-fors" in classroom observations and seeing how the strategies align with their existing classroom observation and teacher evaluation tools.

Additionally, school leaders are expected to participate in all LDC and MDC teacher training sessions. They should support the work of the SREB LDC and MDC coaches during on-site visits by providing them with schedules, by ensuring that teachers have time to confer with the coaches and by accompanying the coaches on class visits and with teacher feedback.

School leaders are expected to establish and support PLCs for each discipline area with the central purpose being to implement LDC or MDC. They will ensure that teachers have scheduled time to meet with their PLC groups. School leaders will be assisted in formalizing PLC structures in their schools that meet proven practices.

After implementing LDC and MDC strategies in classrooms, schools are expected to collect data on the number of teachers implementing LDC and MDC; the total number of LDC modules and MDC FALs taught; student achievement data in cohorts by grade level; classroom achievement; and state assessments.

Because students face a highly competitive and unpredictable national and global economy, there is a need to implement higher literacy and math standards and to graduate more students who are prepared for careers, advanced training and further study. The Literacy Design Collaborative and the Mathematics Design Collaborative provide structures to meet those needs.

Over the past three years, SREB has trained more than 6,000 teachers in LDC and MDC in 38 states.

These teachers have remarkable stories to tell about how LDC and MDC engage and motivate students to learn and how it impacts their teaching. In 2013, SREB published testimonials as teachers and school leaders shared their stories. Now data are beginning to emerge that document LDC and MDC strategies are paying off. Student achievement is up!

In this set of vignettes, teachers and principals share not only their first-hand experiences using LDC and MDC, but they share their data. Join us on the journey to raise the bar and transform education so that more students meet or exceed college- and career-readiness standards.

Sincerely,

Gene Bottoms
SREB, Senior Vice President

Frequently Used Terms

Literacy Design Collaborative (LDC)

An approach for incorporating rigorous literacy standards into middle grades and high school content areas, LDC provides a system for developing reading, writing and thinking skills within a variety of academic disciplines, not just in English/language arts courses. LDC tools are designed to help students reach the new college- and career readiness standards in literacy.

Mathematics Design Collaborative (MDC)

MDC is a framework to balance instruction so that students develop understanding of basic math concepts, fluency with math procedures and the reasoning to know how and when to apply math knowledge and skills to solve problems. MDC helps teachers understand and implement — by design and not by chance — the college- and career-readiness standards. Formative assessment lessons, a hybrid of assessment and instruction, are key MDC tools.

Formative Assessment Lessons (FALs)

A major innovation in teaching and learning mathematics, these lessons show teachers what students understand and allow them to adjust teaching so students learn to reason with math and apply concepts to multi-step problems. FALs focus on student understanding of mathematical concepts; allow students to have a productive struggle; help teachers determine what to change in content and instructional strategies so students can master the standards; and assess how students think with mathematics.

Five Strategies of Assessment for Learning[1]

- Clarifying, sharing and understanding learning intentions and criteria for success
- Engineering effective classroom discussions, activities and learning tasks that elicit evidence of learning
- Providing feedback that moves learners forward
- Activating students as the owners of their own learning
- Activating students as instructional resources for one another

1. Williams, D. (2011). *Embedded Formative Assessment*. Bloomington, IN: Solution Tree House.

Vignettes: Literacy Design Collaborative

"While teaching LDC modules, I've seen my students not only understand concepts but apply them."

Reading intervention teacher

"Our reading scores have risen each year. Our writing scores are above state average for the second year."

Middle school principal

"They are learning science by writing about it. I know now that the more students write, they more they learn."

Science teacher

"Ultimately our writing program is better preparing students to transition to college and careers."

High school principal

Alabama

Honeysuckle Middle School — Dothan, Alabama

Arkansas

Oden High School — Oden, Arkansas

Florida

Avalon Middle School — Orlando, Florida

Hunters Creek Middle School — Orlando, Florida

Pine Forest High School — Pensacola, Florida

Georgia

Eddy Middle School — Columbus, Georgia

Paulding County High School — Dallas Georgia

Shiloh High School — Snellville, Georgia

Kentucky

Jackson County Middle School — McKee, Kentucky

King Middle School — Mercer County Schools, Kentucky

Letcher County Central High School — Whitesburg, Kentucky

Mercer County High School — Mercer County Schools, Kentucky

Tichenor Middle School — Erlanger-Elsmere Schools, Kentucky

Massachusetts

Commerce High School — Springfield, Massachusetts

New Mexico

Alamogordo High School — Alamogordo, New Mexico

North Carolina

Fairgrove Middle School — Fairmont, North Carolina

Robeson County Schools

Ohio

Rosemore Middle School and Whitehall-Yearling High School — Whitehall, Ohio

LDC Changes Students' Attitude About Learning

Paulding County High School — Dallas, Georgia

Looking over her grade book at the end of the school year, **Cheree Vaughn** needed a moment to figure out what was different. Then she saw it. "Not one of my students with disabilities failed my chemistry class. And far fewer students than usual failed overall." Vaughn credits this rise in achievement to her use of the Literacy Design Collaborative (LDC) and the school's approach to make content literacy central to the school improvement effort.

Cheree Vaughn, Paulding County High School

Using funds from its school improvement grant, Paulding County High School (PCHS) extended the school day to provide extra support for struggling students and enrichment for everybody else. With a focus on writing and content literacy, the leadership created REALL Time (Reaching Excellence in Academic Leadership and Literacy). For 30 minutes four times a week, students went through an abbreviated version of the LDC process and repeated this throughout the year.

> *"I'm not just teaching students how to outline; I am teaching them how to learn."*

REALL Time was designed by literacy coach **Chris Leonard** and school improvement specialist **Dawn Ashmore**. Leonard explained, "We wanted to have a literacy focus for this extended learning time to try and help raise our students' writing scores and to provide teachers with an opportunity to practice literacy strategies outside of their normal content areas." Subsequently, Leonard collected articles and developed prompts using LDC templates. Then, he provided guidance on how to introduce the prompts, scaffold the texts, transition to writing, and guide students through the writing process over the course of a week.

Dawn Ashmore, School Improvement Specialist, Paulding County High School

To measure the impact of this enrichment time, PCHS created a series of writing benchmarks given three times over the course of the year. Mirroring the SAT/ACT writing tasks, Leonard and Ashmore used LDC templates to design these prompts as well. Leonard said there were three goals for these benchmarks:

"The first was to give teachers the opportunity to grade work using the LDC writing rubric. For many of the teachers, this was their first time scoring writing this way. After the first writing benchmark, we had the teachers sit down together to grade and discuss what they were seeing in the writing. Our second goal with the writing benchmarks was to give students more opportunities to write in response to a prompt within a set amount of time. The final goal was to monitor writing across the school and identify trends and issues schoolwide with student writing."

Vaughn said this approach was a factor in more students passing her class, including 100 percent of her students with disabilities. "I am sure some of that is due to the fact that literacy was part of the entire school's curriculum. At the beginning of the year, just a few of us were piloting LDC modules, but using this REALL Time sort of sneaked LDC into everybody's classroom."

At the start of the 2012-2013 school year, consultants from the Southern Regional Educational Board helped establish a core literacy cohort, eventually named "Project Literacy Team."

Over the last year and a half, this group has grown, adding special education teachers, fine art teachers and department heads. Principal **Paul McMahon** said this structure has been central to spreading LDC and keeping the focus on literacy. He gives teachers release time to plan and collaborate.

Using LDC as the primary mode of improving literacy instruction, PCHS saw gains in three different content areas on End-of-Course Tests (EOCT) and gains in literacy scores on the SAT.

"With LDC, students don't complain about learning."

Vaughn, also a member of the Project Literacy Team, said LDC has helped her teach students to read their textbooks, a fundamental skill for budding scientists. She said using authentic and disciplinary articles and journals means her "students are better able to dissect the textbook, see how

PCHS Student Gains in Content Areas on EOCT

EOCT	2011-2012 MEETS/EXCEEDS	2012-2013 MEETS/EXCEEDS	2013-2014 MEETS/EXCEEDS
Ninth-grade literature and composition	79%	79%	87%
Biology	62	59	74
Physical science	74	80	83

PCHS SAT Scores

EOCT	2011	2012	2013
Verbal	438	451	456
Writing	413	434	436

Lexiles measure the complexity of texts and are used to determine whether students can read and comprehend at the appropriate grade level. PCHS students saw growth in this area as well.

PCHS Percentage of Students Reading Lexile Level at or Above Expected 11th-Grade Standard of 1275

2012-2013	2013-2014
33%	45%

Barbara Mazur, a Project Literacy Team member and U.S. history teacher, sees a change in students' attitudes toward learning. "With LDC, students don't complain about learning. The first time I taught one of my LDC modules, I actually wondered where these students came from. Was I in my classroom with MY students?" Mazur is confident that this increased engagement has led to better learning outcomes.

it is laid out, interpret graphs, analyze visuals, and pull out key ideas and vocabulary." Furthermore, she has found her modules work best when students write to an authentic audience and when the modules are a strong fit into her curriculum. She said, "I don't want the students to feel like I am hitting them over the head with reading and writing just to do reading and writing. It has to fit into the standards I teach."

Committed to using LDC to teach content and not "dumb-down" the reading, Vaughn has expanded her tool-kit of literacy strategies to scaffold these authentic text selections. "I've gotten away from PowerPoints. Now, I teach them to determine what is important, how to summarize and take good notes on what they are reading or watching on a video. LDC has taught me to be aware of the learning process and help students to construct knowledge in a meaningful way. I'm not just teaching students how to outline; I am teaching them how to learn," said Vaughn.

From Good to Great in Science with LDC

Fairgrove Middle School — Fairmont, North Carolina

In the 2012-2013 school year, 38 percent of the students in Donn Kirkwood's science class scored at the Proficient or Advanced level on the energy strand of North Carolina science standards. This year, after teaching the strand through the LDC module concept, 62 percent of students scored Proficient or above, with 43 percent scoring at the Advanced level.

Donn Kirkwood has distinguished himself as an exemplary science teacher, often selected to represent Fairgrove Middle School at state conferences and workshops. He has been named "Teacher of the Year" and has created some of the materials that Robeson County uses throughout its school system. Kirkwood does not rest until all of his students meet with success in science.

This year, Kirkwood began Literacy Design Collaborative (LDC) training. As a scientist, he approached it with an open mind and as a scientific test. He wanted to see if the claims made by the trainer would actually come to fruition in his own classroom.

Kirkwood devised an experiment. Robeson County uses a benchmark testing system to ensure students are on track to do well on end-of-year assessments. For the first quarter, he continued to use the same teaching methods he used before LDC. The first exam was on matter, comprising state Science Standard 8.1. Previously, about 94 percent of his students scored at the Proficient level. The first benchmark exam was given in October and again, Kirkwood's students scored very well, with about 95 percent scoring at Proficient or above on this strand. Of the four indicators in Science Standard 8.1, Kirkwood's students correctly answered anywhere from 41 percent to 80 percent. This result was slightly higher than the year before, and Kirkwood was pleased but not satisfied.

"They are learning science by writing about it. I know now that the more students write, the more they learn."

He knew that the strand on matter was not as difficult as the next strand to be tested — energy. This previously was a struggle for Kirkwood's students. The exam on this benchmark took place the second week in December. **Kirkwood taught the energy strand solely through LDC modules. After five days of LDC training, he felt ready to test the hypothesis that LDC resulted in success in science. His results were outstanding. Students answered nearly 90 percent of the questions in both indicators of Science Standard 8.2 correctly.**

But the most astounding change was observed when comparing these results to scores for the same strand on the previous year's exam. In 2012-2013 only 38 percent of his students scored at Proficient or Advanced on the energy strand. This year, after teaching the strand through the LDC module, 62 percent of the students scored Proficient or above, with 43 percent scoring at the Advanced level. Kirkwood attributed the improvement to the changes in his teaching methods stemming from LDC.

Besides exam scores, Kirkwood has noticed a change in the general science learning of his students. He said, "Student writing is at a higher quality. The process of gathering and analyzing information helps students really get it into their minds. They are learning science by writing about it. I know now that the more students write, the more they learn."

LDC: Just the Right Fix

Commerce High School — Springfield, Massachusetts

- In 2012, Commerce High School's goal was to score 74 on the English/language arts section of the Composite Performance Index (CPI). It achieved a score of 71.
- In 2013, its goal was a CPI score of 76. After putting in place Literacy Design Collaborative (LDC) strategies with coaching from SREB, its actual CPI was 87.

Leaders and teachers agree LDC had a significant impact on exceeding their goals.

When students tell **Michael Bagge**, "This is science, not English class" he feels a sense of accomplishment. "It is because they are writing quality products," said the Commerce High School science teacher. LDC had an incredible effect on both him and his students. "It helped me come up with authentic, standards-based tasks that helped my students read and write in the content areas of physics and anatomy classes," said Bagge.

As for his students, he said they were more engaged than when they learned primarily from the textbook and lectures. He explained that during an LDC module, his students "were interested in the topic rather than just going through the motions." He concluded that using the LDC's backwards design framework increased engagement because students had a clear purpose for reading and writing. "Within these modules, the backwards planning helps me to clearly communicate to the students what we are working on, and it gives them a sense of purpose for being in the classroom."

For her first module, 10th- grade English teacher **Meaghan Callahan** used *Lord of the Flies* as her primary text. She said the structure of the module led to improved writing and success on the culminating assessment. "I include the college- and career-readiness standards on the test, and the students are beginning to notice the connection between the standard and the LDC prompt, she said. Instead of the students trying to figure out what the teacher wants, it is all spelled out in the prompt." Moreover, she noticed that "their writing was clearer, and I think that was because the prompt was less confusing."

Callahan also appreciated how differentiation was built into her modules. She explained, "There was no guessing about how to scaffold lessons and assignments up or down to reach all types of learners."

Pauline Mulligan, the instructional leadership specialist at Commerce High School, said the training and support from SREB was critical to the success and sustainability of LDC. "The trainings are applicable to all content areas, and there has always been time for cross-content discussion and planning," she said. "One benefit we've gained from LDC training is common collaborative planning time. Particularly, our training has helped prioritize literacy across content areas. Each teacher who has attended the LDC training has been able to incorporate an LDC task into lesson planning. Two history teachers completed an LDC task that was shared with another teacher and the three implemented the task with successful student assessments. One teacher reported that two students who never completed an essay had their first success of the school year writing to an LDC task."

As an instructional leader, Mulligan knows that being able to sustain professional development and implementation while differentiating for each teacher's readiness is very difficult; thus, she sees LDC and SREB as crucial elements to future success. She explained, "This LDC work, grounded in national efforts and rooted in the path of the future assessment design, is both timely and enjoyable, a rare mix."

"This LDC work, grounded in national efforts and rooted in the path of the future assessment design, is both timely and enjoyable, a rare mix."

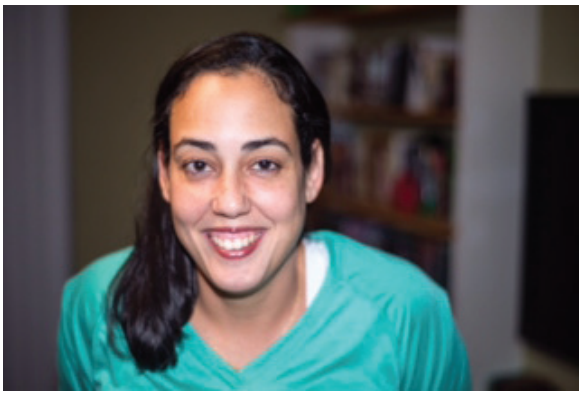
Literacy Design Collaborative and Struggling Readers: A Perfect Match

Avalon Middle School — Orlando, Florida

A common misconception is that the Literacy Design Collaborative (LDC) is not a good fit in classes geared toward struggling readers and writers. **Nicole Craig**, a reading intervention teacher at Avalon Middle School (AMS) in Orlando, Florida, knows firsthand this is not true. Schoolwide, in 2013, 80 percent of AMS seventh-graders and 78 percent of eighth-graders met or exceeded standards on the Florida Comprehensive Assessment Reading Test (FCAT), a 4 percent and 7 percent increase respectively over the previous year. Gains were even greater on the writing exam.

At the same time, 79 percent of Craig's reading intervention class (all at Basic or Below Basic reading levels) met state-assigned learning targets on the FCAT. Avalon's gains were recognized as some of the best in the district. Craig credits these results to using the LDC framework and the work students produced using her LDC reading and language arts modules.

Craig's modules took a unique approach to the traditionally laborious task of exam preparation. When preparing students for the FCAT, many teachers refer to "*FCAT 2.0* Reading Test Item Specifications on Test Taking Skills and Vocabulary." This handbook, created by the Florida Department of Education, provides an overview of the exam, the types of questions, how the exam questions align to specific standards and strategies for finding the correct answers. Teachers often use it to present isolated exam-taking strategies not used in the real world.



Nicole Craig, reading intervention teacher, Avalon Middle School

"I didn't want to do another PowerPoint or lesson on test-taking strategies."

FCAT 2.0: Reading Test
Percentages of Students Meeting and Exceeding Standard (Level 3 and above)

	2011-2012	2012-2013
Seventh Grade Avalon M.S.	76%	80%
Seventh Grade Statewide	58	57
Eighth Grade Avalon M.S.	71	78
Eighth Grade Statewide	55	56

Source: Florida Comprehensive Assessment Test, 2012-2013 school year

FCAT 2.0: Writing Test
Percentages of Students Meeting or Exceeding Standard (Level 3 and above)

	2011-2012	2012-2013
Eighth Grade Avalon M.S.	67%	79%
Eighth Grade Statewide	52	54

Seventh Grade: No test.
Source: Florida Comprehensive Assessment Test, 2012-2013 school year

"While teaching LDC modules, I've seen my students not only understand concepts but apply them. They are reading and comprehending grade level and above texts."

Craig took a different approach. Using LDC tools, she created a teaching task that had students read the exam specification document, review key standards, write exam questions and produce a written analysis of their own and their peers' exams.

Subsequently, students had to complete a close reading of the exam specification guide, determine the key factors used to build questions that align to standards, and apply this knowledge by designing original questions. Finally, they had to use a rubric to peer-review each other's questions and write an analysis using evidence from the document.

"I didn't want to do another PowerPoint or lesson on test-taking strategies" said Craig, "Instead, students learned how to think like a test maker to apply the vocabulary skills they were learning in addition to the language of the standards." The impact of this process was evident on district-created benchmarks. "When students eventually took school benchmarks, they could easily identify the types of questions, what was being assessed and recognize the thinking behind each question." Because of the analysis and reflections, Craig could make this connection between the module and the benchmarks. Students were applying the very skills about which they wrote.

Avalon Middle School's principal, **Judith Frank**, observes the impact of LDC across her school. She said, "On a regular basis, I see teachers requiring students to justify their answers more; they are asking students to cite evidence for their conclusions; they are narrowing their focus." Moreover, she sees teachers "beginning to start with the end product and then scaffolding back to see what skills students need to produce the writing."

Principal Judith Frank, Avalon Middle School

To spread the work and build capacity, Frank and her instructional coach, **Cheryl Vanatti**, created a literacy team comprised of members of each content area. This team is responsible for sharing best practices with their colleagues, including the LDC approach to unit design. Vanatti said this team allows the faculty to see how the various resources, tools and strategies fit together.

Frank believes teacher planning time is a key factor for success. "In addition to time to attend training, they need additional planning opportunities to design units. They need time to share ideas with peers who are not at training sessions."

Craig said LDC has helped her connect what students learn to a clear and concrete purpose. "Before, I would look at recent classroom, district or state test scores and assign a couple of lessons based on students' weaknesses. There was no tie in to the real world or what students will produce at the end of a unit. Now, I'm looking at how the students will use what I'm teaching, not just for testing but for later in their academic career and once they enter the job market. Every assignment has a purpose behind it," Craig explained.

LDC allows Craig to incorporate relevance and rigor into a reading class, and her students consistently impress her by rising to the occasion. "While teaching LDC modules, I've seen my students not only understand concepts but apply them."

In-Depth Learning, No Fluff

Hunters Creek Middle School — Orlando, Florida

At the start of the 2012-2013 school year, the Hunters Creek Middle School eighth-grade English /language arts team began using the Literacy Design Collaborative (LDC) to design their instructional units. By the end of the school year, the team saw a nine point rise in the percentage of students scoring at or above Proficient on the FCAT 2.0 (Florida Comprehensive Assessment Test 2.0). Teachers credit LDC with helping students make this remarkable progress.

Katharine Brown, English Teacher, Hunters Creek Middle School

English teacher **Katharine Brown** is considered a "black belt" in teaching Florida's college-and career-readiness standards. This designation, given to her by the Orange County School District, makes her uniquely qualified to evaluate instructional practices. So, when fellow eighth-grade English teacher, **Steven Gray**, introduced Brown to LDC strategies, she gave it a try. She saw a 10 point increase among her students. One year later, Brown attributes Hunters Creek Middle School's nine point increase on the FCAT reading assessment to a shift in teaching and to in-depth learning brought to the classroom by LDC.

College- and career-readiness standards "are about teaching students to think for themselves instead of us planting a bunch of facts and answers in their heads," said Brown. "LDC does the same. It gives teachers tools to teach students to think deeply about what they read and express that thinking through writing."

To illustrate, Brown describes a module she taught that examined the concept of freedom, free will and security. The students read the novel *The Giver* and excerpts from Thomas More's 17th-century philosophical essay, "*Utopia*." They also viewed the film "*The Truman Show*." After reading, viewing and taking notes on these texts, the students argued to what extent people should be expected to sacrifice freedom to be safe and secure.

Initially, most students advocated for freedom without limits. "But an essay on how they felt would be all fluff," said Brown. "The new standards require students to include more meat in their essays through applying textual evidence to support a claim. LDC helped us focus on that." Brown intentionally designed the module to "bring students back to the text when arguing one side or the other." She said, "Looking for evidence to support their claim, they had to analyze both sides as they took notes for their essays." Reading closely, students remarked that when freedoms infringe on the rights of others, limitations are acceptable. Conversely, they also cited examples of the dangers of trying to control individual choices.

Percentage of Students Scoring at or Above Proficient on Eighth-Grade Florida Comprehensive Achievement Test 2.0 (FCAT 2.0) at Hunters Creek Middle School From 2011-2013

	2011	2012	2013
Hunters Creek Middle School	63%	66%	75%
Orange County School District	50	55	57
Statewide	53	55	56

Source: Florida Comprehensive Assessment Test 2.0

Hunters Creek's principal **Amy McHale** is impressed with how the LDC process has impacted content classes in addition to English. She said, "In one of my science classrooms, I was pleasantly surprised by the work of my eighth-graders on an essay as well as a debate on government spending for space exploration. I noticed students' conversations during the debate were at a much higher level of understanding than I had seen in the past."

Principal Amy McHale, Hunters Creek Middle School

Increasing the quantity and quality of writing across the curriculum have changed the way many students think about their science, social studies and career-tech classes, said McHale. "In LDC, students are connecting the importance of quality writing skills to all facets of learning. They understand the importance of being able to express their understanding of concepts through quality writing."

Now in her second year of using LDC, several elements have infiltrated all of Brown's planning. "It has hit home for me how important backward planning is. Having a clear focus on where we are going saves my sanity." Now, she always asks herself, "What is my end goal? What lessons will move my students toward that goal? The students know the goal and can connect how lessons are going to move them toward it."

Brown has also learned when an instructional practice isn't moving students toward success on the teaching task or learning target, it is okay to drop it. For example, she has stopped teaching vocabulary in isolation.

"At first I was hesitant to let go of my vocabulary notebooks, but I saw how much more effective it was to teach vocabulary in context as opposed to teaching definitions in insolation," Brown noted. During an LDC module, Brown teaches words as they come up in the texts students read. She models how to use context clues, such as synonyms, antonyms and examples around the difficult words. Subsequently not only are students learning new words, they are developing skills that will help them on standardized exams and in their other classes.

Relevant Assignments Engage Students

Honeysuckle Middle School — Dothan, Alabama

In the 2010-2011 school year, 41percent of sixth-graders at Honeysuckle Middle School achieved a Level IV score (the highest level possible) on the Alabama reading assessment. After two years of implementing the Literacy Design Collaborative (LDC) across all sixth-grade classes, 60 percent of sixth-graders achieved Level IV. Additionally, the percentage of students reaching Proficient levels increased from 81 percent to 88 percent overall. Here is the story of how this was achieved.

At Honeysuckle Middle School (HMS) in Dothan, Alabama, all sixth-grade science, social studies, and English teachers made the decision to use the Literacy Design Collaborative (LDC) throughout the year. The results — a 19 percent increase in Level IV achievement, and students have become more independent learners and better able to think like a historian, scientist or literary critic. HMS teachers and leaders agree that this success is due to teachers collaborating to help all students read complex texts and produce quality writing products. While never easy, teachers at HMS say LDC has provided key tools and processes to engage and support students through rigorous tasks, leading to higher levels of achievement.

Jennifer Williams (L), Samantha Garrett (M) and Kenyanna Cole (R), Honeysuckle Middle School

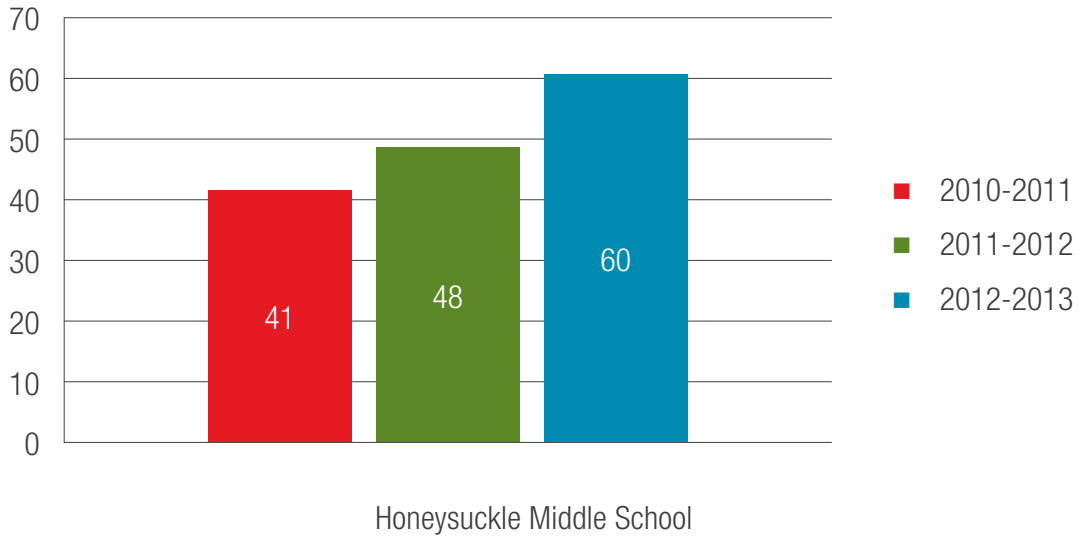
According to Honeysuckle's principal, **Scott Faulk**, the faculty has bought into LDC completely. Subsequently, he has seen a shift in how teachers teach and students learn. "I see more collaborative planning within and across content areas as well," he said, adding the work students are producing has improved in content classes and is more often at or above grade level. "When you can make sixth-graders write quality essays and plan how they will collect evidence, develop claims and write correctly, that is a huge improvement," said Faulk.

How did Faulk and his leadership team achieve such buy-in from faculty? Part of it was the training from the Southern Regional Education Board (SREB). "Breaking the training down into segments and developing lead teachers made it easy to incorporate the process. The LDC training showed an easier way to deliver instruction using practices we already had in place. LDC didn't reinvent the wheel; it gave it a smoother ride," he noted. To get teachers on board, he let the work speak for itself. "We placed student work on the walls and hallways of our school. In grade-level meetings, we shared successful LDC lessons. Also, in staff meetings, we allowed teachers to share what they were doing in the classroom," said Faulk.

At the beginning of the 2012-2013 school year, Faulk's team used an innovative method to introduce LDC to those not previously trained. On the first day of school, teachers are required to present the student code of conduct and safety procedures. Instead of having his teachers robotically read a script, a group of teachers wrote one-day LDC tasks in which students had to read about school safety issues and use evidence to respond to the critical focus question, "How can your actions increase or decrease your overall safety at school?" This assigned reading and writing task set the stage for the level of reading, writing and thinking expected at HMS.

Writing lesson plans has always been fun for **Samantha Garrett**, a sixth-grade English teacher and one of the first introduced to LDC at HMS. Initially she found it challenging to begin with a critical focus question. "When we started, I was having a hard time going from one big idea down to smaller ideas," said Garrett. "Personally, I don't think that way.

Alabama Reading and Mathematics Test (ARMT) Reading Percentages
6th Grade – Level IV



Honeysuckle Middle School

I start with the little things and then I connect it to a larger whole." Now, she feels LDC has helped begin the planning process by pushing her to ask big questions. "I ask myself, does it matter 10 years from now? Is it essential for students when they grow up and become productive citizens?" Garrett said planning this way helps her make sure what students learn is relevant, on grade level and engaging.

HMS' literacy coach, **Jennifer Williams**, said LDC has helped teachers be more intentional in their planning. "Our teachers' lessons aren't just haphazard. There's a goal; teachers begin with an end in mind, and they develop quality mini-tasks to get to their goal," stated Williams.

Backwards design using LDC helps move instruction beyond the textbook, according to sixth-grade science teacher **Keyanna Cole**. However, using more relevant articles introduces another challenge for her: teaching complex and grade-level texts when so many students either have disabilities or are struggling readers. Cole and her team use a variety of strategies as she designs instruction to scaffold student comprehension. "Before making the copies, I pre-chunk the article, and we read it one chunk at a time. A chunk may consist of a paragraph or two. For each chunk, we practice a certain skill that goes with what students need to learn," she explained.

To develop these skills, she teaches her students to mark the text with a highlighter, noting key ideas and underlining important words and phrases. "To help students with close reading, we teach them to annotate using a specific format: exclamation marks mean 'wow, this surprised me or is something new'; underlining means 'this is an important idea'; question marks mean 'I've never heard this before, what does this mean?'; and a circle means 'I don't know what this word means.'" Cole feels that now, whichever class students are in, they are expected to use these types of active reading strategies to help them make thinking visible.

LDC Helps Teachers Design Better Lessons

Alamogordo High School — Alamogordo, New Mexico

Diana Richardson teaches American literature to 11th-graders at Alamogordo High School (AHS) in Alamogordo, New Mexico. The Literacy Design Collaborative (LDC), she said, focused her on the process of learning and improving her ability to plan and deliver quality lessons. She explained, "LDC is about the steps of the learning process, from engagement and capturing prior knowledge to assessment. It is a map to guide and improve the process of reaching students."

Just as learning is a process, so too is teaching. According to Richardson, LDC made her more mindful of how she designs units, investing time early to create tasks and lessons. "The energy level and time that I personally apply to an LDC module make their creation tantamount to giving birth," she said. "Trying to get the critical focus question and teaching task just right is the most time consuming. "I am never satisfied with my module's final draft," she said. "I go back and reevaluate as I teach, changing the organization, delivery and materials throughout the day to support all my students. Nothing is ever set in stone in an LDC module because teachers, circumstances and students are never the same."

In one instance, this reflective approach measurably improved student learning. She was concerned that in her first module only 64 percent of her students handed in writing products. "My findings were that I did not design the rubric clear enough for students to understand what was expected of them. The next rubric was well designed; therefore, the number of submitted end products increased by 32 percent."

The principal of AHS, **Darian Jaramillo**, has seen the impact of LDC across the school. "LDC has helped our teachers design their instruction in a systematic meaningful approach. It has also helped our teachers be more creative and resourceful in their teaching," said Jaramillo.

Most importantly, Richardson felt the teaching and learning process of LDC increased learning in her classroom. "Students reap the rewards of our efforts because the depth of our lessons is apparent in our delivery, our preparation of materials and our connection to the curriculum," she noted.

The teachers and leaders of AHS believe the process of designing modules has had a significant impact on student achievement. The school saw a 16 point increase in the percentage of students scoring Proficient in the literacy section of their Standards-Based Assessment from 2012 to 2013.

Standards-Based Assessment Passing Scores

LITERACY SCORES	2009	2010	2011	2012	2013
Alamogordo High School	42%	40%	61%	54%	70%

A Believer in LDC

Shiloh High School — Snellville, Georgia

Terra Smith, English/language arts teacher, Shiloh High School

From working with nuclear weapons to working with high school students, Terra Smith isn't your ordinary teacher. She left the Air Force in 2005 where she was a nuclear missiles officer to become an English/language arts teacher at Shiloh High School in Gwinnett County, Georgia.

On the surface, the two fields seem far apart, but there are some similarities. As a nuclear weapons officer, it was her job to maintain a critical aspect of the United States defensive arsenal. To do the job, she had to possess certain character traits including cool nerves and extreme mental discipline — good transferable qualities to the teaching field, a field she says "I fell in love with."

Smith has been teaching at Shiloh High School for nine years, but when it comes to student achievement, the 2013-2014 school year has been most rewarding. Smith said that's because she started using the tools and strategies of the Literacy Design Collaborative (LDC) — a framework for creating literacy-rich assignments that engage students in reading, writing and thinking skills in a variety of academic disciplines.

"I was giving students harder work and they were breezing through it," said Smith. She said she simply reorganized her lesson plan format. "As teachers, it makes our skin crawl to write lesson plans. We are lesson plan stealers, not lesson plan writers," quipped Smith.

"I just had to take the time to reorganize into the LDC format, and that one simple step was a phenomenal change. It was so much easier." Smith used the LDC template to formulate her lesson plans. The template requires teachers to do front-end planning (plan weeks of lessons at a time) and always start with the end in mind (what you want students to know and be able to do).

She thought it was difficult and time consuming at first. Then she realized she could take many of her own strategies and assignments and see how they fit into the LDC template. Smith said she would "just plug and play." "When I looked at it that way, a light went on and I realized oh, this is super easy. Once it's done, it saves time in the long run," noted Smith.

Smith's first module or teaching task was for seniors in her British literature class, with a focus on satire. The module was 45 pages and took about six or seven weeks for students to complete. It involved teaching students the definitions and the techniques of satire. They read *A Modest Proposal*, a classic satirical work by Jonathan Swift.

"I used the 'gist' method which I learned from my SREB trainer, and that immediately opened my eyes," said Smith. For every paragraph students read, they would write a one sentence summary in the margins. Smith said she gave students a content quiz to make sure they understood the text.

When she taught this unit in previous years, Smith said her students' grades were typically disappointing — about half would fail. But this time, "My quiz grades jumped to the 80s and 90s. I did not change the quiz, I just changed how they read the text by writing the gist out to the side," said Smith.

Smith has only been using the LDC approach for six months, so there is no hard data on whether it's working in her classrooms. But this is just one anecdotal indication that it is indeed making a difference in student achievement.

Another class assignment involved researching a problem and proposing both a logical solution and an illogical solution. Yet another one involved working in groups to present a news feature or broadcast that centered on satire. Through it all, Smith used the LDC rubric so that students knew exactly what was expected of them and what they needed to do to succeed.

Smith also used free learning technology tools with assignments to engage students and add relevance. Some of the technology included:

- Padlet — An electronic screen allowed students to use a code to type in a question. A sticky note would pop up on the screen. Smith said this helped to engage students who were nervous or didn't want to be embarrassed by asking questions.
- Penzu — Using this online journal, students, as a group, would share the same user name and password and share comments about what they thought a paragraph (or other text) was about.
- Voki — Students could customize and make an electronic avatar and give it a voice by typing what they wanted the character to say. Smith said allowing students to type answers to questions and having the creatures verbalize the answers encouraged more class participation.
- Quizlet — Smith downloaded all of her quizzes to Quizlet to deliver content to students electronically. Students could take the quiz in class or at home.

Smith was blown away by students' final papers. "Their papers showed me they had done the research, that they understood the logical solution, and that they understood the aspects of satire. Their presentation showed me they could master it," said Smith.

To get a non-bias assessment of her students' progress, Smith used a program called Write ToLearn, an online literacy tool that accurately assesses writing. Teachers set the parameters of what they want to assess — grammar, sentence structure, tone, etc. Smith said at the end of the first semester, before LDC was in full use, her class average on the essay was in the 3s (not good; 6 would be exemplary). The Write ToLearn software provided feedback on what students needed to work on to improve, and it allowed them six opportunities to rewrite. To her dismay, after six chances, Smith's class average was still in the 3s.

However, that changed after a semester using the LDC framework. Smith had her students write their final satirical essay in the Write ToLearn program, and she said the class average score jumped to the 5s, one point lower than exemplary. Additionally, students did not need to do six revisions to reach that score. To make sure everything was on the up-and-up, Smith randomly pulled 60 of the 137 essays and uploaded them into the software to check for plagiarism. She was pleasantly surprised; there was none.

Since implementing LDC, Smith said she's had fewer tardies and absences and her class averages have increased from 60 to 70 percent to 80 to 87 percent. Regarding LDC, Smith affirmed, "I'm a believer."

Literacy Design Collaborative Showcase

Robeson County Schools — North Carolina

Performance arts teachers know that public performance is an important part of learning. Students learn the basics of music or theater and then perfect their work to a level worthy of public display. This concept is the theory behind the Robeson County Literacy Design Collaborative (LDC) Showcase, the first of its kind in the state.

Teachers in Robeson County, North Carolina had the opportunity to demonstrate their learning and their work through the LDC Showcase in Lumberton, North Carolina on May 5, 2014. This showcase featured 15 middle grades school teachers who trained and implemented LDC for the past school year. Each teacher taught three or more self-created LDC modules and shared their work through presentation boards and written abstracts.

More than 100 principals and designated teachers attended and had the opportunity not only to see the work of the teacher-presenters, but they were also able to see the results of LDC in action. Teacher-presenters shared testimonials and showed evidence of student success. Student writing and reading scores were expected to improve, but teachers also proudly touted students' improvement in content knowledge in subjects they taught such as science, social studies or English.

Teacher demonstrations were as varied as the teachers presenting. One science teacher showed how her students learned about the laws of motion and matter in science by studying roller coasters. "I was amazed at how engaged my students became in the process," said fifth-grade teacher **Shondra Johnson**. "Students could not get enough. They even, on their own, wrote letters to Carowinds and Kings Dominion Amusement Parks to get more information on the safety of roller coasters. My students demonstrated an understanding of the science standards that I had never before seen."

Donn Kirkwood, another middle grades school science teacher, tracked the progress of his students using the county benchmark assessment exams. Using the strand of "matter" which is in the eighth-grade curriculum, Kirkwood discovered that even though his students scored at about 65 percent Proficient or better using his prior teaching methods, this year, by using an LDC module on matter that he created, his students scored over 90 percent Proficient with over half of his students scoring at the Advanced level.

Nmano Neufuielle, a seventh-grade language arts teacher, focused her work this year on improving student writing. She showed how students performed at a minimal level of writing at the beginning of the year, but through almost daily writing and using rubrics provided by LDC, they became accomplished writers. By showing a comparison of student writing from the beginning to the end of the year, she was able to demonstrate that her work with an LDC module greatly helped her students improve. Her presentation provided observers a step-by-step approach for teaching with rubrics so that students became better writers.

The LDC Showcase allowed teachers to learn from each other. "I have learned so much this year, not just from my work, but also from the work of others. Collaboration is an important part of the learning process," stated **India Russell**, eighth- grade teacher.

"Collaborating is an important part of the learning process."

Response from the visitors to the Showcase was very positive. Many principals and teachers asked for copies of the modules created. Principals whose schools did not take part in the training this year are working to be part of the project for next year. **Shanita Anderson**, an English/language arts secondary instructional coach with the North Carolina Department of Public Instruction, worked in Robeson County for the year. "I have been amazed at what teachers have learned through LDC. This Showcase is a great way to show off their work and their learning and to give other teachers ideas about how to improve their work," she said.

Teachers know they have just begun their transformative work, and they are looking forward to another year of learning. "LDC work is hard," said **Robert Wynn**, eighth-grade teacher, "but it is so worth it for the kids."

"LDC is hard work ... but it is worth it for the kids."

Wynn's class went from a 50 percent pass rate in literature on benchmark exams at the beginning of the year to an 87 percent pass rate at the end of the year. About 44 percent of the students even scored at the Advanced level.

Getting on the Same Page: Collaborating with LDC

Oden High School — Oden, Arkansas

Toby Craver is an agricultural education teacher at Oden High School in Oden, Arkansas, but his students learn a lot more than the science of farming. He said his work with SREB and the Literacy Design Collaborative (LDC) has taught his students to "discuss, critique and create their own work based on knowledge acquired through reading." He uses LDC because it is the "vessel that allows students to use what they already know to create something totally new over which each student has ownership." Now in the second year of using LDC, Craver has become a literacy leader, helping other teachers write modules so students meet college- and career-readiness standards.

For students to succeed, the content teachers and the English teacher must collaborate, said Craver. To do this, content teachers may have to overcome certain insecurities. "In many cases, these are tough conversations for content area teachers," he said. "We do not want to ask the wrong questions or feel inferior on these topics. However, these conversations must take place."

To increase collaboration leading to quality literacy instruction across content areas, Craver has buddied with two colleagues — one art and one English/social studies teacher. This LDC team meets each Monday during their regularly scheduled teachers' meeting time. "We discuss ideas for modules, improvements and new ways of delivering the material. This little bit of extra time has benefitted us all greatly," said Craver.

Oden High School's principal, William Edwards, has played an integral role in making LDC work at his school. In addition to weekly classroom walk-throughs, students share their work with Edwards through Google Docs. A former English teacher, Edwards makes comments on papers as he reads them. Craver said, "I made it a point to talk with each student about their work. This has been a great way for students to have an even larger audience."

Now Craver and other teachers use the instructional ladder daily, even when not teaching LDC modules. "I have adopted the instructional ladder concept in all my classes whether I am in a module or not. I think it lends more easily to college- and career-readiness standards instruction and the new teacher evaluation system. The four sections of the LDC module (task, skills, instruction and results) allow everyone to be on the same page," said Craver.

"Working with buddy teachers has impacted more than how they design lessons. A great aspect of finding buddy teachers is that students are hearing the same vocabulary in different areas throughout their day," said Craver.

Oden High School educators use the STAR literacy assessment from Renaissance Learning to measure student progress. STAR assessments are used to monitor students' growth throughout the year to estimate their understanding of state standards, and predict their performance on the state exam.

At Oden High School, the STAR literacy exam was given August, October and December of 2013. On the October assessment, 70 percent of the students showed growth. On the December assessment, 84 percent showed growth.

Using LDC to Help ALL Students

Eddy Middle School — Columbus, Georgia

At Eddy Middle School (EMS) in Columbus, Georgia, special education teachers hold their students to the highest standards. Along with content area teachers, they collaboratively design instruction to help all students reach college- and career- readiness standards. The Literacy Design Collaborative (LDC), they say, has had an impact on their school's success in this challenge.

Michelle Atcheson (L): special education teacher; Monica Harrell (R): special education teacher, Eddy Middle School

Michelle Atcheson, an eighth-grade special education teacher, was surprised at how easy the LDC tools were to use, an important factor in making them fit with all of the other initiatives at their school. Atcheson explained, "At first glance it seemed overwhelming, but after working through each component it became easy to understand." For example, Atcheson said the first section, Preparing for the Task, specifically guides teachers in how to engage students in the task, how students will develop an analysis of the task, and how to create a plan to complete the task while addressing the content. There are also question prompts embedded within the LDC template that serve as a guide. The questions ensure teachers are addressing what they will do and what students will do.

Monica Harrell also teaches special education classes at Eddy. She agreed, saying her biggest surprise thus far, after studying its components, is finding out how simple the implementation of LDC is. "It also flows with my teaching methods," she said.

Student work has improved because students are taking more ownership of what they learn, according to Atcheson. "Through the use of checklists, students are assessing their own work and becoming more accountable." She said this reflective process has definitely made a difference by helping students improve the quality of their work. Overall, students work hard and prove they can succeed through the products they produce.

Harrell teaches students with disabilities in English, science and social studies classes. She said providing students a clear purpose for reading and writing helps them gain more independence. "My students now know that when they see a teaching task, they will be working toward learning how to complete a grade-level product. Therefore, they take more ownership of their work and keep up with anything I present to them. They can refer back to it later, as we progress through the skills cluster."

She explained LDC skill clusters are central to increasing students' confidence and skills. "Last year I wasn't as familiar with the significance of focusing on developing mini-tasks to fit the correct skill clusters. However, my students are now able to organize their thinking and class notes because of my approach with the instructional ladder. It is both practical and systematic."

Students in almost all subjects have seen significant gains over the last three years.

Percentages of All EMS Students Passing the Administered Criterion Referenced Competency Test (CRCT) from 2011 – 2013

	2010-2011	2011-2012 (YEAR ONE OF LDC)	2012-2013 (YEAR TWO OF LDC)
Sixth-grade reading	79%	85%	86%
Sixth-grade English/language arts	76	74	85
Sixth-grade social studies	50	67	70
Seventh-grade social studies	47	67	70
Eighth-grade English/language arts	85	94	98
Eighth-grade social studies	47	48	70

Making Connections with LDC

Two Kentucky School Systems Get Results Through Literacy Focus

Kentucky schools' focus on strategic unit planning using the Literacy Design Collaborative across content areas helped lead to:

- Tichenor Middle School being named a "High Progress School," meaning it is among the top 10 percent of schools in Kentucky showing the most rapid growth;
- King Middle School improving from "Needs Improvement" to "Progressing," missing "Proficient" by two points; and
- Mercer Senior High School moving from "Needs Improvement" status to "Proficient," going from a 39 percentile ranking to a 77 percentile ranking in just one year.

Tichenor Middle School — Erlanger-Elsmere Schools, Kentucky

Kathy Burkhardt, Superintendent of Erlanger-Elsmere Independent School District

"When you think about it, LDC (Literacy Design Collaborative) and MDC (Mathematics Design Collaborative) are just good instruction," said **Bryant Gillis**, principal of Tichenor Middle School (TMS) in Erlanger, Kentucky. To make that "good instruction" pervasive across content areas and grade levels, THS partnered with the Southern Regional Education Board (SREB) and the Kentucky Department of Education to make literacy-rich instruction an essential part of school culture. **Kathy Burkhardt**, Superintendent of Erlanger-Elsmere Independent School District, described LDC as a transformative practice for her district. She said one of the greatest impacts is "that both students and teachers are more excited about the instruction; students are definitely more engaged in their learning."

"I observe students highlighting and marking up their papers in the science and social studies classrooms on a consistent basis."

Additionally, a major benefit has been how well LDC fits into professional learning communities (PLCs). Burkhardt has observed, "More teachers are sharing their ideas more freely and are actively assisting one another on a regular basis through formal PLC and informal conversations." She has also noted an increased confidence in her teachers as they now have additional tools and expertise to utilize in their daily instruction. Because of the improved work products and learning processes taking place in the Erlanger district, Burkhardt believes "implementation of LDC (and MDC) has been the main initiative in improving instruction and increasing student learning across the content areas."

Gillis agrees that the change in instruction has been dramatic. "We were looking at changing the whole climate of the building. When I first came to the school, we had to pay because we went over our allotted paper copy amount. We were using a lot of worksheets.

Now, students are reading and then writing about what they read. I observe students highlighting and marking up their papers in the science and social studies classrooms on a consistent basis — even in the math classrooms. Our students have learned to read actively to understand word problems and better navigate their textbooks. That is all coming from the LDC work," said Gillis.

Eighth-grade English teacher **Nicci Magee** has always maintained high expectations. Now, through completing LDC modules, her students' expectations of themselves have risen. "The students have to analyze text to complete their assignments and learn how to read for the most important information to complete the task. This has totally changed their outlook on reading itself, and I know it has changed how they learn in science, social studies and in reading classes," said Magee.

At TMS, reading has become a central strategy for learning. Magee maintains using LDC across subjects is one key to success. "Our students know what they need to do to understand what they are reading." Now, students use note-taking strategies to help them organize their thinking and prepare for 'the big essay.' For example, many know to use double-entry journals to help them collect quotes and make connections to what they are learning and will have to write about. "The result — students know what the expectations are in every class because there is consistency to how students learn from their reading," concluded Magee.

King Middle School — Mercer County Schools, Kentucky

> *"Our reading scores have risen each year. Our writing scores are above state average for the second year."*

Terry Gordon, the principal of King Middle School (KMS), said LDC has impacted instruction by changing the way teachers plan. "Our staff is doing more meaningful, collaborative planning as they design tasks and create modules. Our students are doing higher-order levels of reading and writing. Test scores are now above the state average," said Gordon. While Gordon is happy with the rise in exam scores, he also sees an important shift in the types of assignments students are completing. "Students are now using critical thinking skills by forming opinions and backing up their assertions with evidence from the text. Teachers expect more from the students than from the portfolio prompts we used previously. Students are enjoying the process too."

Gordon believes good timing is one reason LDC has had such an impact at KMS. "Our school has struggled with writing. We had never been above the state average. We could not continue doing what we have always done because it was not working." He and his leadership team saw the new English/language arts and literacy standards as an opportunity that could lead to lasting change. He said the new standards meant "We needed a schoolwide change in our approach to literacy." In LDC, he saw an approach that went along with their plan to increase rigor in the school.

"Our reading scores have risen each year. Our writing scores are above state average for the second year. We had a first and second place NASA essay contest winner, and we had the best conservation essay contest submissions ever as a school." This type of success makes capacity building much easier. "Now that reluctant teachers are seeing the success of others, the use of LDC has taken off. We see only great things ahead for our students when it comes to reading and writing."

Mercer High School — Mercer County Schools, Kentucky

> *"A majority of students are more articulate in their writing skills and are able to recognize point of view, bias and accuracy when interpreting various texts."*

While teachers recognize the importance of strong literacy skills, content teachers are often concerned that literacy-focused modules will take precious time from content standards. As some teachers began to develop modules and witness students' growth in mastering content, their mindset begins to change. For example, Mercer High School social studies teacher **Andrew Ashford** demonstrates that well-developed modules, using complex texts to build literacy skills, can deepen learning. "My focus has become more aligned with developing students' analytic skills and applying them to primary sources to teach concepts rather than using more traditional Q & A note-taking sessions."

Ashford does not lose sight of his content. "When planning, I ask myself the question, 'How do these documents and assignments teach students what they need to know to think more critically and understand how and why the world works the way it does?' " said Ashford. He is impressed with the results, and not just exam scores. "A majority of students are more articulate in their writing skills and are able to recognize points of view, bias and accuracy when interpreting various texts and visual sources. This change may be attributed to more accountability on students to develop their own understanding and interpretation of the material," said Ashford.

Building capacity requires the type of planning described by Principal **Mallisa Hutchins** of Mercer High School. She said, "We had at least two English teachers going to training the first couple of years. We then sent a couple of social studies teachers to LDC training specific to them. Next, we allowed those teachers who had been trained to share and help other staff members begin to implement LDC. Teachers within our social studies and English departments became 'the experts' on our staff and have helped guide the other teachers." While Mercer has always employed writing across the curriculum, LDC has strengthened the way non-English teachers approach disciplinary literacy. Subsequently, Hutchins said, "We are already seeing gains across the board in test scores and expect this upward trend to continue as more teachers become experts in LDC."

Opening the Window to Student Success in Reading and Writing

Pine Forest High School — Pensacola, Florida

"A benefit of the Literacy Design Collaborative (LDC) is that it saves time planning instruction when trying to integrate the college- and career-readiness standards with Florida's new Next Generation Science Standards," said Pine Forest High School biology teacher **Stephanie Elliot**. Elliot said at first she was going back and rewriting old lessons to include the new standards. LDC allowed her to pinpoint what students needed to do by the end of the lessons by setting a clear objective through the teaching task. Moreover, she feels the LDC approach allows her to streamline several topics into one overarching unit.

"When I created a task about cancer, I was able to incorporate aging, genetic mutation, inheritability, mitosis, and cell health in one unit." By combining these concepts into an LDC task, students made connections among the different standards. "I get more bang for my buck because students are seeing how different pieces relate," said Elliot.

To engage students in the unit on cancer and cells, Elliot began by asking students about their personal experiences: Did they know anyone with cancer? What caused it? How did they contract it?

"We talked about the most common ways people die. What are the trends for elderly and teens? We watched a video of a woman being diagnosed with cancer and a video lecture about a person's personal battle." Once students saw why understanding the biology behind cancer is important, she introduced the concepts of mitosis and mutations, key elements of her biology standards and module.

LDC has helped Elliot reevaluate the impact of her instructional design on student outcomes. "I used to put slides on a PowerPoint, talk, talk, talk, and make them write everything down," she said. "But they weren't listening to me. When I stopped and asked what is important about this slide, they just read what was on the screen word for word. The next day, they couldn't answer review questions."

Because so many of Elliot's students struggle with reading, she has developed a large repertoire of strategies to scaffold complex texts. "There has not been one particular strategy that has helped all students," she said. "I have to employ everything available to me or my struggling readers will not even attempt to read or write. The biggest challenge is convincing them they can do it, even this late in their academic careers. Some have been scoring at level one on the FCAT (Florida Comprehensive Assessment Test) reading since elementary school."

The type of strategies she uses is illustrated in how she teaches students to set a purpose for their reading, a fundamental literacy skill. She explained, "I give them guiding questions and I color-code each question. As they read the text, they underline the answer to the question with the corresponding color." When students go to write their final products, the information they need is highly organized by key ideas, said Elliot. "It helps those students intimidated by longer passages by giving them a clear focus and purpose for their reading."

Principal **Frank Murphy** said the impact of LDC can be seen across grade levels and content areas. Even with a handful of teachers using these tools, he believes that this focus on content literacy had an impact on his school's measurable gains on a variety of assessments.

Murphy said Elliot's gains with low-performing students and the schoolwide approach to literacy (along with quality instruction from the other biology teachers) led to a 13 point gain in their biology passing rate.

Furthermore, Escambia County uses the Postsecondary Education Readiness Test (P.E.R.T.), developed by the state of Florida, to meet the state requirement to take a postsecondary readiness assessment. The students at Pine Forest High School had an increase of 53 percent to 67 percent on the Postsecondary Readiness Reading Exam.

"Teachers have increased their expectations and the level of rigor that is taught in their classes," said Murphy. "Engagement is much improved and the expectation for quality work is evident." He felt LDC has "clearly changed the learning culture of our school and the way our teachers deliver instruction. Students who are in classes that use LDC are excited about learning and long for that type of instruction on days that teachers do not use it."

Percentages of Students Meeting or Exceeding Standards on Florida's Biology End-of-Course Assessment

	2011-2012	2012-2013
Pine Forest High School	48%	61%
State of Florida	59	59

Source: Florida Comprehensive Assessment Test (FCAT), 2012-2013 school year

Sustaining LDC through a Comprehensive Writing Policy

Letcher County Central High School — Whitesburg, Kentucky

When his son started college, the disconnect between high school and college hit home for **Stephen Boggs**, the principal of Letcher County Central High School (LCCHS) in Whitesburg, Kentucky. "My son was at the top of his class and had a good writing portfolio," said Boggs. "However, when he took writing 101 in college, he struggled." This experience reinforced his view that "what happens in school and college is not aligned." Thus, as the instructional leader of LCCHS, he asked a team of teachers and leaders to create a schoolwide writing policy to address this gap.

The policy built on the success they experienced using the Literacy Design Collaborative (LDC) in partnership with Southern Regional Education Board (SREB).

After beginning work with SREB in 2012, LCCHS:

- increased its overall accountability score from 47 to 60 in 2013, surpassing its Annual Measurable Objective by 12 points;
- moved from a 15 percentile ranking to a 76 percentile ranking on the Kentucky School Report Card; and
- was reclassified from "Needs Improvement" in 2011-2012 to "Proficient/Progressing" in 2012-2013.

The writing policy has five sections describing what will be expected of students, teachers and leaders.

Part 1: The LDC Team

Boggs said, "LDC became the primary tool for teaching writing because we created this plan based on what is working in our school." Letcher High had spent the previous two years building capacity with LDC through SREB workshops, small group professional learning community meetings and after-school sessions. According to the policy, LDC strategies will be used in every class in the school, with the expectation that content teachers use at least two modules a year.

The first step was to create a team of LDC experts from each department. This team plans professional development, mentors teachers and juries modules. The teachers on the LDC team work with their departments as they plan and design modules. Boggs explained, teachers have common planning by department and discuss specific issues they see.

Part 2: Communication Skills

According to LCCHS's writing policy, writing and communication skills will be evident in every class across all grade and content areas. Also, the teachers will provide opportunities for students to use 21st-century technologies to support their learning and assist them in being creative members of a global society. To Boggs, this means employing digital tools to increase students' research skills and their ability to present information. When students share their products, they are expected to use graphs, data, and visuals to represent what they learned. For example, one science teacher has students creating electronic lab reports they must report out to their peers.

Part 3: Feedback

The LCCHS writing policy prioritizes students receiving regular, descriptive feedback through conferencing with teachers and peers, clear rubrics and commentary. Moreover, students are expected to self-assess and provide feedback to their classmates. Boggs said he has made this a key part of how he monitors instruction.

> *The administration provides time for teachers and LDC leaders to jury modules and collaboratively score student work.*

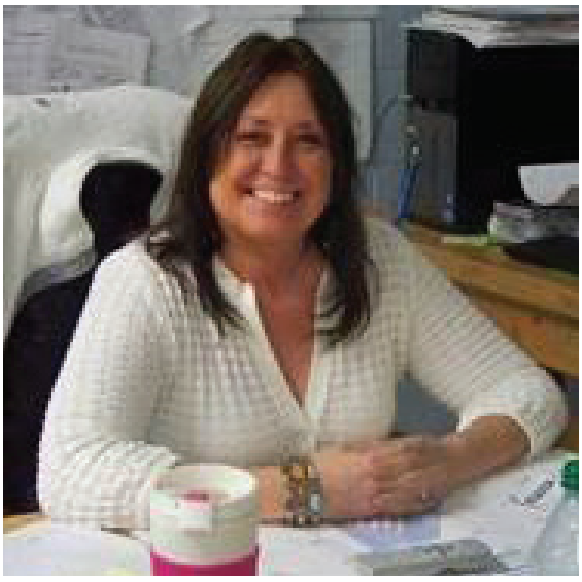
Part 4: Writing Folders

To monitor and celebrate progress over time, each student at Letcher has a writing folder to demonstrate progress. The writing policy states, "Folders' contents shall be aligned with the Kentucky Core Academic Standards and LDC, reflect student interests, and demonstrate growth over time. Folders will show the ability of students to communicate for a variety of purposes and audiences and in a variety of formats (writing pieces, podcasts, blogs, Web pages, videos, etc.)." Over a student's four years at LCCHS, these folders will reflect each student's growth as a writer.

Part 5: Implementation of Writing Program

The final section of the writing policy identifies how leadership, including administration and the site-based decision-making council (SBDM) will support the LDC team and make modifications to the policy when needed. It explains that the leadership team, LDC team and SBDM council will review the literacy program each May to ensure alignment to state curriculum documents and to maintain fidelity to the LDC process. The administration will also provide time for teachers and LDC leaders to jury modules and collaboratively score student work.

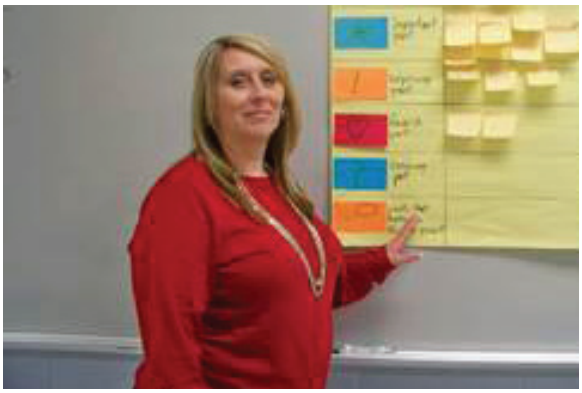
Perspectives of Two Teachers



Sandra Bolling, English teacher, Letcher County Central High School

Stephanie Sexton, a social studies teacher, attests to the impact a systemic and collaborative approach to literacy can have on teaching and learning:

"As a social studies teacher, the idea of teaching my students to write was terrifying. However with the LDC trainings and the team that I was paired with, I became more confident. The most helpful part of this process has been two of my team members, **Rebecca Potter** and **Sandra Bolling**. As English teachers, they have a wealth of resources to share with me. If I have a question, need a strategy, or just some encouragement, they are always there."



Rebecca Potter, English teacher, Letcher County Central High School

Sandra Bolling teaches high school freshmen and sophomores at LCCHS and dual credit classes at the local community college. She said the LDC skills apply to both settings.

"I use LDC in my college class where several students come from high school not prepared," said Bolling. "I create learning centers to teach them the important writing skills."

"Ultimately our writing program is better preparing students to transition to college and careers," said Boggs. "After two years with LDC, I have seen more and more of our students conduct research, write and revise drafts, use appropriate citations and develop skills needed for success after high school." Furthermore Boggs said he has seen more teachers move from compliant to effective and all teachers are focused on communication skills within their discipline; even math teachers are developing these skills, said Boggs.

Whitehall City Schools: Buying into LDC

Rosemore Middle School and Whitehall-Yearling High School — Whitehall, Ohio

During the 2012-2013 school year, Rosemore Middle School and Whitehall-Yearling High School embarked on a schoolwide, four-day professional development initiative. As teachers began developing Literacy Design Collaborative (LDC) modules, they decided more training and support was needed. The district created an LDC train-the-trainer team of 12 that would begin work the fall of the 2013-2014 school year and conclude prior to the end of the first semester.

"I thought it was another training that we would pick up and drop after a year or two, but boy was I wrong," said English teacher **Amie Marker** of Rosemore Middle School. LDC has helped her see college-and career-readiness standards, the writing process and her approach to teaching in a new light. "I have realized that just because I think assignments are too hard for my students, does not mean I should not challenge them. I've learned how to work through the process, going one step at time."

Whitehall-Yearling High School English teacher **Judy Sies** said LDC helped build a common vocabulary among teachers. "We are able to collaborate using the same terminology, staying on the same page and using the LDC scoring guide to determine what our next planning steps should be.

LDC has also helped Sies plan more purposefully. "Deconstructing step by step how to get my students from point "A" to point "Z" has been an enriching experience. As I worked on understanding and planning my instructional ladder, I was able to see the gaps in previous lessons." She said LDC has provided tools to fill those gaps, including strategies, formative assessments and richer collaboration among teachers.

Like many content teachers, **Dan Ensign**, who teaches Chemistry at Whitehall-Yearling High School, feared LDC would force him to cover less material. His first LDC task was about atomic orbitals, emission spectra, and electromagnetic radiation — a topic with easy calculations but difficult concepts. "Past students have seen little connection between the content and real life," he said. In the end, he was more than satisfied with the results of this unit. "The LDC module helped me present content while allowing students to read and write scientific articles, helping them create a conceptual understanding of how these three topics relate," said Ensign.

> *"Allowing students to be active learners instead of passively receiving the information helped them own the material."*

Stormy Gibson, a science teacher at Rosemore Middle School, was also concerned about sacrificing content for reading and writing. Nevertheless, he created a module that taught the content solely through informational texts. "I was extremely nervous to let go and let the teaching task guide my planning," said Gibson. "**However, I was pleasantly surprised with my students' achievement on a summative assessment at the end of the unit. Only 10 out of 140 scored below 73 percent.**"

Most importantly, Gibson said that the module helped students take an active role in their learning. "Allowing students to be active learners instead of passively receiving the information helped them own the material. It gave them the chance to struggle, read and build new vocabulary. I could have helped struggling students by just giving them the answer, but I saw my students learned more by struggling."

Several teachers credit the SREB training for their ability to turn theory into practice. Whitehall-Yearling English teacher **Nicole Nelson** said the SREB coach consistently encouraged her and her colleagues by pressing them onward toward their goal.

One School's Journey in Implementing LDC

Jackson County Middle School — McKee, Kentucky

Located in the foothills of Appalachia, Jackson County Middle School (JCMS) is a typical public middle grades school for its Kentucky region. With a student population of approximately 500, it serves a homogeneous student body. More than 75 percent of its students qualify for free or reduced-price lunches.

In the fall of 2011, JCMS partnered with the Kentucky Department of Education and the Southern Regional Education Board (SREB) to begin use of the Literacy Design Collaborative (LDC) framework to effectively incorporate literacy across its curricula, which includes English/language arts, social studies, mathematics, practical living, science and humanities. SREB provided logistical and curriculum support to teachers. In addition, teacher-leaders were selected to attend periodic regional sessions to facilitate the LDC journey.

Throughout the process, JCMS teachers used formative and summative assessments to record the impact LDC had on individual students and overall classroom impact. Assessment data would be used to inform teachers about the success of LDC for their students.

During LDCs implementation at JCMS, Kentucky has undergone an overhaul of its annual state assessment. From the period of its initial implementation in 2011 until now, Kentucky has moved from the Commonwealth Accountability Testing System (CATS) to the Kentucky Performance Rating for Educational Progress (K-PREP) for annual statewide assessment.

Data gathered from CATS and K-PREP show students performed at higher levels over the course of LDC implementation.

Science, which embedded LDC tasks into its curriculum, demonstrated a 3 percent gain over the course of two years. Additionally, reading, which embedded LDC strategies, demonstrated a 10 percent gain over the same period.

Below are step-by-step actions taken in implementing LDC at JCMS.

Methodology of Implementation

After the initial LDC meeting, the faculty of JCMS began the preliminary process of incorporating LDC into various academic areas. The primary focus was to encourage and broker buy-in for the staff. It was paramount that LDC be used as a proactive tool for instruction. Further, teachers could use LDC as a complementary strategic tool with their current methods of instruction, which would encourage growth within their content area.

The introduction of new material can be perceived as stressful by many teachers, considering it may be an extension of their duties, rather than a tool to bridge the gap between what students know and what teachers need their students to know. To facilitate buy-in from the staff, the LDC template implementation was phased-in through a series of steps to accommodate teacher learning, practice, and incorporating supplemental skills.

Initial Phase

Teachers were asked to think about a single lesson in which they were comfortable and confident about teaching to their students. Teachers were asked to think about the strengths of the lesson and its implications on students' achievement.

Literacy Design Collaborative (LDC): Jackson County Middle School Proficiency Performance Commonwealth Accountability Testing System (CATS) and Kentucky Performance Rating for Educational Progress (K-PREP)

ACADEMIC AREA	2011-2012	2012-2013
Science	40%	43%
Reading	31	41

Second, they were asked to think about ways it could be more effective, especially from the vantage point of incorporating writing into the assignment. Many of the lessons were content-specific, which allowed the inference that the lessons were not geared toward literacy.

Teachers were asked to think about their personal lessons, and then reflect on ways to use LDC as a tool to incorporate literacy skills into their lessons. Teachers began to think about the type of LDC templates (argumentative, informational/explanatory, or narrative) that best supported their lessons.

Next, teachers were asked to think about the skills necessary to successfully incorporate the LDC template into the lesson. This exercise was lessened by the use of Module Creator, which provided teachers with a road map of suggestions and succinct and applicable materials for the implementation of the task. Teachers would begin the process by thinking about the broad skills necessary to succeed at the skill, which facilitated higher-level processes of writing being applied to the task.

Secondary Phase

As teachers became more comfortable with incorporating LDC into a lesson of their choosing, steps were taken to fully implement LDC in the classroom setting. Teachers were asked to research articles and other materials useful in providing additional insight for students into the task. Ultimately it was important for students to think about supplemental resources as part of the writing process.

Through the use of Module Creator, teachers utilized the instruction portion of the program, as a resource for discovering appropriate materials for the task. Teachers were able to research articles and other materials for their task, based on the individual needs of their classes and students. As a result, this portion of Module Creator allowed for a smooth transition from reading to writing.

Classroom Implementation

At this point, teachers had the knowledge, skills and materials ready to implement an LDC task into their instruction. For many teachers, the lesson they had previously chosen, went from a one, two or three-day lesson to a week, or in some instances, it became a unit of study. Students were being asked to transform broad skill sets into more refined skill sets as they worked through the task. Teachers used each step of the task as an individual lesson within their content area, which also incorporated a component of literacy. Throughout the process, teachers used a series of informal and formal formative assessments to gauge students' performance and growth.

Future Implementation

The data show LDC has promise for the academic success of JCMS. The initial thought is that through the use of proven resources such as LDC and Module Creator, teachers at JCMS will continue to use and expand upon their use of LDC resources, for the creation of tasks that challenge students to become more invested in literacy. It is important to all academic areas that literacy becomes a natural part of instruction. Through a transition from intentional implementation of literacy skills to natural implementation, teachers will begin to delve more deeply into educational concepts and create rigorous instruction.

Vignettes: Mathematics Design Collaborative

"Teachers are talking less and the students are learning more."

High school principal

"Rather than teacher-led lectures and demonstrations, I focus more on student-based discovery."

Middle school math teacher

"When I saw the test scores, I saw the difference productive struggle, probing questions and homogenous grouping made on learning."

High school math teacher

"My lower-performing students were willing to try more."

High school math teacher

"Our classrooms have moved from traditional math instruction to a collaborative environment where students are completely engaged in learning."

High school principal

Arkansas

Oden High School — Oden, Arkansas

Sheridan High School — Sheridan, Arkansas

Umpire High School — Umpire Arkansas

Florida

Pine Forest High School — Pensacola, Florida

Georgia

Paulding County High School — Dallas, Georgia

Mississippi

Hinds County District Schools — Hinds County, Mississippi

Missouri

Eldon High School — Eldon, Missouri

New Mexico

Chaparral High School — Chaparral, New Mexico

Santa Fe High School — Santa Fe, New Mexico

North Carolina

Hoke County School District — North Carolina

Tennessee

Cannon County High School — Woodbury, Tennessee

Gra-Mar Middle School — Nashville, Tennessee

Mt. Pleasant High School — Mt. Pleasant, Tennessee

West Virginia

West Virginia Regional Educational Service Agency

Putting Down the Pencil: An Arkansas Teacher Advances Her Students' Math Achievement Through MDC

Oden High School — Oden, Arkansas

In **Linda Barnes**' classroom, students are clumped together in small groups, hunched over a math problem, discussing various ways to solve it. Suddenly a student's head pops up: "Oh yeah!" he calls out, indicating he has a solution. Without prompting from Barnes, the rest of the class huddles around the young man's desk and listens as he explains his reasoning. They are not listening for the answer; they want the process that got him there.

100 percent of Linda Barnes' students met state standards last year in Algebra I and eighth-grade math, and she credits MDC.

Moments like these were major reasons 100 percent of Barnes' students met state standards last year in Algebra I and eighth-grade math, and she credits the Mathematics Design Collaborative (MDC) and SREB with giving her the tools, training and in-school support to make it happen.

With her 25 years of teaching, Barnes was highly motivated to implement MDC after the initial training in the fall of 2012. "I was sold immediately," she said. "I could see how much this would impact my students' achievement." Nevertheless, she felt trepidation when preparing to teach her first formative assessment lesson (FAL). "It was hard to get it right the first time," she said. "If you don't do what is in the lesson as it is presented, the kids won't get what they need out of it."

When solving problems, she allowed students to persevere through productive struggle. At first it was hard and did not come naturally to Barnes. Like all teachers, she thrives on watching her students succeed, so it was difficult to ask probing questions and then refuse to provide the answer. "When they can't answer a question, they turn to me with that 'what do I do now' look. I used to give them an answer at that point; now, I have learned to ask more questions and let them figure it out together."

Because she was used to helping them solve the problem on their paper, Barnes stopped carrying a pencil while rotating through the classroom. "By not carrying a pencil, it was impossible for me to show them how to do it when they got stuck; it forced me to let them keep struggling through."

Through the year, as students became comfortable with the process, they were able to take increased control of their own learning, said Barnes. "For the unit on quadratics, I used an FAL at the beginning and end of the unit. On the second FAL, they took it to a place I had never seen before in my career. They explored what happens when you change the vertex of a quadratic and if it changes the X intercept. They grabbed the smart board pen and went to town, with everyone involved. It went to a place every teacher wishes their class would go." Barnes is convinced that this type of collaborative, investigative approach to learning has deepened her students understanding of mathematical concepts.

Williams Edwards, the principal of Oden High School, is impressed with how MDC has changed the way students talk and think about math. "Students speak with each other about the best way to solve problems. These students' conversations have changed the way they approach word problems."

"The year before I used MDC, 75 percent of my eighth-graders passed the state benchmark exam. After using MDC, 100 percent of them passed," Barnes said proudly.

Striking Gold With MDC

Pine Forest High School —Pensacola, Florida

The districtwide Algebra 1A benchmark exam once functioned as a reminder of how far behind students were in Susan Rigby's intensive math class. Students at Pine Forest High School in Pensacola, Florida in Escambia County were assigned intensive math because they previously scored a Level One, the lowest level possible. However, in the 2012-2013 school year, something changed. The average Algebra 1A benchmark score across the district was 60; the average in Rigby's class was 65. How did students in an intensive math class, 45 percent of whom have Individual Education Plans (IEPs), score five points higher than the district average?

They did it through the same process that increased the percentage of ninth-graders passing the geometry end-of-course exam and the percentage of 10th-graders passing the Algebra I exam. That process was Mathematics Design Collaborative (MDC) with embedded training from the Southern Regional Education Board (SREB).

Percentages of Pine Forest Ninth-Graders Scoring Proficient or Above on Florida's Geometry End-of-Course Exam (EOC)

2011-2012 (BEFORE MDC)	**2012-2013** (AFTER MDC)
82%	88%

Percentages of Pine Forest 10th-Graders Scoring Proficient or Above on Geometry EOC

2011-2012 (BEFORE MDC)	**2012-2013** (AFTER MDC)
68%	70%

Percentages of Pine Forest 10th-Graders Scoring Above Proficient on Geometry EOC

2011-2012 (BEFORE MDC)	**2012-2013** (AFTER MDC)
18%	31%

Average Score on Escambia County School District's Algebra 1A Benchmark Exam

SUSAN RIGBY'S INTENSIVE MATH STUDENTS (AFTER MDC)	ALL ESCAMBIA COUNTY STUDENTS
65	60

"My first FAL (formative assessment lesson) was a disaster." Rigby admitted it was hard because it was different from how she managed her class for 13 years. "I had a lot of control in my classroom: straight rows, direct instruction, everybody does the same work." Since FALs require students to struggle through problems collaboratively, she envisioned her class devolving into chaos. "All I could think about was the number of behavior problems this structure would cause," she said. Like many teachers, she feared giving control of the learning to students; once she did, her classroom was never the same.

The first sign of change was her students' attitudes. When a child spends 13 years feeling "bad at math" they become defeated, she said. "They tell you right off the bat, 'I hate math' and 'I'm bad at math.'" "Watching this mindset change over time is worth more to her than any exam score. The same students who used to come to class and sleep or never bring pencil and paper began stopping me in the hallway, asking 'what are we doing today? Are we going to use the white boards?'" Rigby noticed after several FALs students became excited about math. "They were talking to each other, defending their ideas, being active; this changed their attitude toward everything we did." These "intangibles" as Rigby called them, led directly to improved student achievement.

"Teachers are talking less and the students are learning more."

Pine Forest's Principal, **Frank Murphy** said over the course of the year he saw the level of engagement improve "every day from all of our students, but especially our level one students who typically struggle in school because of lack of

skills and confidence." Murphy said students want classes where they are working with each other and using productive struggle to enhance learning. "Teachers are talking less and the students are learning more," he said. While this shift was a challenge for teachers and students, the results made the transitions easier. Before using MDC, Rigby struggled to get students to write anything on their pretests, and posttests. Then, after several formative assessment lessons, the quality of the posttests changed. "Students began giving vocabulary-rich explanations for their answers," Rigby said. "They could write, 'I used the distributive property to multiply two times x and two times three, then I combined like terms.' They went from elementary-level statements to accurately explaining their work." Eventually, they were arguing over how to solve problems, using the language of the standards.

Rigby credits her success to the intensive training and job-embedded coaching provided by SREB. Throughout the year, an SREB consultant came to her class to observe, provide feedback, and model a variety of practices for her. "**I would have quit trying if I hadn't had somebody supporting me in my classroom," she said. "I've been to workshops where the ideas are great but there is no follow up, nobody to help you afterwards. Having the ongoing support made all the difference**."

"They [students] were talking to each other, defending their ideas, being active; this changed their attitude toward everything we did."

To maintain momentum and build capacity, Murphy developed an MDC and Literacy Design Collaborative (LDC) leadership team on which Rigby serves. This team plans training for new teachers and helps them overcome challenges. Also, Murphy and his two assistant principals attended the training sessions. He said, "This ensures everyone knows the importance of the work and the expectations for full implementation." Furthermore, both assistant principals are assigned an LDC or MDC team, "allowing there to be constant support and collaboration between teachers and administrators at all times," said Murphy.

Teaching Through Discovery

Hinds County District Schools — Hinds County, Mississippi

Before Mathematics Design Collaborative (MDC) implementation began in fall 2011, 65 percent of Hinds County Middle School students scored at Proficient or higher on the Mississippi state assessment, and 63 percent scored Proficient in Algebra I. By 2013, after two years of implementation, almost 70 percent of the middle grades students were demonstrating proficiency and 72 percent of the Algebra I students were Proficient.

After one year of implementing MDC, the Hinds County School District met the *No Child Left Behind* annual measurable objective in math for the first time. Then, in 2013, for the second year in a row, math was the only subject to show measureable growth.

Hinds County Middle School Passing Scores: Mississippi Curriculum Test, Second Edition

	2010-2011	2011-2012 (YEAR 1 OF MDC)	2012-2013 (YEAR 2 OF MDC)
Grade 6	58%	59%	62%
Grade 7	68	66	72
Grade 8	61	69	73
Algebra I	63	70	72

Toni Canizaro, math teacher, Carver Middle School

Toni Canizaro has been instrumental in helping Hinds County meet these goals. As a teacher, department chair and school leader at the Carver Middle School, she has embraced MDC, making it essential to her instructional approach. In 2011-2012, 89 percent of Canizaro's Algebra I students demonstrated proficiency, compared to 70 percent of all Hinds County students taking this course. Then, in 2012-2013, 99 percent of Canizaro's Algebra I students demonstrated proficiency. Countywide, 72 percent achieved this level.

To attain these results, Canizaro's students work collaboratively, discussing mathematics as they explore complicated concepts. She asks thoughtful, probing questions that challenge students to make sense of the reasoning behind the solutions. She credits MDC with taking her instruction to a higher and more effective level.

"My instructional delivery is quite different now that I embrace the MDC strategies" she said. "Rather than teacher-led lectures and demonstrations, I focus more on student-based discovery. Since implementing MDC, my students are now taking much more responsibility for their own learning. I am now asking questions and engaging my students in productive struggle instead of telling them how to do it."

In Canizaro's classroom, challenging, unmotivated students are suddenly interested in solving problems and understanding mathematics. She creates a classroom environment where students feel free to make mistakes and learn together from the mistakes made.

Wall-to-Wall Training

Hinds County began working with SREB in September of 2011. Coaches visited all of the middle grades and high schools and developed a plan for support. All math teachers and administrators were then introduced to MDC and the focus for change was explored. The teachers attended three days of training and four days of embedded coaching that included modeling, observations and feedback.

In the 2012-2013 school year, new teachers received "catch up" training. All math teachers participated in four- and-a-half days of training. Lead teachers received an additional four-and-a-half days. Each school had five days of on-site coaching.

Eventually, MDC became part of how math is taught in Hinds County.

Directing Student Learning through MDC

Mt. Pleasant High School — Mt. Pleasant, Tennessee

After a six-year career in civil engineering, **Angela Hoath** came to Mt. Pleasant High School (MPHS) to teach math. She embraced the Mathematics Design Collaborative (MDC) lessons with the support of her inclusion partner **Kami Hoover** and several other colleagues. According to Hoath, the formative assessment lessons (FALs) motivated students, encouraging them to become resources for each other and take ownership of their own learning.

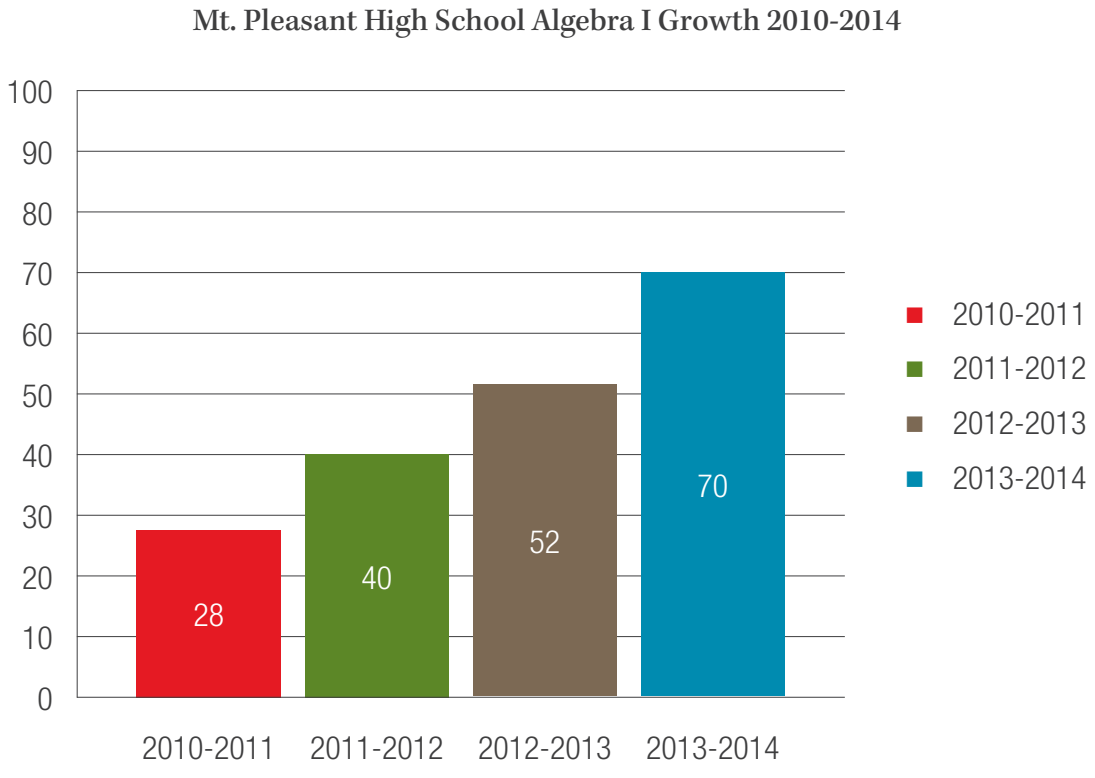
As a result, students at Mt. Pleasant High School saw significant gains in Algebra I and Algebra II on end-of-course exams since it began using the MDC framework in 2011.

MDC increased student motivation by building their confidence, according to Hoath. "My students look forward to participating in the FALs, and they feel successful when they do them," she explained. "I will never forget last school year because a student told me she loved the FALs because they made her feel smart. This student was not typically an A or even a B student, but she felt accomplished while working on these lessons."

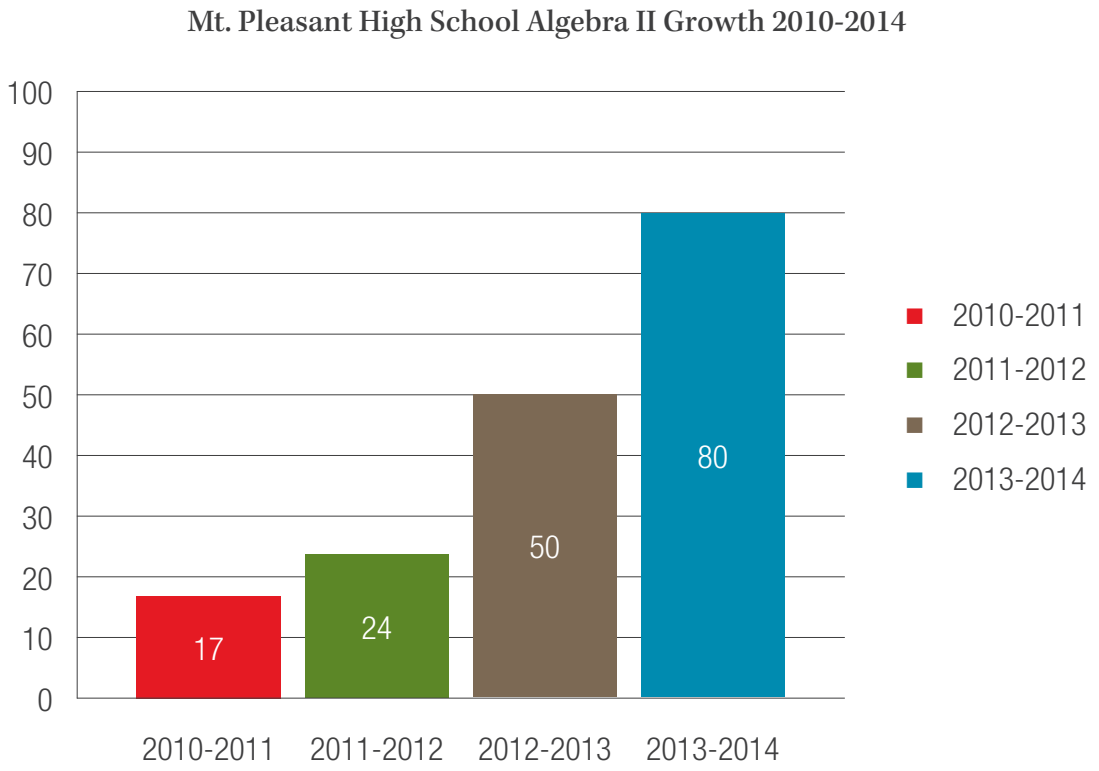
Teachers often site the time required to prepare an FAL lesson as one of the major challenges. While citing time as a challenge, Hoath asserted, "In order to ensure the students get the most from the lessons you must first experience the lesson yourself. The time spent is definitely worth the effort."

During the 2013-2014 school year, Hoath and other math teachers at MPHS joined their feeder middle grades school teachers for vertical teaming. In three different rounds of collaboration, four middle grades school teachers observed two or more high school lessons. Then, the high school teachers observed the middle grades school teachers over three more rounds of collaboration. Next, the high school teachers partnered with a middle grades teachers to develop standards-based units for the second semester.

End-of-Course Exam: Percentages of Algebra I Students Scoring Proficient and Advanced



End-of-Course Exam: Percentages of Algebra II Students Scoring Proficient and Advanced



Mt. Pleasant High School Math Department
Front row: Stacy Brashier, Kim Livengood
Back row: Kelly Southall, Angela Hoath, Lana George and Krista Englett

The principal supports Hoath and her team in making MDC work. "The principal at my school makes his presence known fairly often," said Hoath. "He has shown up in my classroom several times this year. He wants the students to know that he is interested in what is going on the classrooms and that he supports the teachers in their endeavors. He is very supportive of the math teachers and is willing to exhaust any resources possible to help us."

Recently Hoath became a leader in district curriculum development for Algebra I. Her colleagues, Kelly Southall, Kim Livengood, Lana George and Krista Englett were also promoting MDC practices in the Algebra II and geometry curriculum teams.

The Fun Stuff: Building Capacity Through MDC

Cannon County High School — Woodbury, Tennessee

"My students have become thinkers," said **Lisa Choate**, a 16-year math teacher at Cannon County High School (CCHS) in Woodbury, Tennessee. She believes her students "have become more responsible for their own learning" because of the instruction from the Mathematics Design Collaborative (MDC). While not easy, Choate's students eventually enjoyed the formative assessment lessons (FALs), calling them "the fun stuff." The math department at CCHS has incorporated FALs in its curriculum since spring 2012.

Left to right: Norma Lewis, Erika Motlow, Kamille Smith, Maxine Dawson, Rhonda Sims and Lisa Choate, Cannon County High School

Because of the work of Choate and others, CCHS has seen the overall performance of students on the Algebra I and Algebra II end-of-course (EOC) exam improve significantly.

To achieve these gains, Choate and four other math teachers extensively studied and selected MDC lessons for all courses as they ramped up the rigor and expectations for students. Additionally, a special focus was placed on using the lessons in Algebra I lab classes (where lower achieving ninth-graders get additional support). Pre/post exam results were used strategically to determine next steps, both during regular instruction and in schoolwide daily interventions.

Collaboration is central to how CCHS does business. One teacher leads the way in trying out a lesson in an honors class; three others work together in their geometry lessons; and the special education teacher enacts lessons in a resource setting and in inclusion classes. The department chair supports all collaboration, participating in observations and debriefings, and enacting some of the lessons in pre-calculus.

CCHS Growth in Algebra I Proficiency on the EOC Exam

ALGEBRA I EOC	BELOW BASIC	BASIC	PROFICIENT	ADVANCED	OVERALL PROFICIENCY
2010-2011	31%	32%	20%	17%	37%
2011-2012	22	34	21	23	44
2012-2013	20	29	33	18	51
2013-2014	20	35	26	19	45

CCHS Growth in Algebra II Proficiency on the EOC Exam

ALGEBRA II EOC	BELOW BASIC	BASIC	PROFICIENT	ADVANCED	OVERALL PROFICIENCY
2010-2011	48%	32%	14%	6%	20%
2011-2012	50	33	12	5	17
2012-2013	18	41	27	14	41
2013-2014	6	35	50	9	59

Students have become thinkers, more responsible for their own learning.

Recently, teachers have begun a vertical team process, observing and debriefing with their six feeder schools' mathematics teams. Choate said the MDC lessons are proving to be the quickest, easiest tool to convey expectations for college- and career-readiness standards to both high school and middle school teachers.

Having administrative support has been critical to their success, said Choate. "My administration is very much behind this project. They have supported our project with money for an SREB consultant as well as trips to the SREB summer conferences."

As a result of her work bringing the CCHS math team together, Choate was selected as a Tennessee Core Coach. She continues to apply her expanding expertise in her classroom as well as assisting other department members on MDC and college- and career-ready practices and curricula.

Students Change How They Perceive Math Through MDC

Chaparral High School — Chaparral, New Mexico

A gradual shift in students' perceptions of problem solving in their math classes began at Chaparral High School (CHS) in the 2012-2013 school year. Students began accepting there are multiple methods to solving problems and realized that justifying work is part of a proficient solution. "The classroom challenges are helpful for me because they present real-life situations and we get to work with different people all the time. I like working with different people because it helps me understand different ways to solve problems," said one student.

Chaparral High School has been exploring the Mathematics Design Collaborative (MDC) with coaching and training provided by the Southern Regional Education Board's High Schools That Work program.

Helen Duran, geometry teacher, Chaparral High School

"Students are learning to work together collaboratively (using each other as resources), learning to ask appropriate questions for each other and me, and learning to justify work and critique each other," said **Helen Duran**, a geometry teacher. Though teachers were hesitant at first, they experimented with the concept and found it had its advantages. Students in groups realize they each share responsibility toward learning. Groups share solutions with the class more often instead of teachers presenting examples.

Michelle Ballard, an administrator at Chaparral High School, has seen this shift in several MDC classrooms. "I have observed teachers willing to experiment more with groups and change groups often. Teachers have been challenging students with more rigorous problems and encouraging students to persevere in problem solving. There has been more collaboration between teachers, a willingness to plan together and discuss student performance."

Effectively using collaborative learning has been a key element of the schools' success. CHS raised the percentages of students passing the New Mexico Standards-Based Assessment in mathematics by 5 percent from 2012-2013.

Percentages of CHS Students Meeting or Exceeding the New Mexico Standards-Based Assessment in Mathematics

	2012	2013
Chaparral High School	36%	41%

Additionally, teachers have seen the benefits of allowing students to revise and resubmit work, demonstrating that there are always opportunities to go deeper. Moreover, the classroom environment makes it okay to be wrong because students learn how to constructively critique each other's work.

Duran gave an example of this work in action: "The class had recently learned how to graph sine and cosine functions. This lesson was used to challenge their thinking and to deepen their understanding of cosine functions. I gave them the pretest. I collected their work and analyzed it. I did not make marks on their paper, but scored them to the side and wrote down their scores. I gave one point for sketching the graph correctly and three points for writing the function correctly.

In the pre-assessment, one class averaged 0.81 points out of four possible points. After going through the matching cards activity and sharing student work with the class they took the post assessment. I scored the assessment again using the same grading scale and the class average was 2.45. This was a significant gain."

These students were able to view each other's work, see what was correct and incorrect, and learn from each other's and their own mistakes; thus, they are learning math and how to learn math simultaneously.

Breaking Down Walls with MDC

Sheridan High School — Sheridan, Arkansas

Morgan Wilson does not take 'I don't know' as an answer. While math can be overwhelming to high school students, she said the Mathematics Design Collaborative (MDC) has helped her "break down the walls of being wrong."

> *"Our classrooms have moved from traditional math instruction to a collaborative environment where students are completely engaged in the learning."*

She works at Sheridan High School, a small rural school in Sheridan, Arkansas, where 40 percent of students are identified as economically disadvantaged. Wilson said MDC has given her a new approach to reach all her students. After implementing MDC for a year, she saw a seven point increase in the percentage of students meeting the overall Proficient level on the end-of-course exam. Also, there was a 10 percent increase in students achieving at the Advanced level.

Sheridan High School Principal **Rodney Williams** believes MDC has had a profound effect on the mathematics teachers at Sheridan. "Our classrooms have moved from traditional math instruction to a collaborative environment where students are completely engaged in the learning. MDC has changed the way our teachers think about instruction."

One big shift Wilson has made is how she interacts with her students during instruction. For example, when they are off track on an answer or explanation, she does not cut them off to correct them. "**If I cut them off I do not give them the opportunity to learn it themselves.**

After teaching the formative assessment lessons (FALs), I saw that if I gave students the opportunities and tools to struggle through and keep going, they eventually made real progress," said Wilson.

To illustrate, Wilson described a lesson on angles. When students did not understand a concept and felt stuck, she asked, "What shapes do you see? What do you know about that shape?" When students came up with a response, they got frustrated because Wilson did not tell them if they were right or wrong. Instead she asked, "Can you verify that?" She explained, "Even if they get the answer right, they still need to verify and explain how they got to that answer." Students were able to work together to answer her questions. She said this approach "validates their thinking, giving them confidence they have the skills to work a problem."

Placing the responsibility back on students benefits both "high-flying" students and those that typically struggle. **Wilson said, "My lower-performing students were willing to try more ... This is evident in the pre- and post- assessments. These students used to leave their pre-assessments blank; they didn't try. Now, they might be wrong, but their paper is full of work, showing thoughtful effort of how to solve the problem**."

"Everything about my teaching practice has changed," concluded Wilson, "From MDC, I have learned the correct definition of rigor and how important formative assessment is on a daily basis."

Summary of Sheridan High School Geometry End-of-Course Scores

GEOMETRY	BELOW BASIC	BASIC	PROFICIENT	ADVANCED	OVERALL PROFICIENCY
2011-2012	2%	13%	50%	35%	85%
2012-2013	0	7	47	45	92

Igniting a Fire for Math With MDC

Umpire High School — Umpire, Arkansas

Carla Golden, a 28-year-veteran teacher and principal came out of retirement in 2012 to teach math again at Umpire High School in her home town of Umpire, Arkansas. She is sold on the Mathematics Design Collaborative (MDC) because of results on the 2012-2013 state assessments:

- In her pre-algebra class, 11 percent more students scored at Proficient or above than the year before. One student scored 116 points higher, while two others scored 40 and 48 points higher than the previous year.
- In her geometry class, 42 percent more students scored at Proficient and above. Their passing rate was 25 points higher than the state average and 32 points higher than other schools in the district.
- In her Algebra I class, a group containing many special education and English language learners, 3 percent more students scored Proficient or above on the state assessment than the previous year.

"When I saw the test scores, I saw the difference productive struggle, probing questions and homogenous grouping made on learning."

Golden has seen many fads come and go during her professional career, and she is wary of falling for the "next big thing," she said. When she attended MDC workshops at the start of the 2012-2013 school year, she was skeptical. Now, she maintains, as a result of these workshops and the follow-up support from the Southern Regional Education Board, her students have become more confident and proficient in math, problem solving, and critical thinking. In fact, she wonders how she ever taught effectively before MDC.

Initially she was not sure MDC was the right fit. She appreciated the rigor, but questioned if it was appropriate for struggling learners. Golden admitted, "I wasn't sure our students could handle this type of work." After completing her first formative assessment lesson (FAL), her opinion changed.

"When I saw the test scores, I saw the difference productive struggle, probing questions and homogenous grouping made on learning. They [students] grew more confident. Now they ask to do these lessons all the time," she said, "and they enjoy it."

Most surprising to Golden, the lowest performing students demonstrated the greatest growth on classroom and state assessments. She attributed this to how MDC changed her students' self-perception. The FALs, she said, "gave these students a big jump in confidence. They could feel successful because MDC encourages them to find different routes to solutions. The more advanced kids would look at them and ask, 'How did you get that?' and they would explain their work to the class. For the first time, the low-performing students had pride and confidence in their math skills."

Golden also noticed a shift in her instructional delivery. Her questioning skills became more focused on helping students find answers themselves. "Previously, my questioning was about asking students for their answers. Now, using MDC, I've learned to ask questions such as, 'Can you think of a new way to do that?' or 'Why does that process work?' " She said learning to ask probing questions and not providing answers was difficult for her and the students, especially the high achievers. "Those students who are used to always getting the right answer became frustrated when I wouldn't say if they were right or wrong. Eventually, as students discovered solutions and solved problems independently and in groups, they came to understand the process is as important as the product.

"MDC is effective because FALs allow students to connect a variety of standards and concepts in the span of one lesson," said Golden. In one FAL, students learned about parallel and perpendicular lines. "The FAL incorporated about eight math standards rolled into one lesson," she said. At one point in the FAL, students were given a graph with lines, but no X and Y axis. Instead of struggling greatly, as Golden assumed they would, "they started picking up the concepts quicker than ever. They saw how different pieces they have learned fit together. They made the connections among different concepts they had already learned. **When teachers see the growth on test scores, they will be sold," she said**.

Currently in her second year out of retirement and using MDC, Golden is supporting her colleagues in using FALs.

"For the first time, the low-performing students had pride and confidence in their math skills."

"The sixth-grade teacher brought her students to my class and she observed while I taught. Then we taught one together to both of our classes. Eventually she taught it herself and I observed." This collaboration not only helped her colleague, but also refined Golden's skills.

MDC Changes Teaching and Learning in West Virginia

West Virginia Regional Educational Service Agency

Over several months, **Diane Munza** taught or collaborated on three different formative assessment lessons (FALs) in West Virginia schools based on her Mathematics Design Collaborative (MDC) training. After these lessons, each of the three classes saw average achievement levels increase dramatically from the pre- to post-assessments: Specifically, they went up 48 percent, 110 percent and 68 percent.

For 39 years Munza has used math to turn her students into logical thinkers and problem solvers. Now, as an MDC trainer with the West Virginia Regional Educational Service Agency (RESA), she helps teachers take their students beyond computational procedures. Instead, they are implementing deeper and more differentiated experiences through FALs. These detailed lessons encourage productive struggle, cooperative learning, and improved abilities to explain mathematic solutions. After teaching these lessons by herself and with others, Munza is convinced MDC can unlock the joy of math for all students.

> *"Too often, students learn math through regurgitating formulas and following step-by-step procedures. We teach that way and then ask students to solve a real-world problem on their own. We are setting them up for failure."*

The most beautiful and important part of learning math, according to Munza, is developing problem-solving skills. "Sadly, we have gotten away from making that central to math instruction. Too often, students learn math through regurgitating formulas and following step-by-step procedures. We teach that way and then ask students to solve a real-world problem on their own. We are setting them up for failure," said Munza.

"MDC is a bridge from this type of rote learning. It shows students how math is applied in the real world. **"It leads them by the hand in the right direction but allows them to figure out important concepts themselves."** MDC provides a structured support system without step-by-step guidance, Munza maintained.

The structure of the FALs is a key to effectiveness. In traditional classes, Munza said when students try to answer a question and are wrong, they will shut down and lose confidence in themselves. On the other hand, FALs allow students to complete easy steps early in the process, building confidence along the way. "It is like completing a puzzle," she said. "Once they have enough to get started, they want to finish it. Because they feel successful early, they develop confidence to keep trying." Eventually students are willing to persist through problems even if they don't immediately know the answer," said Munza.

With increased confidence comes increased student engagement. Before Munza's lesson, the teacher she collaborated with pointed out a student who rarely participates or hands in work. When the lesson ended, he stayed behind to finish writing his explanation of how he solved the problem. A typically apathetic student genuinely wanted to complete the assignment because he felt successful throughout the process, Munza affirmed. In fact, while students were working, she heard several say, "This is cool." Then as they were leaving some asked, "When can we do this again?"

The low pre-assessment score made the high energy and interest produced by the lesson even more impressive. After analyzing the pre-assessments, Munza felt the students didn't have the background knowledge to complete the tasks in the FAL. "I thought it was going to be a disaster," she said. An integral part of MDC requires teachers not to answer student questions, but to allow them to experience productive struggle, forcing them to collaborate with their homogenous groups.

Despite concerns about this approach, Munza stuck to the script and responded to student questions with her own probing questions. Instead of falling apart, the class earnestly worked their way through the problems. "Not only was everybody working and on task, they were talking and writing intelligently about the math. They were comfortable

writing out their explanations of how they solved the problems," said Munza. Seeing them all diligently working through problems, reminded Munza that figuring things out is what makes math fun, and at that moment every student had the opportunity to have that feeling.

"Not only was everybody working and on task, they were talking and writing about the math, intelligently."

To successfully implement a new approach, such as MDC, Munza said teachers need the type of follow-up and individualized coaching and several days of training provided by the Southern Regional Education Board. "If you don't have the training you might leave important parts out and decrease their effectiveness."

"Ha(a)cking" Into Student Learning With MDC

Santa Fe High School — Santa Fe, New Mexico

Jonathan Haack, math teacher, Santa Fe High School

"When it's good, it's good," said Jonathan Haack after a year of using the Mathematics Design Collaborative (MDC) at Santa Fe High School in New Mexico. The MDC strategies put in place last year (2012-2013) "had good teachers running it, and worked on good practices that can be used everywhere...The instructional practices MDC promotes (and not at the exclusion of other programs I may add) are good — bottom line," said Haack.

Haack saw evidence of MDC's effectiveness in both state data and classroom assessments. "Not only did our Standards-Based Assessment results go up," said Haack, "but the classroom post assessment I gave at the end of the year went up 10 percentage points as well."

Using MDC, Haack said he is able to create higher quality lesson and unit plans. "The *Ten Steps to Effective Units* document helped me break up the block period into distinct segments of learning, structuring those segments around a big idea, or common cluster heading that lasts two to four weeks."

For teachers, positive student feedback can be as rewarding as increased exam scores. When discussing an FAL, one student told Haack, "We should do work like this all the time." Another student seemed able to work at her own pace, and was able to factor the perfect square out of the trinomial and foresee what vertex form would look like when she reached Algebra II.

Santa Fe High School's administration has created an environment where quality initiatives can thrive, maintained Haack.

"The worst type of support is the culture of complaint. Thankfully, our administrators don't favor that philosophy," he said. "Administrative staff shares the vision that every teacher should be making every effort to develop high quality unit and lesson plans. Regardless of student level, school schedule, or other intangible factors, teachers should regularly plan and provide high quality instruction," concluded Haack.

Percentages of Santa Fe High School Students Meeting or Exceeding New Mexico Standards-Based Assessment in Math

SCHOOL	2009	2010	2011	2012	2013
Santa Fe High School	33%	33%	30%	29%	39%

New Mexico Standards-Based Assessment in Mathematics

Impressive Math Results One Year After Implementing MDC

Gra-Mar Middle School — Nashville, Tennessee

Gra-Mar Middle School in Nashville, Tennessee is part of the Metro Nashville School District and has over 500 students in grades five through eight. The Title I school serves a population comprising more than 80 percent minority students.

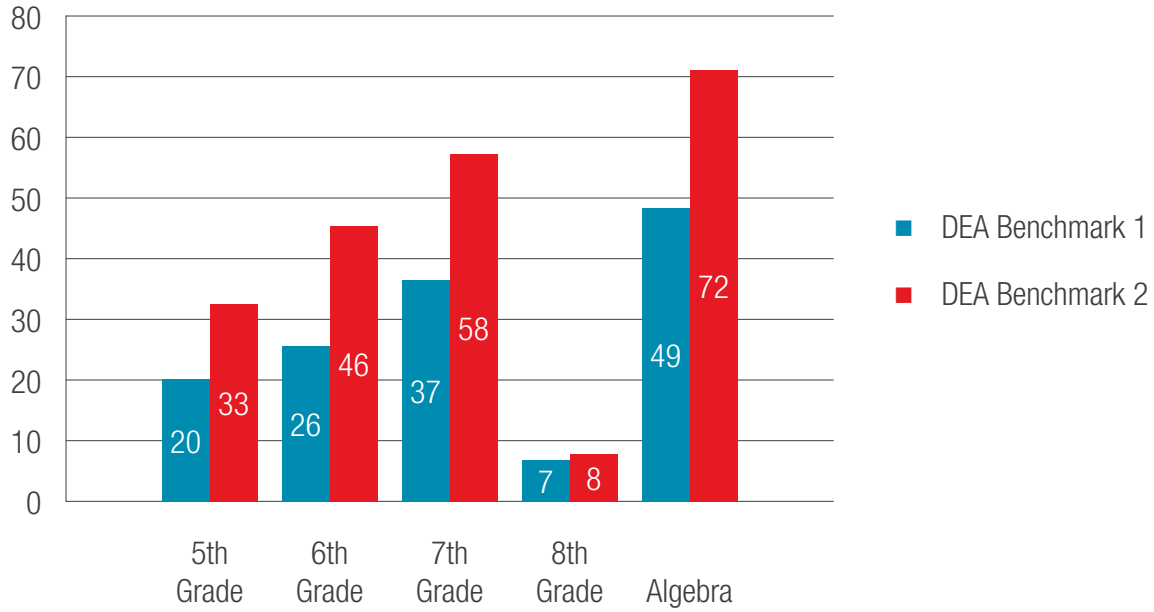
The teachers at Gra-Mar began using the Mathematics Design Collaborative (MDC) during the 2012-2013 school year focusing on student engagement and the Five Strategies of Assessment and Learning. In the 2013-2014 school year, the teachers implemented more short-cycle tasks and formative assessment lessons (FALs).

As a result of this work, students have seen growth on the state Discovery Education Assessment (DEA) benchmarks given throughout the school year. For example, fifth-grade math scores increased by 13 points from the first to second DEA benchmark given in 2013-2014. Algebra scores jumped 23 points over the same period.

Krishon Davis, a sixth-grade teacher, has implemented four FALs and several short-cycle tasks this year. She said she used MDC to "focus on analyzing students' work in order to create questions to advance their learning or further reveal gaps."

She was happy with the impact MDC had. She explained, "MDC challenged the students and gave them experience with the level of thinking needed for college-and career-readiness standards. It also was beneficial in providing students with visuals for the mathematics." To get to this point, Davis has changed her instruction in several ways. "I focus more on formative assessment mainly in the form of questioning and whiteboard practice," said Davis.

2013-2014 DEA Benchmark Results Gra-Mar Middle School



Math Scores Soar Using MDC

Paulding County High School — Dallas, Georgia

Using Mathematics Design Collaborative (MDC) strategies and formative assessment lessons (FALs), **Dean Petti** increased his students' passing percentages on the Mathematics II end-of-course exam from 14 percent in 2011-2012 to 59 percent in 2012-2013. The 2012-2013 passing rate was 8 percentage points higher than the average for his district and 5 percentage points higher than the state passing rate.

Paulding County High School in Dallas, Georgia has been involved in MDC since 2011-2012. Now, teachers like Petti are incorporating strategies from the FALs into their daily lessons. One of the biggest shifts in teaching Petti has made is regularly utilizing the Five Strategies of Assessment for Learning[2] to engage his students and improve learning.

Strategy One: Clarify and share learning intentions and criteria for success.

MDC has taught Petti to provide clear learning goals to let students know what quality looks like. To do this, he has made the pre-assessment a tool for instruction. "I analyze a standard and anticipate what misconceptions students may have. Then, I include those problems in a pre-assessment. This exposes them to what they need to know for success. I use the pre-assessment as an activating strategy where student responses drive instruction."

Strategy Two: Engineer effective discussions, questions and tasks that elicit evidence of learning.

Petti uses questioning techniques, asking students to think more deeply about math. He explained, "I have students write their processes and solutions to problems on cards and tape them under a corresponding problem in front of class." Students witness multiple ways to solve problems. Moreover he uses MDC strategies to make connections to previous concepts. For example, "I have students write their process and solutions to angle of elevation and depression problems involving special right triangles. They must compare the process of using trigonometric ratios to special right triangle side ratios. Then they choose the process that they feel is more comfortable for them. Finally I ask students what happens if we use the other acute angle of the right triangle situation. They must explain why the results would or would not change."

Strategy Three: Provide feedback that moves learners forward.

Petti's feedback is often in the form of questions. "My favorite moment during an activity is when one student's process or solution conflicts with another's," he said. In one instance, "one student marked a horizontal distance as the hypotenuse of a right triangle. I asked students to make arm motions of a horizontal distance and to compare their motion to the visual. I asked if the two make sense together." Petti said the questioning techniques he learned through MDC helped students to go beyond rote memorization; instead, they apply the content to real-life situations.

Strategy Four: Activate students as owners of their own learning.

"Students take more ownership of their learning when they see how it relates to their lives and experiences," said Petti. He connects classroom activities to the world in which his students live. "On a post-assessment, I encourage students to apply learned content to real-life situations and to apply hidden messages of graphic organizers."

Strategy Five: Activate students as instructional resources for one another.

One shift of the college and career-readiness math standards is learning to explain solutions. To support students with this shift, Petti focuses his class on how students talk about math. "When I feel a student understands a concept, I ask him or her to explain it to another student. Then I reference their responses and ideas to clarify the concepts for others. Sometimes, I may name an idea or concept after a student."

Whichever strategy Petti is using, he brings joy and enthusiasm to every lesson. "This is what I do, and I love it!" he said.

2 Williams, D. (2011). *Embedded Formative Assessment*. Bloomington, IN: Solution Tree House.

Getting All Stakeholders on Board with MDC

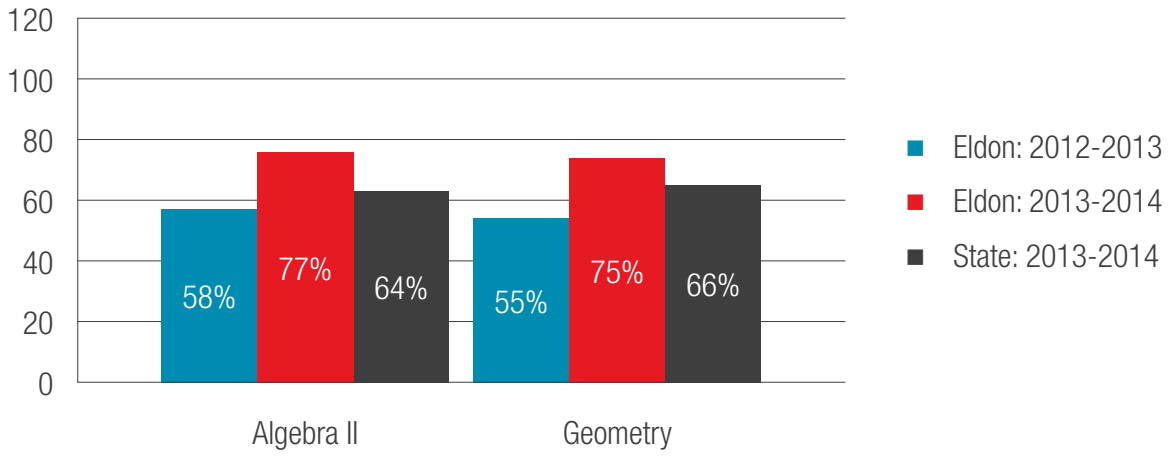
Eldon High School — Eldon, Missouri

Eldon High School is a rural school serving 600 students, about 70 percent of whom are on free or reduced-price lunch. Starting in August of 2013, teachers in the math department began training in the Mathematics Design Collaborative (MDC). By the end of the academic year, not only did students' achievement scores increase on end-of-course assessments, they also surpassed the state average by 13 points in Algebra II and nine points in geometry.

One key to successfully implementing MDC at Eldon was the active involvement of the school and district leadership. At the initial two-day training, the math team, Eldon's Principal **Kristina Harwood** and district Superintendent **Matt Davis** all attended. Together they learned about formative assessment lessons (FALs), the importance of allowing students to go through productive struggle and how to engage students with probing questions.

Harwood knew immediately this was the instructional framework her teachers needed to better develop college- and career-readiness skills. With her math background, she helped teachers prepare for their first FAL. Even in the early stages, Harwood noticed that teachers were asking students to become problem solvers, encouraging them to share their different solutions and approaches.

Percentage of Students Scoring at Proficient and Advanced on State Assessemnts



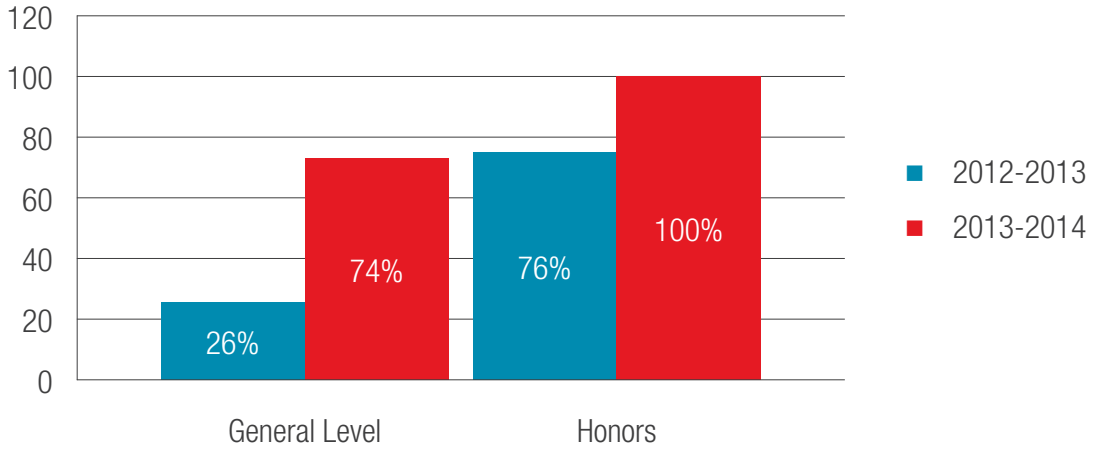
Eventually, teachers became confident with their FALs. Students were engaging in rich mathematical conversations and showing evidence of becoming resources for each other. Harwood has continued to observe and support her teachers throughout the process.

Later in the year she prepared a presentation to share with the school board summarizing MDC and showing the gains students were making. For example, on the end-of-unit assessments measuring students' mastery of surface area and volume, teachers compared end-of-unit exam results without MDC (2012-2013) and with MDC (2013-2014). They also compared the effect on honors and general-level students.

Harwood said, "As I go from room to room, it is obvious to me by observing students how the MDC instructional strategies have changed the climate, culture and rigor of the mathematics classrooms"

During the initial MDC training, Superintendent Davis participated in the collaborative activity portion of the Interpreting Algebraic Expressions FAL. Even though Davis is not a math person, he immediately recognized the utility of the whole class discussions to engage struggling learners and saw the value of questioning and how it impacts students having difficulty with certain concepts.

End-of-Unit Assessments at Eldon High School: Before MDC (2012-2013) and After MDC (2013-2014)



Harwood and Davis are not the only school leaders in Missouri impressed with MDC's impact on instruction and student learning. **Bob Simpson** is a state trainer for Missouri's new teacher evaluation system. After observing the implementation of an FAL at Eldon, he told Harwood he witnessed some of the highest level of math instruction he had seen. He plans to have Eldon teachers videotaped using MDC and FAL strategies, and use them as exemplars for other teachers seeking to help students master problem solving and critical thinking skills.

MDC Changes Students Attitudes About Math

Hoke County School District — North Carolina

Hoke County Schools began working with the Southern Regional Education Board to implement the Mathematics Design Collaborative (MDC) and formative assessment lessons (FALs) during the 2013 fall semester. The district saw the following results:

- A 9 percent increase in Algebra I proficiency on the North Carolina READY Assessment (end-of-course exam) compared to last year's first semester
- An 8 percent increase in the number of seventh-graders achieving proficiency on districtwide benchmarks
- A 5 percent increase in the number of eighth-graders achieving proficiency on districtwide benchmarks

Jennifer Courdway, a West Hoke Middle School math teacher, saw evidence of success in her classroom throughout the semester. "They (students) enjoyed becoming the experts and showing off their work. They saw and experienced math in a different way. It (MDC) has caused them to ask more questions, which created more experiences for learning," said Courdway.

Additionally, she found MDC provided students opportunities to become classroom leaders and 'experts.' "This built up my students' confidence in their mathematical capabilities and their enjoyment of math," said Courdway.

Sandy Grove Middle School Teacher **Jennifer House** saw an attitude change in her students. "They started to question my explanations by offering alternative views and answers and asking if they are still right," said House. Also, the challenge and added confidence led to increased motivation. "Once they realized they were going to have to think outside of the box, they enjoyed the challenge and worked together to solve the task. They used what they learned from these tasks to answer other problems and tried to reason with each other when working in pairs or groups."

Using guided discussion and hands-on activities, House's students had the opportunity to teach each other. The result: "They expanded their thinking. They didn't just look for one right answer but they looked for ways to explain their answer," said House. She credited MDC with giving her a process and set of tools to achieve these results. She said MDC gave her tasks that allowed students to come to their own learning conclusions and helped her move away from just giving notes, definitions, examples, etc.

For **Tiffany Mathison**, a West Hoke Middle School teacher, MDC changed her instruction and how students learn. "I no longer look for just the answer," she said, "but I look for them to tell me how they got the answer." Now, her students approach math differently. "My students are becoming critical thinkers and are no longer just accepting an answer at face value," said Mathison.

Michael Monk, math teacher, Hoke County High School Teacher

Hoke County High School Teacher **Michael Monk** said MDC helped bring him and his colleagues together around lesson planning and instruction. "The Math 3 teachers meet more. I speak with one of my co-workers for 40 to 60 minutes each morning, sharing ideas and making daily changes as needed. MDC has brought more teachers together in their development of lessons and delivery to the learners. As a whole, I believe there has been an increase in understanding of standard knowledge."

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