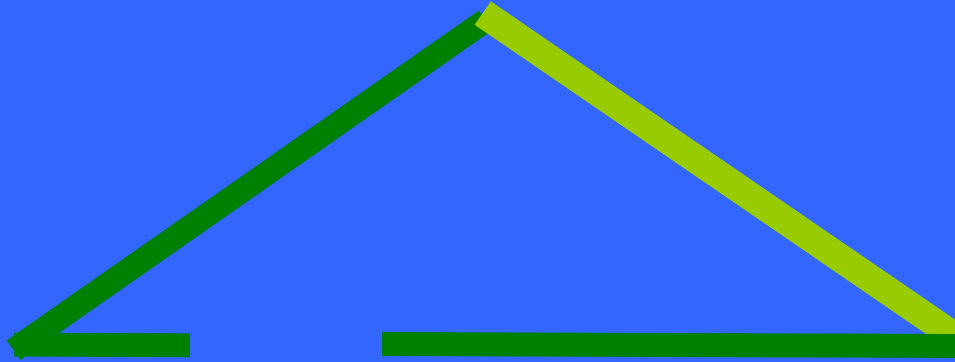


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Design Principles for Learner-Centered Schools:

*Scaffolding Instruction
to Improve Student Learning*

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I. Introduction

In this third volume of *Design Principles for Learner-Centered Schools*, we focus on research-based principles for scaffolding instruction to support student learning for meaning. Our work in this volume continues to be guided by the Design Principles for Learner Centered Schools and the Learner Centered School Model that we developed in our two previous volumes of Design Principles. We also draw from brain research and the work of David H. Rose and Anne Meyer in *Universal Design for Learning: Teaching Every Student in the Digital Age*. As in previous volumes we present a set of principles and the strategies that teachers and principals can use to guide their efforts to scaffold instruction to improve student learning. Our descriptions of research-based evidence of practices are supported by examples from a series of recent articles in ASCD's *Educational Leadership* by experts on teaching for meaning and by Robert J Marzano, Debra J. Pickering and Jane E. Pollock's (2001) work in *Classroom Instruction that Works*.

What Does A Focus on Learning Require?

A school that focuses on learning constantly articulates its broad beliefs that all children can learn and that all children will learn. Its mission statement refers to the school community's specific position regarding how students learn and how teachers should teach. Resources, both material and human, are channeled into policies and practices that facilitate student learning.

Why Focus on Scaffolding Instruction Not Instructional Scaffolds?

Educators typically think of instructional scaffolds as those structures of instruction that focus learning in specific areas. In this sense they narrow and reduce the degrees of freedom that learners have to explore from diverse perspectives. At the extreme used as narrowing instruction without accounting for learner diversity, scaffolds are viewed as highly suspect by many researchers. Ideally, scaffolds should be optional and assignable to individual students, in order to better accommodate individual progress and differences between learners.

To emphasize that we view scaffolding in a different way, one that emphasizes ***teaching for meaning***, we focus not on *instructional scaffolds* but on *scaffolding instruction*. In this volume we will show that teaching for meaning requires teachers to scaffold their instruction to a theory of research-based practice of matching specific instructional strategies to specific types of knowledge. By framing our focus on ***scaffolding instruction*** we wish to remind educators that different types of knowledge involve different types of learning, and therefore different types of teaching. Marzano, Pickering and Pollock (2004) remind us that Ralph Tyler first introduced this notion in the 1950s. It remains such an important notion that in this volume we call attention to the need for teachers to scaffold their instruction to a theory of comprehensive instructional practice. At the heart of this theory of practice is a focus on teaching for meaning that requires the teacher to become a mediator of thinking (Brooks, 2004). Students learn to practice the ***knowledge arts*** (Perkins, 2004).

The knowledge arts bundle together deep reading, compelling writing, strong problem solving and decision making, and the strategic and spirited self-management of learning itself, within and across the disciplines (Perkins, 2004).

II. School Conditions That Support Making Meaning

In schools where teachers mediate students' practice of the knowledge arts, instruction is thoughtfully designed to teach students to take charge of their own learning. In doing so these schools launch self-directed learners, who when confronted with complex and sometimes ambiguous and intellectually demanding tasks that characterize life in the knowledge society that the U.S. has become, have developed the dispositions and habits of mind to become self-managing, self-monitoring, and self-modifying (Costa & Kallick, 2004, Perkins, 2004). They become practitioners of the knowledge arts, adept at communicating strategically, insightfully, and effectively, thinking critically and creatively, and putting school knowledge to work. This requires that teachers scaffold their instruction to a theory of meaning making that improves student learning. Our focus in this volume is on teaching for meaning by scaffolding instruction to increase student learning.

Jacqueline Ancess (2004) reports that there are specific conditions in schools that support teaching and learning for making meaning:

Teacher ethos and belief in the importance of making meaning in the education process is enhanced when school cultures support their efforts, providing students “opportunities to practice, internalize, and deepen the requisite habits of mind that develop meaning making as a norm not only in school but also in their lives” (p. 39).

Trust in teacher judgment is common in schools supporting teaching for meaning. “Teachers are expected to make important decisions about how they design and organize the curriculum and what instructional materials they use” (p. 39).

Organization of curriculum into focused units. Schools supporting teaching for meaning organize curriculum into meaningful units, or by creating thematic clusters of courses taught by interdisciplinary teams that create scaffolds for deepening student understanding.

Infrastructure to support meaning making. In meaning making school teachers' efforts to overcome student resistance are supported by a school-wide organizational and instructional infrastructure that anticipates student needs.

From Principles to Practices

This third volume of *Design Principles for Learner-Centered Schools* is again edited by **Dr. Hanne B. Mawhinney**, who is pleased to continue to show how the research-based principles developed in the previous two volumes have been turned into effective practices. In this volume again, descriptions are supported by examples of strategies that Maryland school districts use to increase student learning in reading, writing, mathematics, and science for all students. We are proud to feature the work of a team of contributors who are leaders in local school districts and doctoral students or recent graduates of the College of Education at the University of Maryland, College Park, **Golnar Abedin, Dr. Shannon Bramblett, Dr. Allan D. Arbogast, Kathy Kubic, John Quinn, Dr. Sharon Russell, and Jane Woodburn**. We highlight their backgrounds and provide contact information at the end of this volume. We are also pleased to highlight the work in integrating technology in ways that put our design principles to practice by the faculty of **Magnolia Elementary School**, in **Harford County Public Schools**, and thank Superintendent **Jackie Haas** and **Principal Barbara Douglas** and instructional technology teacher **Mike Lackner**.

Connecting to Maryland's Standards

In showing educators how to turn principles to practices we are also pleased to support the efforts of the Maryland State Department of Education by showing how the resources available from the Maryland School Improvement website can be used to design scaffolding strategies, and how Maryland's Standards for Professional Development can help guide the design work of professional learning communities that are developing approaches to scaffolding instruction for improved student learning.

Colleen Seremet, Maryland's Assistant State Superintendent for Instruction says "the rubber will really hit the road when we are able to ensure that every teacher has the knowledge and skills they need to deliver an exemplary curriculum to meet the various needs of all the students in every school around the state" (School Improvement in Maryland, Teaching and Assessing, (<http://mdk12.org/instruction/index.html>))

III. Organization of This Report

This report is intended to be a resource for schools seeking to develop high quality professional development for teachers to gain an understanding of research based strategies for scaffolding instruction to improve student learning. In the report we outline design principles and associated strategies that researchers have found to best enhance the learning of diverse students. Complementing each principle are descriptions of

- strategies that address the principle;
- explanations of the value of adopting particular strategies;
- suggestions for use of technology to support the strategy;
- a section called "From Principle to Practice" which outlines examples of strategies for scaffolding instruction in reading, writing, mathematics, and science and across curricular areas used by school systems in Maryland with descriptions of specific actions that teachers and principals can take;
- standards- based professional development activities that focus on addressing these principles;
- use of technology to support scaffolding instruction to improve student learning.

Report Summary and Supporting CD-ROM

Our short summary report is presented in a hard copy, with the full report presented in the CD-ROM version. The CD-ROM of this third volume of ***Design Principles for Learner Centered Schools: Scaffolding Instruction to Improve Student Learning*** includes expanded descriptions of the strategies by the following contributors:

- Scaffolding Instruction in Reading by ***Sharon L Russell***,
- Scaffolding Instruction Through Reading Apprenticeships by ***John Quinn***,
- Scaffolding Instruction for Improved Student Learning in Writing by ***Jane Lai Woodburn***,
- Scaffolding Instruction in Mathematics by ***Kathryn L. Kubic***,
- Providing appropriate practice, feedback, and assessment, and tying grading directly to mastery objectives by ***Bud Rorison***
- Developing unit designs that promote increased cognitive demand and student independence by ***Allan D. Arbogast***,

And descriptions of Scaffolding Instruction Using Instructional Technology at ***Magnolia Elementary School***

IV. Learner Centered Principles for Scaffolding Instruction

WHAT IS A LEARNER-CENTERED SCHOOL?

The work of administrators, faculty, and staff of the Learner-Centered School are guided by the following principles:

1. schools should focus on learning
2. schools should build professional learning opportunities
3. schools should engage the external environment to promote learning
4. school leadership should be distributed
5. there should be coherence in the school program.

Leading for Learning Sourcebook:

<http://depts.washington.edu/ctpmail/PDFs/LforLSourcebook-02-03.pdf>

In our second edition of *Design Principles for Learner Centered Schools* we showed that Learner Centered schools have particular organizational structures and cultures that promote student learning. We identified five principles to guide the design of Learner Centered Schools based on the findings that researchers at the Center for the Study of Teaching and Policy at the University of Washington used in developing their Leading for Learning Model. In this third edition we focus specifically on the first principle of the Learner Centered School: ***Schools should focus on learning.***

Learner-Centered Principles of Instruction

In this volume we provide research-based guidance for schools designing strategies that deepen the focus on student learning based on the learner centered approach to instruction identified by Karen Murphy and Patricia Alexander.

Learner Centered Principles of Instruction

Karen Murphy and Patricia Alexander identified five principles that should guide the design of instructional strategies to support student learning:

- learning involves increasing students' knowledge base
- motivation is a key factor in student learning
- students learn by strategically processing new information
- there are commonalities and differences in the way people learn and in the rate at which they learn
- social contexts affect learning

The Learner-Centered Principles: Their Value for Teachers and Teaching.

V. Supporting High Quality Professional Development

We believe that high quality professional development must also be a central feature in meaning making schools. We have also shown that learner centered principles can guide efforts to increase instructional capacity to teach for meaning. In order to put these and other principles that focus on specifically on scaffolding instruction into practice, we must ask a critical question: how can we help teachers develop instructional capacities to teach for meaning?

Colleen Seremet, Maryland's Assistant Superintendent for Instruction explains that the important pieces of a quality instructional program are: solid curriculum, a quality assessment program, and high quality teacher professional development:

Supporting High Quality Professional Development

This third volume of *Design Principles for Learner Centered Schools* is intended to be used as a resource to support the kind of embedded professional development opportunities for teachers specified in the three Maryland Teacher Professional Development Standards focused on processes that are: data driven, used to inform planning, applying knowledge of teacher learning and adult learning theory, and the five Standards

focused on content of professional development that: deepens teachers' understanding of Maryland content standards and research based on best practices and appropriate assessment, enables them to apply research to decision making, ensures that teachers collaborate with colleagues, are able to meet learning needs of all students equitably, and are able to involve families in the processes (http://mdk12.org/instruction/professional_development/1).

Colleen Seremet, Maryland's Assistant Superintendent for Instruction, reminds us:

"Curriculum doesn't teach kids; assessment only measures how our students are doing. The real important element in quality instruction is always the teacher in every classroom."

VI. Scaffolding Instruction to Teach for Meaning

Why is teaching for meaning so important today? This question is the focus of discussion by researchers in the September 2004 edition of *Educational Leadership*, published by the Association for Supervision and Curriculum Development. One contributor observed "Are there any serious educators who, in principle, don't want teachers to teach for meaning or don't want students to construct deep understandings of content with enough breadth and depth to demonstrate competence in a number of disciplines? (Brooks, 2004, p. 9). The answer is no!

Maryland educators are well aware that teaching for meaning is as crucial for fostering students' deep understandings of content areas as it is for leading students to achieve and to develop the dispositions they want to achieve. Both are required if all of Maryland's students are to have opportunities to achieve proficiency in state assessments and if teachers are to meet the high standards set by the state.

"Maryland schools take very seriously the job of preparing students, offering more AP courses in high school and strengthened academic rigor at all levels," said **State Superintendent of Schools Nancy S. Grasmick**. "High standards and accountability pave the way for success for all of our students in whatever they plan to do after high school." (Measuring-Up-2004, Annapolis, MD, September 15, 2004)

The state of Maryland has led the country in supporting instructional improvement through an accountability system intended to ensure that each student has opportunities to achieve. Maryland's Visionary Panel, called for "alignment of every aspect of education—educators' preparation and professional development, policymaking, testing, curriculum,

leadership, and funding—to support the classroom teacher and student."

And, Maryland's *Bridge to Excellence Act* calls on districts to use their master plans to align resource allocation and reform goals. In response to these recommendations, Maryland has developed a Voluntary State Curriculum (VSC) that aligns the Maryland Content Standards and the Maryland Assessment Program. Teachers across Maryland are now able to look at a Voluntary State Curriculum to guide their instructional designs.

However, as **Colleen Seremet, Maryland's Assistant Superintendent for Instruction**, explains: "We all know that a perfect Voluntary State Curriculum, if there is such a thing, and a perfect Maryland assessment system, by themselves are not going to bring the kind of student achievement for every student across the state of Maryland that we are looking for. So in the next steps in the curriculum develop process we are looking to our colleagues in the local school districts to share exemplary formative assessments, unit plans, and particular resource materials they are finding to be effective with certain sets of content standards or indicators. So that we can really take the skeletal framework of Voluntary State Curriculum and begin building muscle on to that framework, so that there are more and more tools for teachers to be able to share across the state and use with each other." (School Improvement Maryland, Instruction, Voluntary State Curriculum. Hear her at (<http://mdk12.org/instruction/curriculum/index.html>)).

The Second Curriculum: Developing Strategic Practice of Knowledge Arts

Maryland's educators are well aware that much work is needed to build instructional capacity and use the Voluntary State Curriculum in ways that ensure that all students have opportunities to practice knowledge arts. They know that teaching for meaning is essential if students are to have learning opportunities that foster creating, communicating, organizing and acting on knowledge of facts, ideas and skills gained through the Voluntary State Curriculum. This is a significant task, but one that is really only a matter of developing good methods of teaching content in ways that enhance student engagement and make knowledge more meaningful.

Yet, David Perkins (2004) of Harvard University's Project Zero, tells us that schooling as it has been practiced has not done well in developing the knowledge arts of students. In typical schools, investigative, inquiry-oriented activities in which learners create knowledge are not common; nor are students given opportunities to do much with their learning outside school. Similarly, schools do not address well the problem of transfer of knowledge; students are not typically encouraged to carry their knowledge from one classroom to another. Although educators do communicate knowledge to students, and students are given many opportunities to receive this knowledge, they are typically not taught to do so strategically.

Harvard Project Zero has found that teachers promote the knowledge arts when they:

- Make thinking visible
- Teach for understanding
- Create a culture of learning

(www.pz.harvard.edu)

Teaching strategic knowledge arts under the requirements of *No Child Left Behind* requires that educators infuse a second curriculum into their instructional practices. The good news is that this is not another add-on to the Voluntary State Curriculum. Educating students in the second curriculum means equipping them with knowledge handling skills so that they can

What do we mean by strategic practice of knowledge arts? David Perkins tells us that the “knowledge arts are more than just tools for teachers to teach with; they encompass ideas, skills, and attitudes for learners to learn- a second curriculum. Thinking of the knowledge arts in this way creates new responsibilities for educators. As teachers teach science, history, or literature, they should be able to specify what skills of inquiry, strategies of communication, methods of organization, and ranges of application they are striving to develop in students; how they are spending time on it; and how they are exciting students’ interest and providing serious guidance. (Perkins, 2004, p. 18).

deepen and broaden their mastery of the Voluntary State Curriculum. Teaching the knowledge arts involves bringing the knowledge required to gain proficiency in the content of the Voluntary State Curriculum to life and keeping it alive for each student.

Researchers who study approaches to teaching that foster students’ deeper understanding have found that certain instructional techniques are very effective in supporting students as they learn to recognize patterns; other techniques are better suited to supporting students as they learn strategic skills, or as they build engagement with learning.

Brain research confirms that teachers must develop instructional strategies to support student learning through recognition, strategic, or affective networks. We now know that

teachers can accommodate diverse learners by using a repertoire of teaching strategies suited to each of the brain networks. Principals can provide the best support for teachers by helping them design pathways that scaffold learning opportunities for students that address individual differences in students' networks.

VII. Designs for Learning From Brain Research

Evidence from theory driven cognitive science research is now being translated into designs for instructional strategies. Newly emerging neuropsychological brain mapping studies are adding compelling biological evidence to behavioral observations that align with constructivist learning theory. Our focus in this edition is on specific sets of strategies that target the three pathways to learning identified by brain researchers.

In this we draw from the *Universal Design for Learning* (UDL) developed by David H. Rose and Anne Meyer (2002) (<http://www.ascd.org/publications/books/2002rose>).

What Do We Know About Learning From Brain Research?

In recent years, scientists have made progress toward unlocking the secrets of how our brains learn. Researchers have found that there are multifaceted networks of connections that help individual parts of the brain communicate flexibly and along multiple pathways. Many smaller networks are specialized for performing particular kinds of processing and managing particular learning tasks. Three primary networks, structurally and functionally distinguishable but closely connected and functioning together, are equally essential to learning.

Recognition networks are specialized to sense and assign meaning to patterns we see; they enable us to identify and understand information, ideas, and concepts.

Strategic networks are specialized to generate and oversee mental and motor patterns. They enable us to plan, execute, and monitor actions and skills.

Affective networks are specialized to evaluate patterns and assign them emotional significance; they enable us to engage with tasks and learning and with the world around us.

The activities of these networks parallel the three prerequisites for learning described by the Russian psychologist Lev Vygotsky (1962): recognition of the information to be learned; application of strategies to process that information; and engagement with the learning task. Although all brains share general processing characteristics across these networks, individual brains differ substantially.

For the latest research on learning, please see the on-line text *How People Learn: Brain, Mind, Experience, and School* at <http://www.nap.edu/html/howpeople1/>.

Researchers are using this new knowledge to address many questions that concern educators, students, parents, and policymakers:

- How does the brain work during learning?
- Under what conditions do we learn best?
- Why do some people learn differently from others?
- Is everyone's brain built the same way?

The implications of brain research in education are significant, and already well recognized. We now know that students do not have one kind of intelligence or one way of learning—they have many. To accommodate these many ways of learning, teachers can use what we know about how each brain network operates to make their teaching methods and curriculum materials flexible in specific ways and to scaffold instruction for enhanced meaning to diverse groups of students.

The **Class Learning Profile Template** helps you evaluate learner needs and strengths in light of the three brain networks at <http://www.cast.org/TeachingEveryStudent/learnerneeds>

Universal Design for Learning (UDL)

Rose and Meyer (2002) remind us that because all three brain networks are involved in learning, teachers cannot literally "teach to" students' recognition, strategic, and affective networks as separate entities. However, thinking about these networks individually helps us remember that learning is multifaceted and that barriers in the curriculum can arise in a number of places.

Broadly speaking, we must teach our students to

- Recognize essential cues and patterns.
- Master skillful strategies for action.

The Framework for UDL: Three Principles

Rose and Meyer explain “As teachers, whether we are addressing individual differences in our students' recognition, strategic, or affective networks, we can provide the best support by individualizing pathways to learning. Flexible methods and materials—the heart of the UDL framework and its implementation—make this feasible in the real world. While pursuing a common goal, each student in the classroom can follow his or her own path and obtain a level of performance that represents personal progress.” Drawing from brain research and using new media, the UDL framework proposes that educators strive for three kinds of flexibility:

- To represent information in multiple formats and media.
- To provide multiple pathways for students' action and expression.
- To provide multiple ways to engage students' interest and motivation.

The UDL framework shifts educators' understanding of learner differences. It challenges us to rethink the nature of curriculum materials and endow them with the inherent flexibility necessary to serve diverse learning needs. UDL also opens the door for rethinking how we teach. With the option to individualize learning supports and focus the challenge differently and appropriately for each learner, teachers must be very clear about the learning goals they set for any given assignment or unit. Only when goals are clear can we select and apply flexible materials to support and challenge each learner. Similarly, clear goals help us focus our assessment of student progress in an accurate and useful way. The UDL framework can guide these three pedagogical steps, helping teachers to *set clear goals*, *individualize instruction*, and *assess progress*. For additional material about Universal Design for Learning, see

<http://www.cast.org/TeachingEveryStudent/UDL>

VIII. Design Principles for Learning in the Context of Diversity

In our previous volumes we explained how cultural, educational, and legal changes have significantly altered the mix of students in regular education classrooms. The challenge posed by greater diversity and greater accountability is to enable students with widely divergent needs, skills, and interests to attain the same high standards. This requires teachers who have a deep knowledge of how to teach for diversity. We now describe strategies for scaffolding instruction to improve student learning associated with three principles for addressing students' diverse learning networks. In addition, our fourth principle recognizes students' diverse cultural pathways. Finally, we recognize that instructional design occurs within the context of accountability that may appear to constrain efforts to support teaching for meaning. We, therefore, provide examples of how schools can turn principles to practices to support by engaging in instructional leadership practices identified as effective in Maryland's Framework for Instructional Leadership.

Design Principle One: Scaffold Instruction to Support Students' Diverse Recognition Networks

“Although our recognition networks are very efficient, patterns such as alphabetic symbols, the format for writing a research paper, scientific and mathematical theories, and geographical or geological facts require specific study.

Because students aren't all on equal footing when it comes to recognizing such patterns, teachers need to provide differentiated instruction.” (Rose & Meyers, 2002)

“The Urban Academy of Manhattan serves diverse students who have struggled academically using an inquiry approach to learning. The school has organized instruction, curriculum, and assessment into a structure that enables students to pursue authentic questions...Students investigate a question using multiple sources of information that have multiple perspectives; develop their own point of view; support that viewpoint with evidence; and engage in discussion and debate with peers and teachers. Teachers encourage disagreement and challenge” (Ancess, 2004, p. 37).

Differentiating instruction can occur through inquiry approaches to learning. Teachers can differentiate instruction by establishing norms of inquiry that foster student-meaning making. They can support students’ diverse recognition networks by using a number of strategies.

Diverse Recognition Scaffolding Strategies

In this report we outline four strategies for teaching recognition:

- Providing multiple examples.
- Highlighting critical features.
- Providing multiple media and formats.
- Supporting background knowledge.

Recognition Scaffolding Strategy 1: Provide Multiple Examples

Using Technology Supports to Provide Multiple Examples

“Much of the art of teaching patterns lies in selecting and presenting numerous, effective examples. The flexible nature of digital media expands teachers’ ability to collect many varied examples that are personally and topically relevant and provides new ways for students to interact with those examples” (Rose & Meyer, 2002).

Students must be exposed to many different examples if they are to learn to recognize key characteristics and patterns. Opportunities to hear, touch, see and even smell many different instances of a pattern enables students’ recognition networks to identify critical features of a pattern and to transfer that knowledge of patterns to new instances.

Recognition Scaffolding Strategy 2: Highlight Critical Features

Although students may be able to derive key features from multiple examples, good teachers scaffold learning by highlighting critical features and patterns using visual and auditory clues. They use pitch, intonation, pointing, gestures and facial features.

Marzano and his colleagues (2001) report that instructional strategies that help students identify similarities and differences

“Bruner and his colleagues (Wood, Bruner, & Ross, 1976) long ago described this ‘marking of critical features’ as one of the key ways to scaffold learning in the tutorial context. Good teaching includes much of this kind of bottom-up scaffolding” (Rose & Meyer, 2002).

are helping them to develop one of the core mental operations in all learning. Marzano and his colleagues draw four generalizations from research on identifying similarities and differences:

1. Presenting students with explicit guidance in identifying similarities and differences enhances students' understanding of and ability to use knowledge.
2. Asking students to independently identify similarities and differences enhances students' understanding of and ability to use knowledge.
3. Representing similarities and differences in graphic or symbolic form enhances students' understanding of and ability to use knowledge.
4. Identification of similarities and differences is a highly robust activity that can be accomplished in a variety of ways (Marzano et al., 2001, pp. 15-16).

Teachers can help students identify similarities by using various graphic organizers to:

- Compare
- Classify
- Create metaphors
- Create analogies

See Marzano et al (2004)

Focus on BIG ideas. Other researchers like Bransford and his colleagues tell us “experts’ knowledge is organized around core concepts or “big ideas” that guide their thinking” (2000, p. 24). Because teachers seek to develop student expert-like knowledge, they also provide opportunities for students to compare and contrast around BIG ideas.

Students are more likely to make meaning and gain understanding when they:

- relate facts to “big ideas”
- have opportunities to revise their assignments using clear examples of successful work, known criteria and timely feedback

Recognition Scaffolding Strategy 3: Provide Multiple Media and Formats

Brain researchers tell us that learners have varying abilities to process visual, aural, olfactory, or tactile patterns. This means that a single means of presentation doesn't work for all students. In order to include more learners, teachers should increase choice and redundancy in instruction by providing multiple representations of patterns through a variety of media, formats, organizations, levels of detail, and degrees of depth.

Research has shown that teaching in multiple modalities (a technique sometimes called *transmediation*) not only increases access for students with difficulties but also improves learning generally among all students (Rose & Meyer, 2002).

Choice increases access to learning by enabling students to find the format or medium that appeals to and works *best* for them—students with disabilities affecting a particular modality can access the information via another one.

Redundancy offers opportunities to discern patterns in a variety of ways, thereby increasing the understanding about what matters in the pattern.

Graphic organizers are one of the most common ways to help students generate nonlinguistic representations. For examples see David Hyerle (1996), *Visual Tools for Constructing Knowledge*.

Nonlinguistic representations are powerful ways for learners to organize knowledge. Marzano and his colleagues drew two generalizations from research on the effects of nonlinguistic representation on student learning:

1. Nonlinguistic representations that produce powerful effects on student learning include: graphic representations, physical models, mental pictures, pictures and pictographs, kinesthetic activity.
2. Nonlinguistic representations should elaborate on knowledge (Marzano et al, 2001, p. 73-74).

Recognition Scaffolding Strategy 4: Supporting Background Knowledge.

According to cognitive learning theory, people learn by attending to new knowledge and associating it with knowledge that they acquired previously. Students bring differing knowledge bases to school, and this impacts what they pay attention to, learn, remember, and forget. In neural network terms, new learning is integrated into networks that have been shaped by previous learning. Consequently, what the brain already knows can influence what it will learn from a new example or experience. This means that when students learn, they incorporate new knowledge into old knowledge.

Teachers can help students connect to their background knowledge by:

- asking students to reflect on their own experiences that relate to reading material,
- reviewing key vocabulary prior to reading assignments, and
- directing students to relevant additional materials.

Teachers can also use ***cues, questions and advance organizers*** to activate prior knowledge.

Marzano and his colleagues (2001, pp. 113-114) report that the following generalizations can be drawn from research on the effects of cues, questions and advance organizers on student learning:

Teachers can ask questions that ***elicit inferences*** by asking about the things, people, actions, events, and states students are studying.

Teachers can ask ***analytic questions*** to focus on:

- analyzing errors,
- constructing support,
- analyzing perspectives.

Advance organizers are most useful with information that is poorly organized. Advance organizers include approaches that are:

- Expository
- Narrative
- Graphic
- Skimming

1. Cues and questions should focus on what is important as opposed to what is unusual.
2. “Higher level” questions produce deeper learning than “lower level” questions.
3. Waiting briefly before accepting responses from students has the effect of increasing the depth of students’ answers.
4. Questions are effective learning tools even when asked before a learning experience.

Design Principle Two:

Scaffold instruction to support students' diverse strategic networks

“Different learners aiming for the same goal generate different plans and steps for getting there. Because individuals have their own optimal pathways for learning strategic skills, teaching approaches and tools need to be varied. Based on our knowledge of how strategic networks function, we can recommend the following teaching methods to support strategic learning” (Rose & Meyer, 2002).

Researchers have found that one way to increase students' awareness of what goes into creating, communicating, organizing, and acting on knowledge is to use *thinking routines* (Ritchhart, 2002).

Certain kinds of thinking can be made visible by asking:

- What is going on here?
- What do you see that makes you say so?

(Tishman, 2002).

Approaches for teaching skills must be flexible and must reflect the way strategic networks learn. Since these are varied, teachers must vary the media, models, supports, and feedback they offer to students.

Instructional Scaffolding Strategies for Diverse Strategic Skills

As we show next teachers can use four strategies for teaching strategic skills:

- Provide flexible models of skilled performance
- Provide opportunities to practice with supports
- Provide ongoing, relevant feedback
- Offer flexible opportunities for demonstrating skill

Strategic Skills Scaffolding Strategy 1: Provide Flexible Models of Skilled Performance

In order to develop mental models of specific patterns students must be exposed to models of expert performance and to counter-examples that demonstrate incorrect performances. Teachers can present multiple models to show different and effective ways to do something. This can help learners identify critical features of a process, and different ways to achieve that end.

“Digital tools and media can extend teachers' ability to present multiple models for strategic teaching. Using the World Wide Web or a local network, we can collect models over time, link these models to a home page, and offer students an increasing array of choices including examples of completed work, steps in a process, demonstrations of skilled execution, or connections to experts willing to share the way they work. We can provide these models in a variety of media to make them accessible and useful for diverse sets of students” (Rose & Meyer, 2002).

Strategic Skills Scaffolding Strategy 2: Provide Opportunities To Practice With Supports:

In order to achieve complex strategic goals, learners must *automatize*, or over-learn, the

“Electronic media are ideal for providing scaffolds in the context of learning. Features such as text-to-speech "translation" support decoding so that learners can focus on strategic reading or content learning; spell checkers support mechanics so that learners can focus on expressing their ideas and improving their writing fluency; built-in calculators scaffold math facts so that learners can focus on mathematical reasoning” (Rose & Meyer, 2002).

individual steps in the process until each is automatic. This requires extensive practice. However, researchers have found that having students practice skills in context is more effective than directing them to practice skills in isolation. To support contextual practice, teachers can scaffold some parts of the process so that learners can focus on strengthening their abilities in other parts.

Marzano and his colleagues (2001) find that two generalizations can be drawn from research on the effects of practice on student learning:

1. Mastering a skill requires a fair amount of focused practice.
2. While practicing students should adapt and shape what they have learned.

Homework: Research on homework as a strategy to increase student opportunities to practice suggests that to be effective teachers must:

- Establish and communicate a homework policy
- Design homework assignments that clearly articulate the purpose and outcome
- Vary the approaches to providing feedback on homework.

Strategic Skills Scaffolding Strategy 3: Provide Ongoing, Relevant Feedback

Researchers have shown that learners need ongoing, relevant feedback. They need to know if they are practicing effectively, and if not, which aspects of the practice process they need to change. Feedback is most effective when it is provided in an ongoing fashion—supporting course corrections and building learners' confidence about things that are going well.

Marzano and his colleagues found that research on the effects of feedback on student learning confirms that feedback should be

1. corrective in nature
2. timely
3. specific to a criterion

David Perkins describes how one teacher used his “Teaching for Understanding Framework to organize and deliver an introductory writing course for at risk 9th graders. Students engaged in a wide range of understanding performances including working with collages as preparation for writing; keeping and critically reviewing portfolios; and setting and pursuing goals individually using a form that listed writing skills that they wanted to improve, from sentence structure to revision practices to aspects of self management” (Perkins, 2004, p. 17).

Classroom Practice Strategies:

Charting Accuracy and Speed:

Skills should be learned to the level that students can perform them quickly and accurately, and be taught to chart both.

Practice should focus on

specific elements of a complex skill or process.

“Software tools and digital networks can be an excellent source of ongoing feedback... A tool as simple speech-to-speech embedded in a word processor enables students to hear how their writing sounds when read aloud and then to revise as they work. Software programs designed to develop skills such as typing or arithmetic routinely offer specific feedback about performance as students work. And online connections to mentors and peers offer students the chance to seek comments from others outside the classroom” (Rose & Meyer, 2002).

Enhance Student Self Monitoring:

Other researchers argue that because students don't have their teachers around during every practice session helping learners develop self-monitoring skills may be the very best way to ensure ongoing feedback for all practice. David Perkins of Harvard's Project Zero has developed a *Teaching for Understanding Framework* to help teachers develop effective approaches to foster student self-monitoring.

Strategic Skills Scaffolding Strategy 4:

Offer Flexible Opportunities For Demonstrating Skills

Provide learners with chances to demonstrate that skill is essential to teaching for meaning. Demonstration challenges learners to consolidate and apply all parts of the process. It also elicits feedback from a broader audience. Researchers find that demonstrating skills and knowledge can factor powerfully into motivation, helping learners experience the ‘why’ of learning.

“Digital media offer widely varied supports and opportunities to help students demonstrate knowledge and skills. Publishing on the World Wide Web or on a class home page invites feedback from an expansive audience and can provide a sense of accomplishment. Presentation tools such as HyperStudio and PowerPoint provide templates and tools for incorporating multiple media and for structuring presentations. Desktop publishing software helps students incorporate images and layout printed work in a professional manner” (Rose & Meyer, 2002).

Design Principle Three:

Scaffold instruction to support students' diverse affective networks:

“Affect is the fuel that students bring to the classroom, connecting them to the ‘why’ of learning. Affect goes beyond simple enjoyment, and among other things, it plays a part in the development of persistence and deep interest in a subject. If we emphasize skills and knowledge to the exclusion of emotion, we may breed negative feelings towards learning, especially in students having difficulties. Were we to focus on affect more explicitly in our learning goals, we might be more successful at one of the most important tasks for teachers—developing students who love to learn” (Rose & Meyer, 2002).

Instructional Scaffolding Strategies for Diverse Affective Needs

As we show next teachers can use four strategies for meeting diverse affective needs:

- Offer choices of content and tools
- Offer adjustable levels of challenge
- Offer choices of rewards
- Offer choices of learning contexts.

Engaged Time: The Grail of Teaching

Sam M. Intrator (2004) points out that students who are deeply immersed in learning experience engaged time. When this happens, students he observed became “roused to life, animated with feelings and ideas. Episodes of intense concentration occurred. High schoolers experienced these moments as provocative, enchanting, memorable, and enjoyable” (p. 22).

Affective Needs Scaffolding Strategy 1: Offer Choices Of Content And Tools

Researchers tell us that giving students choices of content and tools can increase their enthusiasm for learning particular processes. Rose & Meyer (2002) remind us that when affective engagement links background knowledge with strategic or recognition tasks, students are more likely to build skills, sustained interest, and deep understanding. They are also more likely to pursue the extended practice needed for “automatization.”

Sam Intrator (2004) found that students he studied were most vibrant when creating or thinking about something new and when expressing their originality. “Students tuned in when they felt ownership over ideas expressed in class and felt they were in a safe place to express their own ideas. They yearned to be listened to and to have their insights taken seriously” (p. 23).

Decades of research on successful schools that serve a high percentage of children in poverty suggest that teachers deemphasize directive pedagogy and emphasize fostering connections between academic learning and students’ personal worlds (Knapp, 1995). Teachers in these schools use approaches such as project-based learning, and inquiry-based instruction. In both approaches teachers respond to students’ curiosity by scaffolding their instruction to support student interests.

“At CAST, we have found that working with multimedia and the World Wide Web can break the cycle of discouragement and re-engage learners who are stressed by or indifferent to conventional learning media. We have seen students with writing disabilities use sound or images to develop the key elements of a composition and then spend the next 45 minutes enthusiastically writing text. Enjoyment and competence fuel students' motivation to learn. Suitable programs include Paint, Write and Play; Write, Camera, Action! Hyper Studio; and Kid Pix. In addition, more and more Web sites are dedicated to providing varied content and tools for instruction” (Rose & Meyer, 2002).

In the *Power of Projects* (Helm & Beneke, 2003) Lilian Katz suggests that to fully engage young children, projects should:

- Include processes of questioning, hypothesizing and predicting that lead to higher-level thinking
- Focus on topics that tap into true child interest
- Produce meaningful products resulting from children’s understanding and reflections by them on what was learned.

Science educators advocate inquiry-based instruction almost universally. See the National Research Council’s *National Science Education Standards* (1996), and the American Association for the Advancement of Science’s *Benchmarks for Science Literacy* (1993).

Affective Needs Scaffolding Strategy 2: Offer Adjustable Levels Of Challenge

Cognitive psychologists have reported for decades that students learn best in their ‘zone of proximal development’ (Vygotsky, 1962). This is the point where challenge is just beyond their current capacity but not out of reach. We also know that students' comfort zones—the level of difficulty, challenge, and frustration optimal for them—vary considerably.

Teachers who hope to sustain students' engagement must be able to continually adjust the challenge for and among different learners.

Providing such choices for students also makes the process of goal-setting explicit and provides a structured opportunity for students to practice setting realistic goals and optimal challenges for themselves. Discovering the consequences of setting goals that are too high or too low helps students develop the meta-

Students with ADHD and other problems with strategic skills who often have difficulty setting appropriate goals, can benefit from practice and experience in a supportive learning context.

skills they need for independent learning.

One way that teachers can provide students with adjustable levels of challenges to do this is to design instruction so that students can become self-directed learners. Arthur L. Costa and Bena Kallick (2004) suggest that students need to learn how to guide themselves along the way, monitor their progress toward a specific destination, and make small maneuvers and midcourse corrections.

Teachers can provide *structured opportunities for students to become self directed* by:
Having students confer with a “critical friend;”
Holding student-teacher conferences and asking questions about student goals;
Providing self-reflection worksheets for new subject matter that has students reflect on what they already know and what they need to know;
Determining whether students are becoming more aware of their own thinking by asking them about the problem solving process they use. See Costa & Kallick’s (2004) *Checklist for Educators on Self-Directed Learning*.

Affective Needs Scaffolding Strategy 3: Offer Choices Of Rewards

Educators commonly motivate students by using external rewards and punishments including deferred rewards like grades, concrete rewards like stickers or money, increased or decreased privileges like recess and field trips, and social rewards like affection and attention. Marzano and his colleagues (2001) report that these instructional strategies fall under a widely misunderstood category of strategies that are referred to as praise, rewards or recognition. In general research suggests that providing praise or rewards may not enhance achievement, and may indeed be detrimental to motivation. However, research also suggests

1. Rewards do not necessarily have a negative effect on intrinsic motivation,
2. Reward is most effective when it is contingent on the attainment of some standard of performance,
3. Abstract symbolic recognition is more effective than tangible rewards.

Rose and Meyer (2001) point out two problems with the practice of offering rewards:

Identifying Rewards that Will Be Valued:

Each student has different ideas about what is or is not a reward. Also fear of punishment (or failure) spurs some students to work hard, but may discourage or frighten others.

Rose and Meyer (2001) suggest that problems with providing rewards that students’ value may be overcome by offering students choices of rewards.

Identifying Motivational Processes:

External rewards tend to be inappropriate and ineffective in motivating learning over the long term. Research shows that extrinsic rewards can result in unintended negative consequences for learning, such as “turning play into work” (Lepper & Greene, 1978). Rose and Meyer suggest that the answer might be to look a little more closely at play. Most highly motivating video games give no external rewards at all; rather, the motivation they provide comes in the form of immediate feedback and knowledge of results.

Building students' meta-awareness of accomplishment and progress may be one of the most effective ways to instill intrinsic interest in learning and support students' long-term engagement (Rose & Meyer, 2001).

Affective Needs Scaffolding Strategy 4: Offer Choices Of Learning Context

Brain research confirms that because of the broad connectedness of our neural networks—almost any aspect of the environment is included when we learn. Rose & Meyer (2001) point out: “In the classroom, factors such as noise and activity in a room or structure in a task contribute to the learning context students experience. By choosing to present a task as an independent in-class assignment or as homework or as a small- or large-group discussion, teachers may inadvertently lend ‘intellectual home-court advantage’ to certain students who are more comfortable in those learning contexts.”

They remind us that ***context preferences are individual***. An optimal context for one student is not necessarily optimal for another. Some students like to explore ideas and create their own individual approaches. Others would be paralyzed by that degree of freedom. One student might prefer to create a story or painting with minimal direction, whereas another would be unable to start unless provided with a topic and some initial, short-term goals.

There are some powerful context structuring strategies that teachers can use to enhance student learning.

Offer Choices

By offering students a selection of materials from which to choose, each with varying degrees of structure, we can offer *all* students an appropriate learning context.

“A staggering array of digital content is available on compact disc and on the Internet. With these kinds of resources at teachers' disposal, creating innovative ways of engaging learners in anything from long division to historical analysis is relatively easy to do. Teacher-designed WebQuests can be individually tailored to a student's structural preferences” (Rose & Meyer, 2002).

Create Authentic Learning Environments

Joseph Renzulli, Marcia Gentry and Sally Reis (2004) point out that if teachers challenge students to solve everyday problems in meaningful contexts learning will take care of itself. Authentic learning requires students to engage in high-end learning by applying relevant knowledge and skills to solving real problems. Such learning involves:

- finding and focusing on a problem
- identifying relevant information
- categorizing, critically analyzing, and synthesizing the information and
- effectively communicating the results.

Developing Authentic Enrichment Clusters draws on skills most teachers already have if they have been involved in extracurricular activities. In addition Renzulli and his colleagues recommend that teachers: **Reverse the teaching equation** by depending on just-in-time knowledge that has immediate relevance in resolving the problem

Reverse the role of students by helping them create real products (not student like imitations)

Create a unique enrichment cluster by following guidelines for inductive teaching

When in doubt look outward to mirror real world situations (Renzulli et al., 2004).

Design Principle Four:

Scaffold instruction to support students’ diverse cultural

networks. Shannon Bramblett, Virginia Department of Education

Classrooms are places where cultures inevitably and quite literally converge. All students, especially English language learners, make cultural transitions in the classroom. For this

reason, it is especially important that educators establish a welcoming environment for students from all cultural backgrounds. The psychological and emotional difficulties newcomers to a culture experience have been well documented by language acquisition researchers.

Researchers tell us that beyond the need for English language instruction, cultural and social differences should be recognized (Garcia, 1991). *Five standards for effectively teaching diverse learners* have been proposed by researchers (see Bradford, 1999, Tharp, 1998):

1. Joint productive activity, where teacher (expert) and students (novices) work closely together to accomplish joint projects.
2. Developing language and literacy across the curriculum, where language development is continually emphasized and assisted through modeling, eliciting, probing, restating, clarifying, questioning, and praising.
3. Making meaning, where learning is highly situated within and concerned with the real-world contexts of students' lives.
4. Teaching complex thinking, where students are involved in complex tasks and instruction shifts from basic skills to complex manipulation of problem solving in content domains.
5. Teaching so that students are engaged in learning through the use of language and dialogue, especially in relation to real world tasks (Morrison, Ross & Kemp, 2001, p. 52).

Creating effective instructional scaffolds addressing these standards begins by recognizing that helping students maintain their ties to their cultural networks is critically important.

Cultural networks refer to students' system of beliefs and ways of being. Students' cultural networks serve as a foundation and a filter through which all future learning flows.

The strategies in this section were identified by Shannon Bramblett (2004) in her doctoral research at the University of Maryland. The strategies focus on utilizing students' cultural networks effectively to improve instruction. They show us how to utilize students' cultural networks as a fund of knowledge. Bramblett identifies four strategies that teachers and principals can use to support students' diverse cultural networks:

- Build a learning environment that welcomes students from cultural backgrounds reflected in the student body.
- Design instructional activities that invite students to use their cultural networks to build understanding of new ideas and concepts.
- Assist students in making cultural transitions.

Scaffolding Cultural Networks Strategy 1: Build a learning environment that welcomes students from cultural backgrounds reflected in the student body.

What Teachers Can Do:

- Verbally acknowledge the value of other cultures.
- Symbolically value students' cultures in the classroom by carefully displaying artifacts from students' cultures.
- Value students' cultures by using objects students' create that represent their cultures in the classroom.

Principals' Actions:

- Ensure that the public spaces in the building communicate an appreciation for various cultures in the school.
- Encourage teachers to communicate value of students' cultures.
- Provide sustained high quality professional development to teachers and staff about various student cultures.

Scaffolding Cultural Networks Strategy 2: Design instructional activities that invite students to use their cultural networks to build understanding of new ideas and concepts.

What Teachers Can Do:

- Begin instruction by activating students' cultural networks.
- Invite students to compare and contrast their cultural background with those of others.
- Build opportunities in assignments for students to communicate with other students about their cultural networks.

Principals' Actions:

- Promote the understanding in the school that all learning is a cultural activity.
- Provide opportunities for teachers to discuss strategies for activating students' cultural networks.
- Plan school-wide learning opportunities for students to share their cultures.

Scaffolding Cultural Networks Strategy 3: Assist students in making cultural transitions.

What Teachers Can Do:

- Provide reflective opportunities for students to write about cultural transitions they are making.
- Promote awareness of support services that are available to students.
- Help students to build relationships with older students who may be further along in making cultural transitions.

Principals' Actions:

- Ensure that there are adequate supports not only for students, but also for families to receive support they need transitioning to the school community.
- Provide material resources, time and support for teachers and staff to involve all families in the educational process.

IX. FROM PRINCIPLES TO PRACTICES

We now turn to providing examples of how educators in Maryland school districts are applying our four design principles to designing approaches to scaffolding instruction to improve student learning in specific content areas. Our contributors describe why the strategy works, and the actions that teachers and principals take. We support their descriptions with references to Maryland's Voluntary State Standards and to the resources that schools can access on the state's mdk-12 website for school improvement planning. We recognize that principals must develop a full range of instructional leadership practices to increase teacher capacity to scaffold instruction, however, here we feature specific examples of evidence in principals' practices of instructional leadership that demonstrate the outcomes identified in Maryland's Instructional Leadership Framework that seems particularly important for

increasing teachers' capacities to scaffold instruction for special education students; in reading, math, writing and science content areas, and in cross curricular efforts to develop assessment strategies and strategies to develop unit plans that scaffold instruction to improve student learning. Our contributors describe each of these examples of turning our Design Principles into practices. We end each discussion of these strategies by identifying the kinds of instructional leadership that must be practiced if these strategies are to be successfully implemented. In doing so we refer to a draft of the Maryland Instructional Leadership Framework Outcomes and indicators of evidence supporting those outcomes (MSDE, Draft, October 2004). The eight key outcomes that we refer to throughout this volume are noted below:

Maryland Instructional Leadership Framework (Draft, October 2004)

Instructional Leadership Outcomes:

1. Facilitate the Development of a School Vision
2. Align All Aspects of School Culture to Student and Adult Learning
3. Monitor the Alignment of Curriculum, Instruction, and Assessment
4. Improve Instructional Practices Through the Purposeful Observation and Evaluation of Teachers
5. Ensure the Regular Integration of Appropriate Assessments Into Daily Classroom Instruction
6. Use Multiple Sources of Data to Improve Classroom Instruction
7. Provide Staff with Focused, Sustained, Research-Based Professional Development
8. Engage All Community Stakeholders in a Shared Responsibility for Student and School Success

Organization of Section X Principles to Practices

Readers can review in any order the examples that follow of how the research-based principles for scaffolding instruction to improve student learning described by the contributors to this volume of *Design Principles for Learner Centered Schools*. We, have, however, presented these descriptions in an order that allows readers to first read about new research based strategies for scaffolding instruction for special education students and in reading instruction. ***Golnar Abedin*** describes what researchers tell us about how special education can be designed to support scaffolding instruction. ***Sharon Russell*** then outlines critical approaches to scaffolding reading instruction based on her own recently completed doctoral research. We then present two examples of how local school districts are applying these research-based principles. ***John Quinn*** outlines an approach to reading apprenticeship used in Howard County Public Schools. ***Jane Woodburn*** describes how Montgomery County Public Schools uses the 6-Traits Approach for scaffolding writing instruction. We then turn to examine how a school district can design a system wide strategy to scaffold instruction. ***Kathy Kubic*** describes how Anne Arundel County Public Schools designed a system wide strategy to scaffold instruction in mathematics. We end by describing two cross-curricular strategies used in local schools. ***Bud Rorison*** describes a strategy for scaffolding instruction by linking it to assessment and grading used in Montgomery County Public Schools. ***Allan D. Arbogast*** outlines an approach to unit planning used in his school in Anne Arundel County Public Schools.

Scaffolding Instruction for Students in Special Education *Golnar Abedin* ***Why Scaffolding Works for Special Education Students:***

Scaffolding instruction supports students by making the learning process explicit. Instead of simply presenting new content material, teachers using scaffolding techniques guide students step by step through the necessary cognitive strategies.

Through a gradual decrease in teacher assistance and gradual increase in student responsibility (Rosenshine & Meister, 1992), the goal of scaffolding is to support students until they can apply the new skills and strategies independently (Larkin, 2001).

Many special education teachers apply concepts embedded in scaffolding as part of their instruction:

- Teaching cognitive approaches to content material,
- presenting a lesson in a step by step manner,
- continuous assessment and feedback, and
- offering multiple and flexible opportunities to demonstrate skills.

“Universal Design for Learning” (“UDL”), presents important scaffolding practices (Rose and Meyer, 2002). Some of the instructional techniques UDL recommends to teachers are: highlight critical features, provide multiple media and formats, support background context, provide opportunities to practice with supports, provide ongoing, relevant feedback, and offer flexible opportunities for demonstrating skills (Rose & Meyer, 2002).

Meeting each student’s individual learning needs (often described in the IEP goals) and applying individualized instruction in the general education classes are the challenges in applying scaffolding to students in special education. The following are some examples of the ways in which teachers and principals can plan and implement scaffolding instruction.

What Teachers Can Do

In order to meet the first challenge, meeting individual learning needs, advanced planning is essential. Special education teachers can learn students’ instructional needs by reading their IEP’s as well as through formal and informal assessments. Once each student’s learning needs are clear, special education teachers can use scaffolding to help students reach their instructional goals in the same way as regular education teachers can apply the technique to the instruction of content specific material. Teachers can take the following steps to overcome these challenges:

1. Backward Planning

Once teachers know their students’ areas of difficulty and the goals they aim to reach, backward planning is the first step to scaffolding. In backward planning teachers begin by considering the skills necessary to reach the instructional goal. After clarifying the learning strategies students need to successfully approach the goal, teachers apply scaffolding strategies, taking into account student differences in the steps needed to reach those goals.

It is important to take into account individual learning styles while adapting the components of scaffolding such as the cognitive strategies, and designing multiple and flexible assessments to monitor learning. Therefore, scaffolding can be a useful strategy to bridge students’ needs with their instructional goals.

Backward Planning Example

Before presenting a reading lesson to a student, the teacher can use assessment and IEP information regarding the student's learning difficulties to come up with a lesson plan which would apply scaffolding instruction appropriately based on the student's needs.

2. Use Assessment Knowledge and Creativity in Grouping Students

The second challenge for special education teachers is applying scaffolding to meet individualized needs for students in small groups as well as for those mainstreamed into large regular education classes. Using assessment knowledge and creativity in grouping students in special education classes is an essential step given the difficult task of addressing each student's unique learning style.

Grouping Examples

Two possibilities for grouping students are to schedule students with either similar learning needs or goals in the same session, or to place students with various difficulties into different clusters within the same group, where the teacher can rotate direct instruction and independent work for students within the same group.

3. Schedule Regular Meetings for Special Educators and Teachers

Planning and applying appropriate instruction is more difficult when students are mainstreamed in large regular education classrooms. Although scaffolding strategies take into account aspects of the learning process which are common to all students, it is crucial for the special education teacher to inform regular education teachers of their students' needs that make learning even more challenging for them, especially taking into account the size of a large classroom. Therefore, another important task is for special and regular education teachers to schedule regular meetings to discuss students' learning needs and progress.

Special education teachers can also help modify lessons and assessments, as well as co-teach in regular education classes.

Principals' Actions

Principals can provide staff training in scaffolding instruction. However, even once teachers are highly experienced, it is important to take into consideration the planning time needed to implement scaffolding strategies. Principals can offer common preparation time for special and regular education teachers to plan instruction. Most importantly, they can be a part of the instructional process by observing the implementation of scaffolding instruction in the classrooms and providing feedback to individual teachers. Principals can also allow time in staff meetings for teachers to share their experiences regarding individual students as well as the instructional process. Given the intensive work involved in applying scaffolding strategies, teachers cannot implement the method effectively without the support of school administrators.

Principals Actions

- Provide planning time
- Provide time for teachers and special educators to plan
- Observe the implementation of scaffolding strategies
- Allow time in staff meetings to share experiences

Maryland Instructional Leadership Outcomes Met Through Principals' Actions

Principals taking the actions to support scaffolding instruction in special education that we suggest above will demonstrate the following outcomes:

Align all aspects of school culture to student and adult learning (Outcome 2) by:

- Creating effective professional learning communities aligned with the school improvement plan, focused on results, and characterized by collective responsibility for instructional planning and student learning. (2.4)

Resources:

School Improvement Planning: see Leading your school through a school improvement process:

<http://mdk12.org/process/leading/>

Professional Learning Communities
Southwest Educational Development
Laboratory: <http://www.sedl.org>

Provide Staff With Focused, Sustained Research-Based Professional Development (Outcome 7) by creating

- Opportunities for teachers to engage in collaborative planning (7.2)

Resources:

Maryland's Teacher Professional Development Standards

(http://mdk12.org/instruction/professional_development/teachers_standards.html).

Strategies to Support Teaching Reading and Language Arts in Maryland

The next three sections of our report focus on teaching reading and language arts. We begin by presenting important new findings about effective strategies in reading from the research conducted by *Sharon Russell* at the University of Maryland. We believe that the strategies she describes provide important new and highly useable knowledge about what it takes to engage students in reading for meaning. *John Quinn* then outlines how the model of reading apprenticeship can be used to foster reading instruction in content areas. Turning to language arts instruction, *Jane Woodburn* describes the 6 Traits approach to writing used in Montgomery County Public Schools.

Our descriptions can be used by teachers and principals to help inform how schools can design strategies to respond to alignment of curriculum, instruction and assessment that Maryland has undertaken and the implications for teaching reading. The strategies for scaffolding instruction in reading and language arts that we outline can help schools implement the Voluntary State Curriculum, which at this point does not include materials and approaches to professional development to support the content standards.

Maryland State Department of Education's *Kathy Volk* explains "Maryland's VSC has three components- in reading and English language arts: Content Standards- the essential "walk away" knowledge students are expected to have; Unit lessons and materials to support the standards; and Professional development to assist in implementing the essential curriculum. However, at this point the MSDE has completed the Content Standards (<http://mdk12.org/instruction/curriculum/reading/kv.html>).

In this volume we are pleased to offer Maryland educators research-based strategies to scaffolding instruction in reading and language arts supporting the VSC.

Strategies for Scaffolding Instruction in Reading

Sharon L. Russell, College of Education, University of Maryland

Based on her recently completed doctoral research, Sharon Russell (2004) provides extensive research-based descriptions of four strategies for scaffolding reading that address the following design principles:

Strategy 1: Scaffold instruction to support students' diverse recognition networks by using a **Direct Guided Reading Framework (Design Principle 1)**

Strategy 2: Scaffold instruction to support students' diverse strategic networks by using **Text Structure Instruction (Design Principle 2)**

Strategy 3: Scaffold instruction to support students' diverse affective networks by supporting competence through **Goal-Oriented Instruction (Design Principle 3)**

Strategy 4: Finally, Russell links the three design principles in a holistic strategy to encourage reading achievement among adolescent struggling readers through creating: **Accelerated Reading Small-Group Discourse Communities.**

Strategy I: Use Direct Guided Reading Framework

Often, the texts and materials they are forced to read in their high school classes challenge students. They are required to read numerous pages from subject area textbooks that are often very conceptually difficult and poorly written, (Chambliss & Calfee, 1998) and to answer comprehension questions independently after reading (Durkin 1978-1979). Classroom interaction often consists of the teacher asking a question to which one student provides the answer (Gallimore & Tharp, 1990).

Use Strategic Processing:

One way for teachers to assist students with textual comprehension is through teaching students to use strategic processing as they read text. One strategy for assisting students with text comprehension is Direct Guided Reading (DGR) (Russell, 2004). Research indicates that students who comprehend text on multiple levels are able to use multiple cognitive reading strategies flexibly (National Reading Panel, 2000; Palinscar & Brown, 1984; Pressley, 2000; Smolkin & Donovan, 2001; Snow, Burns & Griffin, 1998; Vaughn, 2000).

Design Principle 1:
Scaffold instruction to support students' diverse recognition networks by using a Direct Guided Reading Framework.

Direct Guided Reading (DGR) Framework Steps

The DGR framework has four steps.

1. *First, a question is posed.*

The teacher or students can do this. Often, as students are beginning to learn comprehension strategies, the teacher poses and scribes the question. As students become more proficient, they may be able to pose and scribe their own questions for the group.

2. *Second, students read silently a specifically chunked piece of text, such as a single paragraph, to answer the question.*

Direct Guided Reading (DGR) (Russell, 2004) is a flexible framework for providing students with the reading strategies they must learn to use. The DGR framework is extremely flexible because it allows teachers to teach reading strategies while focusing on content area comprehension.

- During silent reading, the teacher must wait until all students have completed the reading.
3. *Third, students answer the question posed in their own words.*
 4. *Finally, a student must volunteer to read orally only the section of text that supports or proves the answer.*

Examples of strategies that teachers can focus on include:

- answering the question asked,
- posing and answering literal and inferential questions,
- use of context to determine the meaning of vocabulary words,
- use of prediction,
- use of text to support comprehension, and
- comprehension monitoring strategies.

This list is not exhaustive. Teachers need to choose strategies that are appropriate for their students and the text they are using.

DGR Encourages Word Attack and Comprehension Monitoring Strategies

A benefit of the DGR framework is that it adopts principles from early intervention programs. Because students are first reading the question, then reading text silently for a purpose and finally reading text orally, they have three opportunities to practice word attack and fluency within the same piece of text (Clay & Cazden 1990; Malone & Mastropieri, 1992; Russell, 2004).

Teachers can use the oral reading of the text to encourage word attack and comprehension monitoring strategies (Clay & Cazden, 1990). As a student is reading orally, teacher language is crucial. If a student makes a mistake, simply providing the unknown word does not allow the student to think or to monitor comprehension. Teacher prompts that may assist a student in self-correcting his or her own reading include:

- Suggesting that the student re-read the sentence,
- asking the student what makes sense in that sentence,
- syllabifying the word on the chalkboard,
- helping the student to focus on the root word,
- breaking the word apart.
- when a student

makes an unprompted self-correction, it is important to let the student know he or she has done something good readers do.

Comments such as, “nice self-correct,” or “I like the way you re-read that sentence to understand it,” are forms of feedback that offer the student a performance guide (Gallimore & Tharp, 1990).

Adapting the DGR Framework:

As students’ reading skill increases, the DGR framework can be adapted. For example,

Again, scaffolding students through text is important. If a teacher creates a written guided reading sheet, it is wise to first include page numbers to accompany each question so that the text is still chunked for the novice reader.

- A teacher may choose to allow cooperative groups or a single student to become the “guided reading teacher” for a specified section of text.
- Students can create their own guided reading questions that can then be distributed to the class and discussed after the selection is read.
- The teacher may wish to provide guided reading sheets that pose the question but only provide

space for the student to write down the page and paragraph numbers.

- Then the guided reading sheet can become the basis for a class discussion about the selection of text.

What Teachers Can Do

- **Learn to use the DGR framework** comfortably.
- **Incorporate the DGR framework** into your lesson plans. It allows you to accomplish both content and literacy goals.
- **Expect that the DGR process will take time.** But also expect positive results.
- **Know the text extremely well.** Write questions ahead of time and chunk the text according to the abilities of the students in your classroom.
- **Include cognitive strategies** within the framework that assist students with text comprehension.
- **Challenge students** by writing questions slightly more difficult that you think they can answer independently. Then scaffold your questioning until students are able to answer the question asked. This allows you to focus both on textual content and on multiple levels of comprehension.
- **Practice teacher language** that encourages students to think for themselves.

Be observant. Do you need to provide more or less scaffolding? Do you need to chunk the text differently? Is it time to release some responsibility to students? How much can they handle? Scaffold release of responsibility.

Principal's Actions

- **Provide teachers with staff development** in how to incorporate cognitive reading strategies into content courses. Provide staff development in how to implement guided reading.
- Allow teachers who are comfortable with guided reading to **coach teachers who are not.**
- **Provide reading coaches** to work with teachers in secondary classrooms.
- **Support strategic reading** school-wide.

Understand that, in the beginning, the DGR framework will take time. Teachers will be unable to cover as much material at the beginning of the school year. However, as students become more proficient textbook readers, teachers will be able to cover more content. Allow teachers to develop their curriculum standards accordingly.

Strategy 2: Text Structure Instruction

One of the difficulties students may encounter with high school textbooks is a lack of understanding of how texts can be organized. Proficient readers possess an abstract cognitive model that they can apply to a new text. In this way, the reader is able to anticipate how the content will be presented because authors structure their writing according to genres typically accepted by a particular community.

Design Principle 2: Scaffold instruction to support students' diverse strategic networks by using **Text Structure Instruction.**

Research supports the use of text structure instruction in aiding comprehension (Meyer & Poon, 2001, Taylor, 1985) because it assists students in developing an understanding of the organizational formats of text. For example, a text about the differences between Indian and African elephants will be structured very differently from a text about the causes of the Civil War.

Look For Global Structures

High School texts possess a global structure as well as embedded sub-structures. Using graphic depictions to help students organize text may serve to help students negotiate their grade-level textbooks that often switch back and forth between structural patterns. Some of the more common text patterns teachers can focus on include

- compare and contrast,
- cause and effect,
- persuasion or argument,
- sequence or time order, and
- problem-solution.

Evidence Supporting Use of Text Structure Representation

Using the Chambliss & Calfee (1998) model for text representations, Russell (2004) found that:

- Students who engaged in direct text structure instruction were better able to represent the organizational patterns in texts in written summaries.
- Further, students were able to transfer this knowledge to verbal recalls of text when no teacher scaffolding of the text was provided.

Other research in text structure has yielded similar results (Brown, Day & Jones, 1983; Chambliss, 1990; Chambliss & Murphy, 1995; Meyer, Brandt & Bluth, 1980; Winograd, 1984).

Teaching Text Structure

When teaching text structure, it is advisable to use text with which students are already familiar. In this way, they can focus on identifying and graphing the structural patterns of the text devoid of other comprehension and decoding issues. Text structure can be taught using content area text from the curriculum. Teachers and students can create graphic representations of the text or of a piece of text on large chart paper. As students are learning text patterns, they are also engaging in comprehension, solidification of content area material, conceptual knowledge, and vocabulary important to the class.

For example, a chapter about storms can have a global topical net structure where information about various storms such as blizzards, tornadoes and thunderstorms is presented in separate sections. However, the section of text about each storm can have its own sub-structure. ***For example***, the section about thunderstorms may be a cause and effect passage about how thunderstorms form while the section on tornadoes may be an argument for the destruction caused by tornadoes.

Russell (2004) found that students who were scaffolded through difficult text by creating text maps with the teacher were able to recall more content area material in their written summaries than students who were not scaffolded via text structure instruction. Therefore, teachers may want to encourage the use of text maps as study guides.

Release of Teacher Responsibility for Text Structure Representation

As students become adept at recognizing the patterns of text, the teacher can release responsibility for this activity (Gallimore & Tharp, 1990; Vygotsky, 1978).

- For example, students can work in pairs or independently to create their own text graphs for a section of text. Perhaps they can present their text graphs to the class, explaining the decisions they made.

What Teachers Can Do

- ***Become familiar with the structures*** used in your textbooks. Teachers need to understand the patterns in order to teach them.
- ***Choose sections of text*** that lend themselves well to instruction in text structure, especially when you are first teaching text structure.

When beginning text structure instruction, the teacher may want to focus only on the global structure of the text and add sub-structures later.

Use a Blackline Master

It may also help to give each student a ***blackline master*** of the text pattern being taught. Blackline masters of the text patterns adapted from the Chambliss and Calfee (1998) model are found in Russell (2004).

- ***Explain to students the structure they will be learning*** and what types of text are typically structured this way. Allow students to help you create a whole-class text map of the global structure. Then have them help you add main ideas and supporting details to the text map.
 - ***Encourage students to use text maps*** as study guides. Model how this can be done.
 - ***Be patient***. The teaching and learning of text structure takes time. Incorporate it into your lesson plans as appropriate.
- Keep a chart of the text patterns students have learned posted in the classroom and encourage students to refer to it.

Principal's Actions

- ***Provide teachers with staff development*** in understanding and using text structure as a comprehension and study strategy.
- ***Support teachers*** as they learn to use text structure as a teaching method.
- Understand that the ***teaching of text structure takes time***, but that students are also gaining content area knowledge as they engage in text structure activities.
- ***Provide teachers with the charts and materials*** they need to teach text graphing.

Strategy 3: Competence Support through Goal-Oriented Instruction

It is well known that students who struggle to read, especially if they are still struggling when they reach high school, have very little motivation or self-efficacy. They fail to believe that they are able to learn to read or that they are capable readers (Wigfield & Guthrie, 2000). Students who are given clear goals for learning and performance standards against which they can compare their progress (Tharp

Design Principle 3: Scaffold instruction to support students' diverse affective networks by fostering Competence Support through Goal-Oriented Instruction.

& Gallimore, 1990) can gain communicative competence in spoken and written English through the concept of task (Chapman, 1999; Swales, 1990).

A task is a learning goal in which students must become active participants.

- Students must understand and engage in a pedagogical task within the context of a particular text.
- Swales (1990) concept of task can be directly related to what Wigfield and Guthrie (2000) termed competence support.

Competence Support

Wigfield and Guthrie (2000) view competence support as a motivational variable in student learning. The researchers theorized that:

- If a teacher is providing clear goals for achievement students' intrinsic motivation should increase.
- Further, students must *perceive* that the teacher is providing clear learning goals as well as assisting students in meeting those goals (Skinner, Wellborn and Connell, 1990; Wigfield & Guthrie, 2000).

Competence support is another way of considering goal-oriented instruction.

Application to Reading Pedagogy

Relating competence support theory directly to reading pedagogy means that teachers must not only teach cognitive and word attack strategies, they must also provide an attainable goal that the student understands (Gallimore & Tharp, 1990).

- This goal should be connected to the comprehension strategies proficient readers use as they process text.
- Further, the teacher needs to make clear the goal and the ways in which teacher support is being offered to students.

Russell (2004) found that when cognitive strategic reading practices were directly taught, the reading efficacy and the willingness of struggling readers to take risks in reading improved.

What Teachers Can Do

- ***Teach the when, what, how and why of reading strategies*** to students so they understand how good readers use the strategy.
- ***Assist students by practicing the strategy*** in the classroom using their textbooks.
- ***Keep a list of strategies*** taught and learned in the classroom and refer to them to prompt students.
- ***Ask students what they can do for themselves*** when they experience difficulty. Then scaffold the student from what they are capable of doing to a new level of comprehension.
- Make clear both the ***literacy goal*** and ***how the literacy goal links directly to the content*** they are to be learning.

Principal's Actions

- **Provide staff development** for content area teachers to learn how to connect reading strategies to goal-oriented motivation.
- **Empower teachers** to provide the goal oriented strategy instruction they believe their students need.
- Support the teaching and learning of **smaller reading goals** within the classroom as students are engaged in learning content material.
- **Provide extra support** for students who are significantly below grade level.

Strategy 4: Accelerated Reading Small-Group Discourse Communities

Recent data indicates that there exists a sub-population of high school students who are so significantly below grade level in reading achievement that they will not thrive in academic secondary courses. Further, adolescent literacy receives very little attention. Often, adolescents are not

A Crisis in Reading Proficiency
According to the *1998 Reading Report Card*, only **33% of eighth graders and 40% of twelfth graders** were reading at or above a proficient level (National Assessment for Educational progress, 1999).

given appropriate instruction in appropriate materials by teachers who understand the process of becoming literate (Moore, Bean, Birdyshaw, & Rycik, 1999).

The National Center for Educational Statistics further reported that data for grade 12 over the three testing years, 1992, 1994, and 1998 were varied. In 1992, 20% of the nation's twelfth graders were above a proficient level. In the years 1994 and 1996, those numbers were 25% and 23% respectively, indicating that there may have been an increase in reading proficiency among twelfth graders (National Center for Education Statistics, 1998).

Linking the Three Design Principles to Encourage Reading Achievement Among Adolescent Struggling Readers.

The Organization for Development's (OECD), *Student Assessment (PISA)* countries, groups of achieved even minimal school careers. In each of percentage of students PISA level 1.

What Do We Know About
What is known about that appropriate instruction (Snow, Burns, & Griffin, textual material that increase reading 2000). Unfortunately, this school level. Many

U.S. Students Read Below OECD County Average

Six percent of the students taking the assessment in the United States fell below a Level I PISA score, 12 percent scored at PISA Level 1, and 21 percent fell at a PISA Level 2 score, for a combined total of 39 percent of students in the United States falling below the OECD average.

Economic Co-operation and *Programme for International* (2002) echoes this crisis. Across students exist who have not literacy skills throughout their the 31 participating countries, a existed who did not score at the

Assisting Struggling Readers?
assisting struggling readers is must occur in appropriate text 1998). Placing students in frustrates them will not serve to proficiency (Leslie & Caldwell, occurs regularly at the high students who do not possess

basic literacy skills struggle to read their academic texts. Within the current culture of high schools, it may not be possible to assist these readers in gaining communicative competence (Swales, 1990) adequate for success in school.

Create Discourse Communities

For students whose reading achievement is significantly below grade level, it may be necessary to alter the environment of schooling in order to provide learners with avenues for successful literacy acquisition (Brown, 1992; Swales, 1990). For these students,

- creating a small group discourse community where students can take an active role in their own literacy development guided by an expert teacher who provides clear goals for learning (Wigfield & Guthrie, 2000) may make the most pedagogical sense.

A Risk Free Learning Environment

Within this discourse community, students are able to participate in a risk-free learning environment where reading challenges are encouraged and where discussion in appropriately leveled text can create cognitive challenges.

What is Needed to Create Discourse Communities?

Often, low-level expository text can provide students with interesting materials (Guthrie, 2000; Russell, 2004) while they are learning to negotiate the genres typically used in high school classroom textbooks (Chambliss & Calfee, 1998).

Strategies for Small Group Discourse Communities

Strategies applied within these small-group discourse communities are the same as some of those described elsewhere in the Design Principles.

- Direct Guided Reading with word study mini-lessons combined with direct instruction in text structure supported students' reading achievement as well as increased intrinsic motivation for reading through competence support (Wigfield & Guthrie, 2000) and goal oriented teaching (Russell, 2004).

Russell (2004) found that creating daily small-group discourse communities where very low readers were engaged in processes of simultaneously decoding and comprehending low-level exposition enabled these ninth grade students to increase their reading achievement by six to eight grade levels within two school quarters as measured by the Qualitative Reading Inventory-3 (Leslie & Caldwell, 2000). This type of instruction was effective across populations, including low readers who were second language learners and who were labeled as learning disabled along with low readers who carried no school labels.

Transitioning Students Out of Small Group Discourse Communities

Russell (2004) also found that not all students needed to remain in the small-group discourse community for the full 90 school days. It may be possible for some students to achieve success at grade level within one quarter.

- If a single reading specialist can work with six small groups of six students daily, 36 students can be reached in a school quarter.
- If a flexible scheduling procedure is instituted where students who have reached grade level can be placed on a maintenance program, and new students can be accepted into

the reading discourse communities, it is possible that one teacher may be able to assist over 100 students per year.

What Teachers Can Do

- ***Develop risk-free, safe learning environments*** where all students are encouraged to participate as equal partners in the learning process.
- ***Develop positive rapport with students*** through taking a genuine interest in their ability to thrive both in and out of school.
- ***Develop a classroom climate where contingency management centers on praise and positive feedback*** (Gallimore & Tharp, 1990) as opposed to a rule-centered approach.
- ***Encourage and expect self-efficacy from all learners***, particularly students whose first language is not English and students who are labeled as learning disabled.
- Be highly observant in order to ***match reading, thinking, and word attack strategies to learner needs***.
- Be highly observant in order to ***place learners in appropriately leveled text***.
- ***Engage students cognitively in strategic processing*** that extends beyond the text in order to tap the cognitive resources adolescents already possess.
- ***Engage students in learning and creating text structure maps*** to assist them in understanding how exposition is organized.

A teacher who is knowledgeable in the processes of reading acquisition must implement this type of program.
See *Sharon L. Russell (2004)* for guidance in developing capabilities in teaching reading.

Principal's and Administrator's Actions

- ***Hire highly trained reading specialists*** to work in small groups with adolescent struggling readers.
- ***Plan for flexible scheduling***, or devise a system of scheduling that accommodates such a program.
- ***Accommodate schedules*** that allow English as Second Language students as well as special education students to participate.
- ***Provide resources*** for the reading specialist to acquire the appropriate textual materials needed.
- Develop school procedures and rules that ***focus on positive behaviors and attitudes***.
- ***Develop rapport with teachers*** so there is understanding of how they are creating discourse communities in the classroom.
- Understand that ***learning in a discourse community may not look traditional***.
- ***Respect teachers professionally*** as facilitators of positive discourse communities.

Principals should empower teachers to create discourse communities for struggling readers.

Maryland Instructional Leadership Outcomes Met Through Principal's Actions

Principals taking the actions to support scaffolding instruction in reading that we suggest above will demonstrate the following outcomes:

Facilitate the development of a school vision (Outcome 1) by developing:

- A written school vision that encompasses values, challenges, and opportunities for the academic, social, and emotional development of each student (1.1)
- Resources aligned to support the vision (1.4)

Align all aspects of a school culture to student and adult learning (Outcome 2) by demonstrating

- High expectations for all students and teachers in a culture of continuous improvement (2.2)
- Effective professional learning communities aligned to the school improvement plan, focused on results, and characterized by collective responsibility for instructional planning and student learning (2.4)

Provide staff with focused, sustained, research-based professional development (Outcome 7) by providing

- Opportunities for teachers to engage in collaborative planning and critical reflection during the regular school day (job-embedded) (7.2)

Resources

To read about the Directed Guiding Reading Framework and Discourse Communities see Russell, S. L. (2004). *Cognitive challenge in appropriate text: A framework for accelerating the literacy growth of adolescent struggling readers*. Unpublished doctoral dissertation. University of Maryland, College Park.

See School Improvement in Maryland website for teaching and learning in reading and language arts <http://mdk12.org/instruction/curriculum/reading/kv.html>

Hear Kathy Volk talk about the alignment of curriculum, instruction and assessment that Maryland has undertaken and the implications for teaching reading.

Scaffolding Instruction in Science Through Reading Apprenticeships

John Quinn, Howard County Public Schools

Reading in the Science Classroom

School Improvement Maryland website on teaching and learning in the science classroom now highlights the importance of reading in the science classroom:

Reading strategies help students focus their thinking and construct meaning. Many of these strategies are a natural part of the science lesson.

- The science content area provides students with the opportunity to use reading skills in an authentic environment. The authentic application of these skills is a critical experience for students as they learn to read. Science texts give teachers the informational material the students can

Science provides a context for reading. Because the topics in the science curriculum stimulate a student's natural curiosity and sense of wonder, they motivate the student to read.

School Improvement Maryland: Reading in the Science Classroom: http://mdk12.org/instruction/curriculum/hsa/earth_space/reading_classroom.html

summarize and can explore for details that can be organized. The information students collect can be connected to their prior experiences.

- Science investigations give students the opportunity to read to perform a task. The investigation challenges them and they are motivated to explore and discover.
- Students can analyze and evaluate before, during, and after they conduct the investigation.

School Improvement Maryland website states:

Science provides lessons that build proficient readers. A science educator who understands the natural connections between reading and science strategies is equipped to produce powerful lessons.

John Quinn reports on how Howard County Public Schools foster the opportunities for teachers to gain an understanding of this connection by using reading apprenticeship in science classrooms.

What is reading apprenticeship?

Reading apprenticeship is a strategy that helps content area teachers utilize their expertise with reading in their particular field to help their students become better readers. Since content teachers already know how to use the information from the texts of their disciplines, they are in an ideal position to apprentice their students into learning how to read the content material.

Reading apprenticeship addresses four dimensions to classroom life that support student achievement:
Social – building community,
Personal – connecting to reading,
Cognitive- developing comprehension and problem solving strategies, and
Knowledge-building – deepening understanding of text.

Why does reading apprenticeship work?

Teachers help their students learn and internalize strategies for persisting with and understanding texts that students perceive as difficult, boring, or irrelevant. Once students have been given methods for comprehending difficult and seemingly boring texts, they often become more engaged in the content.

What Teachers Can Do

- ***Model the behaviors and strategies*** that they have mastered for reading in their content areas. This is known as making the invisible (thinking) visible.
- ***Engage in ongoing conversations*** with students and ask them to discuss their personal relationships to reading, the social environment and resources of the classroom, their cognitive activity, and the kinds of knowledge required to make sense of the text.
- ***Initiate metacognitive conversations*** to be carried out both internally, as teacher and students individually read and consider their own mental processes, and externally, as

Studies conducted in California by WestEd nonprofit education, a research and development agency that helped develop the program, have shown that reading apprenticeship has yielded great progress in student reading achievement.

they talk about their reading processes, strategies, knowledge resources, and motivations in their interactions and responses to text.

- **Use classroom applications such as think-alouds, talking to the text, and double entry journals** during reading activities to guide students through the stages of the metacognitive conversation - noticing their thinking, focusing on their reading, taking charge of their reading processes, and becoming aware of subject area discourse.

Principals' Actions

- **Establish reading apprenticeship as a school-wide strategy** to improve reading performance and offer a training institute for staff members. Certified trainers for reading apprenticeship can be contracted from WestEd.
- **Create action research teams** of participants that meet on a monthly basis for follow-up training in implementing reading apprenticeship and/or for sharing their experiences with implementation.
- **Administer pre implementation and post implementation** "Student Reading Surveys" (provided by WestEd) to students.
- **Interview students** during the year about reading apprenticeship as another source of data to be shared with instructional staff.
- **Examine trends in data** associated with formal state and local reading assessments.

Maryland Instructional Leadership Outcomes Met Through Principal's Actions

Principals taking the actions to support scaffolding instruction through reading apprenticeships that we suggest above will demonstrate the following outcomes:

Use Multiple Sources of Data to Improve Classroom Instruction (Outcome 6) by

- Regular use of the MSDE websites (Maryland Report Card and School Improvement) 6.1.
- Root cause analysis of student performance on school-wide data and decisions driven by those ongoing analyses (6.3).

Resources
MSDE Assessments in Science:
<http://mdk12.org/instruction/curriculum/science/assessments.html>

Ensure Regular Integration of Appropriate Assessments into Daily Classroom Instruction (Outcome 5) by

- Multiple and varied assessments that are collaboratively developed (5.1)
- Formative assessments that are a regular part of the ongoing evaluation of student performance and which serve as a basis for adjustments to instruction (5.2)

Resources:
WestEd: Strategic Content Literacy Initiative www.wested.org/stratlit
Reading in the Science Classroom:
http://mdk12.org/instruction/curriculum/hsa/earth_space/reading_classroom.html

Provide Staff With Focused, Sustained Research-Based Professional Development (Outcome 7) by

- Professional Development that is connected to school improvement goals and is results oriented (7.1).
- Opportunities for teachers to engage in collaborative planning and critical reflection during the regular school day (job-embedded) (7.2).
- Personal involvement in professional development activities (7.4).

Resources for Principal Supported Professional Development:

School Improvement Maryland: *Teaching and learning: Science: What are the components of a science lesson:*

http://mdk12.org/instruction/curriculum/hsa/earth_space/instructional.html

Schoebbach et. al, (1999). *Reading for Understanding: A Guide to Improving Reading in Middle and High School Classrooms*. San Francisco. CA: Jossey-Bass,

Jordan et. al., (2001, May). Amidst Familial Gatherings: Reading Apprenticeship in a Middle School Classroom, *Voices from the Middle*, 8(4)

Scaffolding Instruction for Improved Student Learning in Writing

Jane Lai Woodburn, Montgomery County Public Schools

What the strategy is

An approach to scaffolding instruction to improve student learning in writing is the 6-Traits model, an interactive writing process using analytic assessment to guide instruction.

Montgomery County Public Schools use the 6-Traits approach for effective writing instruction as described in the system's English/Language Arts curriculum guide:

Writing in MCPS is based on instruction and assessment of six essential features: ideas and development, organization, voice, word choice (diction), sentence fluency (syntax), and conventions. These are traits of effective writing in all types of discourse, whether the purpose is to persuade, to tell a story, or to explain an idea. Since students can revise what they can assess, they learn to discuss writing in terms of these six features at an early age and continue to do so through high school. The 6-Traits approach and rubrics offer a clear vocabulary for students and teachers to discuss, develop, and assess writing in all content areas, empowering students to become confident communicators.

6-Traits Approach for Effective Writing Instruction

was developed, researched, and field-tested by the Northwest Regional Educational Laboratory since 1982. www.nwrel.org

Ideas and Development – Theme or purpose of a piece of writing, insights of the author, the information, elaboration, images, and carefully selected details that build understanding and hold the reader's attention.

Organization – Overall structure of a piece of writing, the introduction, sequence of ideas and details, the conclusion, and transitions to keep the writing moving with purpose.

Voice – *Writer’s sense of both self and audience, the way the writer brings together all aspects of writing, suggesting the person and personality behind the words.*

Word Choice (diction) – *Precision in language; the careful selection of words with a sense of purpose.*

Sentence Fluency (syntax) – *The way sentences are put together in terms of length and structure to create a rhythm and flow to achieve the writer’s purpose.*

Conventions – *The overall clarity and correctness of written expression: punctuation, spelling, grammar, usage, capitalization, and paragraphing.*

Why it works

Using the 6-Traits approach that focuses instruction on the essential elements of good writing during all phases of the writing process, students have a structure for assessing the effectiveness of their own work. Direct instruction on several traits of effective writing is linked with each stage of the writing process:

Pre-writing – *thinking, finding, and organizing (Ideas and Development)*

Drafting – *assembling (Ideas and Development, Organization, Voice)*

Revising – *fine-tuning content (Organization, Voice, Word Choice, Sentence Fluency)*

Editing and Proofing – *fine-tuning mechanics (Word Choice, Sentence Fluency, Conventions)*

The 6 Traits model works because the teacher is modeling and providing guided practice with lots of support initially, and then gradually removes the support so students can perform the tasks independently using the scoring guides to self-assess their own work.

The 6-Traits model scaffolds writing instruction by breaking the writing process down into meaningful, manageable elements to meet the needs of the student. Supports are put in place temporarily to allow students to achieve success and are gradually withdrawn so students can perform independently. The Student-Friendly Scoring Guides for each trait define what good writing looks like by providing smaller pieces for students to work on, as they become more proficient writers. By using these scoring guides to assess other students’ writings,

The 6-Traits writing approach is assessment-based and is consistent with the **MSDE Content Standards for writing**.

students begin to understand the power of the traits and become better writers.

What Teachers Can Do

By scaffolding instruction, teachers introduce each trait through direct instruction eventually moving students toward independent use of the scoring guides for each trait to improve their own writing. In grading student-writing samples, teachers would focus on pre-determined traits and not attempt to grade writing samples on all 6 traits at one time.

At every grade level, teachers should design and implement instruction on all 6 Traits of effective writing, and consistently assess student writing using the analytic writing assessment continuum and scoring guides. Since the traits are not a curriculum but rather a shared vocabulary and vision of what good writing looks like, teachers need to look at the curriculum and decide where the teaching of the traits would logically fit. Traits can be taught in isolation that allows students time to build on each trait. Based on pre-writing

assessments, the teacher starts teaching traits aligned with the student’s strengths and then builds on other traits that might be weaker areas for the student.

Teachers need to instill in their students the importance of writing not only to be able to effectively communicate in written form, but also in terms of standardized testing such as the new SATs which will have a writing section, the Maryland School Assessments, and the High School Assessments.

Teaching traits is more effective when developed in context guided by the needs of students as determined by pre-assessments.

Principals’ Actions

As the instructional leader of the school, principals need to be knowledgeable about the 6-Traits approach and the scoring guides/rubrics in the *MCPS English/Language Arts Curriculum Guide* so they will know what to “look for” when making classroom observations and evaluating teacher performance.

Maryland Instructional Leadership Outcomes Met Through Principal’s Actions

Principals taking the actions to support scaffolding instruction in writing that we suggest above will demonstrate the following outcomes:

Monitor the Alignment of Curriculum, Instruction, and Assessment (Outcome 3) by:

- Ongoing conversations with teachers as to how state content standards, voluntary state curriculum and/or local curriculum and research based strategies are integrated into daily classroom instruction (3.1)
- Student work that is rigorous and demonstrates new learning (3.2)

Resources:
6+ 1 Trait Writing: A Model That Works: Video Set, NWREL
Contact: Ms. Annette Ffolkes, principal, Galway Elementary School, Montgomery County, MD (301) 595-2930, Email: Annette_M_Ffolkes@fc.mcps.k12.md.us

Provide Staff With Focused, Sustained Research-Based Professional Development (Outcome 7) by

Professional development that is connected to school improvement goals and is results oriented (7.1)

Resources:
Maryland’s Teacher Professional Development Standards (http://mdk12.org/instruction/professional_development/teachers_standards.html).
School Improvement Maryland: What is new in Reading/ELA? <http://mdk12.org/instruction/curriculum/reading/kv.html>

Strategies for Scaffolding Instruction in Mathematics

Kathryn L. Kubic, Anne Arundel County Public Schools

In the current education arena, a school's success is clearly defined by the performance of its students on high stakes assessments. In Maryland, that assessment is called the Maryland School Assessment (MSA). A common state assessment, such as the MSA, is a level playing field for all 24 districts in the state on which schools can be measured.

MSA Should Be Part of a Scaffolded Instructional Program

I would argue, on the other hand, that the MSA is part of a scaffolded instructional program for students. Note that I refer to the MSA as an instructional tool, not merely an assessment:

- *Educators should always question why they give the MSA or any assessment if they do not make instructional decisions based upon the results.*

A common perception by some district leaders, however, is that the MSA is a "be all/ end all" assessment taken by students in early March (or late February!). These district leaders perceive the year as a march of instruction through curriculum towards the MSA, and they hope that their students did well while eagerly awaiting the results return in June.

The MSA provides an annual snapshot of a child's progress against expected mastery of grade level material; however, it should be only one snapshot in a series of assessments that together form a video of student progress. And like any well-scripted video, the result should not be a surprise. Rather, with a properly scaffolded instructional program, educators should know how a child would perform on the MSA *before* the results are returned. A scaffolded instructional program, in fact, should move *all students* from their starting point to a proficient level or from a proficient level to an advanced level of achievement on the MSA. Additionally, all Maryland educators realize that time is not an ally.

A scaffolded instructional program, or any instructional program, must be applicable to all students and time efficient

This section describes the ***scaffolded instructional program used by Anne Arundel County Public Schools (AACPS)*** in the 2003/2004 school year for mathematics instruction. After one year of implementing the new mathematics program, in which scaffolding instruction was a part, students demonstrated significant improvement on the MSA. The table below shows the

percent of students performing at the proficient or advanced levels in the years before and after the new mathematics program was implemented.

Percent of students scoring at the proficient or advanced level in Anne Arundel County Public Schools on the Mathematics section of the MSA

	<i>2003 MSA</i>	<i>2004 MSA</i>
<i>Grade 3</i>	73.3	81.4
<i>Grade 5</i>	64.5	76.9
<i>Grade 8</i>	39.1	56.2

Steps in Building a Scaffolded Instructional Program for Mathematics

AACPS used the following steps:

- Shatter Damaging Myths;
- Align the Curriculum, Instruction, and Assessment;
- Assess Students on a Continuum; and
- Review Content Standards on a Steep Trajectory.

Although the bulk of the physical work is divided between the county and school level for the final 3 steps, the mental challenge of the first step is shared by every member of the organization. It often proved to be the most difficult yet most profitable step.

Step 1: Shatter Damaging Myths

The first step to building a scaffolded instructional program for mathematics, or any successful mathematics program, is to shatter the most common and damaging myths that typically permeate mathematics instruction. These myths are firmly rooted in some educators' mindsets and affect their instructional decisions and guide their anticipated outcomes. In AACPS, we found that the technical aspects of implementing a scaffolded instructional program were much better received and easier to implement in schools and classrooms that did not cling to these myths. *We recognized the importance of building on a strong belief system, and worked through every level of the organization to foster the same beliefs*

Common and Damaging Myths in Mathematics Instruction

Myth – *Mathematics is for the academic student, and some kids will just never “get it.”*

Fact – Every student must learn rigorous mathematics. In Maryland, students must successfully complete a course in Algebra, a course in Geometry, and one additional high school level course to receive a high school diploma. To deny a child grade level material, especially at the early grades, significantly decreases that child's potential to earn a high school diploma.

AACPS' Response – We adopted the motto “Every child should have the opportunity to learn rigorous mathematics.” We used this motto on all curriculum documents and communications. We often asked educators to identify those variables that prevented children from learning rigorous mathematics and worked to eliminate them or work around them. Classroom teachers were strongly discouraged to consciously omit grade level material, particularly for Special Education students.

AACPS's Response – We eliminated the bell curve philosophy from assessments, and pushed for results where every child successfully passed the minimum requirements. The goal became to teach so that every child was able to get every question correct. The Superintendent of AACPS refers to this phenomenon as the “***J Curve.***”

Myth – *The results from an assessment should take on the form of a bell curve indicating that some children excelled, most children performed satisfactorily, and some children failed.*

Fact – According to NCLB, all children must eventually perform at least at the proficient level. Therefore, any curve that indicates a level of student failure is unacceptable

Myth - *Tests are an assessment tool.*
The results are used as a cross sectional piece of data for a unit or chapter of study. The class moves on to the next unit independent of the results.

Fact – Tests and quizzes are an instructional tool. The results are one piece of longitudinal data that tell us the strengths and weaknesses of the instructional program: what concepts and skills might be eliminated from further instruction and what concepts and skills must be spiraled back into instruction.

AACPS' Response – We developed and implemented an assessment data gathering system for every teacher in grades 1 through Geometry. Teachers could enter their classroom data for any chapter test, but were required to enter the data for at least 3 chapter tests. The data was collected for each question on the assessment, and each question was linked to a content standard in the Maryland Voluntary State Curriculum (VSC). The data could be analyzed at the classroom level by the teacher, at the school level by the principal, or at the county level by the Mathematics Coordinator or anyone on the instructional staff. Curriculum and instructional decisions were constantly made based on this data.

Myth – *Assessments are usually whole class periods in length and are administered to students in a silent testing environment.*

Fact – Assessment should be part of daily instruction and may take on multiple and varied formats as necessary to accelerate student achievement.

AACPS' Response – Teachers were encouraged to give short, frequent assessments in a variety of testing environments. Although the content, format, and rigor should always lead to the type expected on the high stakes assessment, the method of delivery can change and dramatically affect student results. See *Assess Students on a Continuum* and *Reviewing for High Stakes Assessments*.

Step 2: Align the Curriculum, Instruction, and Assessments

Curriculum-

In the instructional calendar year, there is simply no time to waste. For this reason, AACPS adopted the VSC to guide instructional decisions. This adoption avoided the instructional gaps and overlaps that so often plague rogue mathematics programs.

Instruction –

AACPS implemented four instructional variables to bring students from the required curriculum to the required assessment.

The Voluntary State Curriculum (VCR) clearly indicates the concepts and skills expected for students to master at each grade level. It narrowed the curriculum for each grade thus preventing “a mile wide and inch deep” curriculum.

Single Text Adoption –

Our county purchased the same, new, high quality text for each grade or mathematics course for every student in our district. The only exception to this rule was the purchase of two different programs at the elementary level based upon prior student performance. Each text was chosen for its alignment with the VSC and supplemental instructional materials. The

motivation for such a costly investment was the belief that the quality or quantity of the instructional materials provided to a child should not depend upon the school that the child attends.

Pacing Guides –

Select teachers and district staff wrote a Pacing Guide for each grade or mathematics course from Kindergarten to Advanced Placement Calculus. Lessons in the text that are not part of the VSC were omitted, and a Focus Lesson was written for VSC content not found in the text. Each guide consists of a page called “A Year at Glance” and subsequent pages with 5 columns: Day Number, Student Outcome, Text Reference, VSC Content Standard Reference, and a Lesson Closure Question.

These Pacing Guides are the “what” and “when” of instruction. They suggest to teachers what content should be taught and provide a reasonable timeline to cover the material before the high stakes assessment.

County Produced Assessments –

Although only one part of the assessment continuum described further in Step 3, selected teachers and district staff wrote the chapter tests for every grade and course from 1st grade through Geometry. Each teacher received an assessment packet for his or her grade or course. The packet contains the assessments, answer keys, and a chart detailing these items for each question on the assessment: the appropriate lesson that covered the material, the level of cognitive demand at which the question was written, and the VSC indicator being assessed.

Each assessment was written to mock the format and rigor expected for each grade. For example, third graders were only given SRs and BCRs while eighth graders were given SRs, BCRs, ECRs, and SPRs.

Staff Development –

Creating a newly aligned mathematics program was a costly drain on district resources, but we were aware that all efforts would be fruitless without the knowledge, understanding, and implementation of the classroom teachers.

Significant time and money was spent on providing adequate staff development. For example, approximately \$200,000 was spent in stipends and materials for mathematics summer camps for classroom teachers.

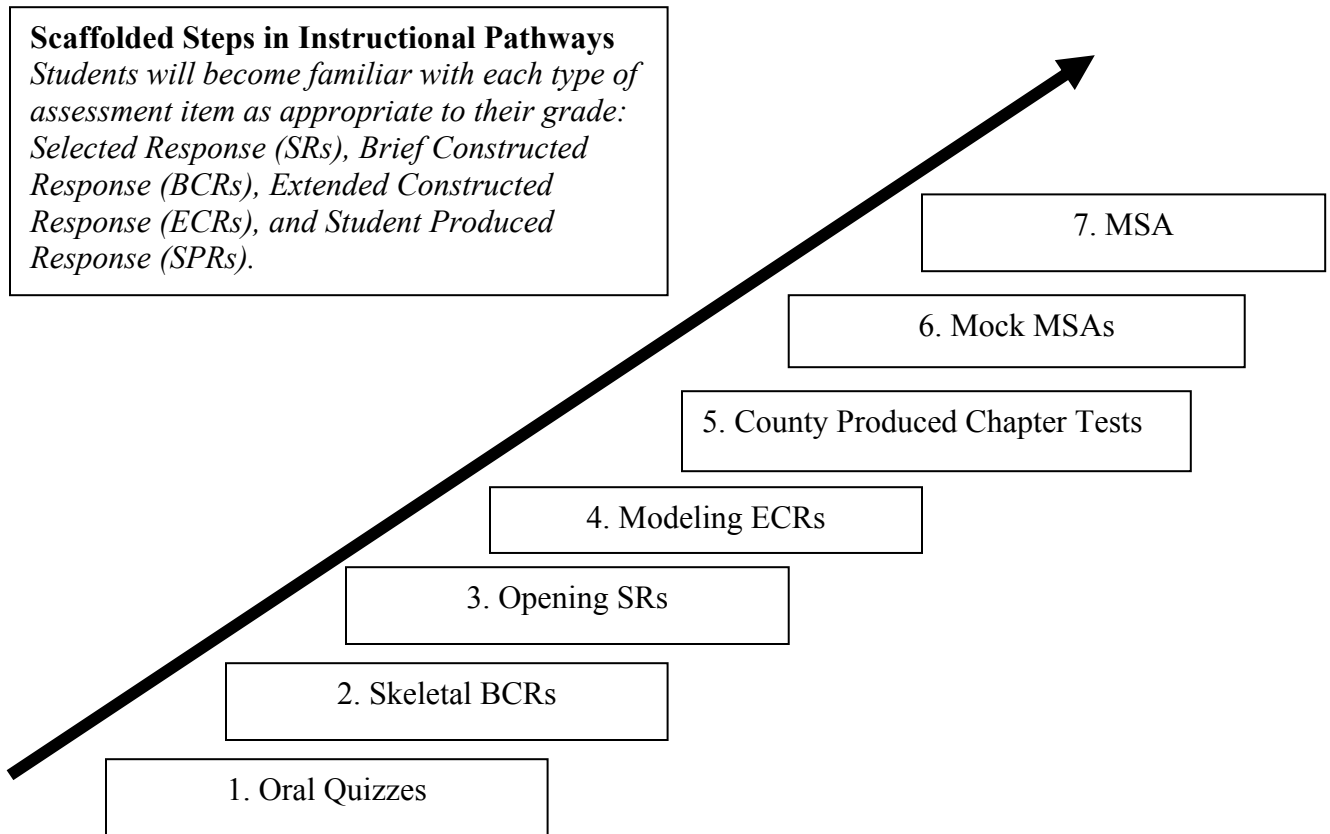
Step 3: Assess Students on a Continuum

Changing teacher assessment practice is not an easy task; therefore, a comparison to preparation to the driving test often helped teachers adjust to the necessary changes in assessment strategies. If a student is taught how to drive an automatic transmission on flat terrain, that student was most certainly taught how to drive. If, however, that student is given the driving test in a stick shift in a hilly area, that child will fail the assessment.

It follows that students must be taught the content in the appropriate format and at the appropriate level of rigor. AACPS recognized that students could not leap to the level of difficulty expected on the MSA in so many question formats. Consequently, a scaffolded assessment program was developed.

Pathway to Leading Students to Success on Assessments

When inservicing teachers on assessment strategies, it is helpful to remind teachers that we want all students to eventually perform at the advanced level on a rigorous high-stakes assessment. That is the long-term goal, but it is our responsibility to build the steps necessary for them to achieve that goal. The following strategies are a pathway to lead the lowest performing students to success on the toughest assessments.



1. Oral Quizzes

First, for new material, teachers were encouraged to give oral quizzes. This strategy was the hardest for some educators to accept until it was compared to a coach walking players through a new play. It is a first level assessment strategy that might be omitted in higher performing classrooms, but it worked particularly well for previously unsuccessful students.

An oral quiz is an opportunity for the teacher to talk each student through the assessment and provide instructional cues and direction.

- Appropriate assessment directions are given and high level of cognitive demand is expected, but the framework of the question is provided.
- Students respond well to coaching, and

For example, when trying to assess if students know the new location of a coordinate if its old location is flipped over the x -axis, students could be walked through the construction of the coordinate plane on the board using appropriate terms and labels. The question is then set up on the board yet phrased orally as a SR or SPR to the class.

their performance reflects their success.

- These assessments are short and very scripted. Students should be given the possible SR responses on their paper.

2. Skeletal Brief Constructed Responses (BCRs)

The next assessment strategy works particularly well as a closure question. Students should not be expected to immediately master material presented in the class period, but they should be able to demonstrate a beginning understanding. A skeletal BCR provides this mechanism of assessment.

- Students are given a question and asked to use their notes and class examples to complete the BCR.
- As the material appears more often in the instruction, less of the skeletal frame is provided to the students.

3. Opening Selected Responses (SRs)

The next layer of assessment can be performed at any time during the instructional period, but it works particularly well as an opening question for a lesson.

- The teacher should review the previous night's assignment and answer questions.
- Next, the students are presented with no more than three Selected Response Items (SRs).
- These questions should directly reflect the content and level of difficulty of the previous night's assignment.
- Papers can be exchanged and graded quickly to determine the success of the prior lesson.
- The amount of spiraling necessary in the next lesson is therefore determined.

4. Modeling Extended Constructed Responses (ECRs)

To prepare students for ECRs, which are often considered the most challenging type of MSA question; a modeling strategy is appropriate at any time in the instructional period.

- Students are given the question and a well-written ECR on a topic to serve as a model.
- The teacher quickly reviews the question and answer.
- The students are then given a similar ECR and asked to rewrite a poorly written ECR response based on the model.
- Students can also be asked to independently produce their own response based on the model.

Modeling is similar to any trade occupation where the worker knows exactly what the guidelines are for the finished product although each product is different. *For example, a person who washes cars is not trained on every type of car. Rather, the training on one type of car applies to all types of cars.*

By providing daily assessment opportunities during instruction, students are continually being prepared for the county produced assessments in content, format, and rigor. Additionally:

- Teachers were encouraged to break up the county produced assessments if necessary at the beginning of the school year to lessen the time spent on assessment each day.
- Teachers in elementary school were also encouraged to read assessment questions as appropriate in the lower grades until their students could adjust to the expectations.

5. Mock Maryland School Assessment

The final step of preparation for the MSA was called the Mock MSA. The format of the Mock MSA matched the format for each given grade, and the level of rigor of questions varied. Teachers were instructed to use class time as appropriate to review these questions that county data revealed to be most troublesome to students.

Keeping in mind the utmost value of each instructional minute, AACPS did not want teachers to simply administer this assessment as a silent test. Rather, we encouraged multiple classroom scenarios with each one having the goal of every student getting every answer correct.

Step 4: Review Content Standards on a Steep Trajectory of Expectation

No effort of instructional preparation for the MSA is complete, however, without a focused review of content. Again, a coaching analogy of going through a routine or the plays before the sporting event is not only expected, but also a very good idea. Similarly, students must be reminded of the content, format, and rigor before the MSA.

AACPS also adopted a scaffolded approach to review for the MSA. Although students were reminded daily of SRs and SPRs during class, the hurdle to prepare students for the BCRs and ECRs seemed most daunting.

Whereas commercially available products expect students to be immediate masters of every content indicator, we recognized the length and breadth of the year and built our review to support students through the material.

A Six Week Plan Preparing for Maryland State Assessment in Mathematics

The following plan went into effect for the six weeks prior to the MSA on each of the mathematics content strands: Algebra, Geometry, Measurement, Probability, Number Sense, and Statistics. Central office staff provided all material electronically to principals who then made it available to their staffs.

Constructed Responses Weekly Plan

DAY 1 (Whole Class)

- Teacher reads BCR/ECR
- Class reads BCR/ECR
- Students answer and teacher writes responses on OH/chart paper
- Class reads response
- Teacher shares exemplary response

DAY 2 (Whole Class)

- Teacher reads BCR/ECR
- Class reads BCR/ECR
- Teacher reads example of a “1” response (BCR) or a “2” response (ECR)
- Students give suggestions to revise BCR/ECR to a “2” response (BCR) or a “3” response (ECR)-Teacher writes revision on chart paper
- Class reads response
- Teacher shares exemplary response

DAY 3(Partners)

- Partners read BCR/ECR
- Partners write response
- Partners share responses with class
- Teacher/students make suggestions for improvement
- Partners revise response
- Teacher shares exemplary response

DAY 4(Partners)

- Partners read BCR/ECR
- Partners write response
- Partners share responses with class
- Teacher shares exemplary response

DAY 5(Independent) (Graded)

- Student reads BCR/ECR
- Student writes response
 - Grade 3- 11 minutes for BCR
 - Grade 5- 7 minutes for BCR
 - 11 minutes for ECR
- Students share responses
- Teacher collects BCR/ECR for a grade
- Teacher shares exemplary response

Maryland Instructional Leadership Outcomes Met Through Principal's Actions

Principals taking the actions to support scaffolding instruction in mathematics that we suggest above will demonstrate the following outcomes:

Align all aspects of a school culture to student and adult learning (Outcome 2) by

- Demonstrating that there are high expectations for all students and teachers in a culture of continuous improvement (2.2)

Monitor the Alignment of Curriculum Instruction and Assessment (Outcome 3) by

- Demonstrating that assessments regularly measure student mastery of the content standards (3.4)
- ***Ensure the regular integration of appropriate assessments into daily classroom practice (Outcome 5) by:*** Demonstrating that there are multiple and varied assessments that are collaboratively developed (5.1)

Use multiple sources of data to improve classroom instruction (Outcome 6) by:

- Root cause analysis of student performance on school-wide data and decisions driven by those ongoing analyses (6.3)

Resources

See School Improvement in Maryland website for teaching and learning mathematics

<http://mdk12.org/instruction/curriculum/mathematics/index.html>

Listen to Donna Watts introduce the Voluntary State Curriculum for mathematics

For web based resources in mathematics and other content areas search- Education Resources Index:

<http://el.k12.md.us/EducationResources.html>

Cross Curricular Strategies for Scaffolding Instruction

In this section of the report, we present two cross-curricular strategies for scaffolding instruction that address all four design principles.

Strategy 1: Bud Rorison describes a strategy to scaffold instruction by providing appropriate practice, feedback, and assessment, and linking grading directly to mastery objectives.

Strategy 2: Allan D. Arbogast describes a strategy to scaffold instruction by developing unit designs that promote increased cognitive demand and student independence.

Cross Curricular Strategy 1: Provide appropriate practice, feedback, and assessment, and tie grading directly to mastery objectives.

Bud Rorison, Montgomery County Public Schools

Current research on practice, feedback and assessment suggests that teachers look differently at how they assess and grade their students. Traditionally, teachers included many instructional activities such as class work and homework into the final grade for students (Marzano, 2000). However, these grades often serve as proxies for participation because teachers cannot feasibly grade these daily assignments for accuracy and they award points simply for assignment completion.

Practice and Feedback Should Not be Graded

While research suggests that practice and feedback play a crucial role in student learning, these activities should not be included in student grades (Marzano, 2000). Students need opportunities to practice and make mistakes without the consequence of poor grades.

When teachers include points for assignment completion in the grade, this grade may no longer accurately reflect completion of mastery objectives.

What Kind of Feedback Is Needed?

When feedback is personalized, constructive, and provides information as to *why* a response is wrong, students can learn from their mistakes (Hoy & Hoy, 2003). Appropriate feedback should be “*corrective*”, *timely*, and *specific to a criterion* (Marzano, Pickering, & Pollock, 2001). After sufficient practice and feedback, teachers then provide graded activities that allow students to demonstrate (ideally in multiple ways) what they know. If these assessments are tied to clearly stated mastery objectives, teachers can accurately determine the level of student understanding, provide additional opportunities for students to demonstrate understanding if appropriate, and assign a grade that accurately reflects completion of mastery objectives.

What Can Teachers Do?

- establish and communicate *clear mastery objectives*
- provide *sufficient practice and appropriate feedback*
- provide *multiple forms and opportunities for assessment*
- assign grades based on a body of evidence of *completion of mastery objectives*

Principal's Actions

- *provide staff development* activities to help teachers grapple with the idea of grading solely on completion of master objectives and not on participation.
- provide training to teachers on *appropriate forms of feedback.*
- provide training to teachers on *multiple forms of assessment and grading practices.*

From Principle to Practice

Montgomery County Public Schools is currently implementing a new grading policy that differentiates between assessing academic achievement and assessing learning skills such as participation and assignment completion. In addition, the policy requires that teachers move away from reporting grades based on points attained divided by points possible to reporting grades based on a scale of 0-4. This system assigns an equal weight to each grade as opposed to grades A-D representing a 10 percent range each while an E represents a range from 0-59, skewing overall grades towards failing.

See MCPS's new grading policy at <http://www.mcps.k12.md.us/info/grading/documents/supporting/>

Cross Curricular Strategy 2: Develop unit designs that promote increased cognitive demand and student independence.

Allan D. Arbogast, Anne Arundel County Public Schools

Unit designs that end with performance assessments provide a platform for scaffolding cognitive demands and student independence.

Use a Backward Mapping Scheme

- By using a backward mapping scheme, teachers develop units that begin with a guiding question and end with a performance task that addresses the guiding question (Wiggins & McTighe, 1998). Teachers use task analysis to determine the sequence of learning, moving from factual knowledge to application to problem solving and finally to self assessment (Anderson & Krathwohl, 2001).
- In addition, the tasks begin with teacher support and direction and gradually release responsibility to cooperative student teams and ultimately to individual student accountability (Maehr & Andermann, 1993).

The final project should involve authentic audiences (Hoy & Hoy, 2003).

What Teachers Must Know About Unit Planning

- *Plan has a guiding question* that reflects the unit program indicators.
- *Plan has a focus question* that clarifies a concept, process or application (the student outcome) that refers back to the guiding question.
- The applications require *cross-curricular connections*.
- Students *apply knowledge to real problems* and reflect on their own thinking.
- Student accountability reflects *high level thinking*.
- Students can *demonstrate their understanding* of the concepts and applications in *more than one format*.
- The *sequence of lessons* moves from specific teacher didactics to student support teams (cooperative learning) to individual student application and accountability.
- Students use a *rubric to self assess*.

Activities are scaffolded to develop understanding. For example, the thinking becomes sequentially more difficult, with new learning built upon previous learning.

What is Required?

- Students have enough background knowledge or text support to complete the activities.
- There is a high level of engagement through a variety of tasks incorporating multiple intelligences.
- Group dynamics are addressed.

See Wiggins, G. and McTighe, J. (1998) *Understanding by design*. Alexandria, VA: ASCD.

What is Assessed?

- Are students able to demonstrate attainment of the outcome?
- Does each activity contribute to student understanding and achievement?
- Does the plan use time effectively?

See: Maryland Assessment Consortium, at-
www.newhorizons.org/strategies/assess/mctighe.htm

Principal's Actions

Principals should ask:

- Do teachers have access to and an understanding of the outcomes and assessment limits?
- Are there opportunities for cross-curricular connections?
- Are there opportunities to provide audiences for student work?

Principle to Practice
Developing Unit Plans by Scaffolding Instruction Using Maryland's Voluntary State Curriculum

Grant Wiggins and his colleagues (2004) remind us that content standards and benchmarks should NOT be addressed one at a time through targeted lessons.

INSTEAD:

- Cluster discrete standards under an umbrella of BIG ideas.
- Use complex performance assessments so that students can apply facts, skills and concepts contained in multiple standards to deepen their understanding.

Theory to Practice in Teaching and Learning Science

Look at: MSDE mdk-12 website: Teaching Science: *Designing a Science Lesson Using the 5 E Model* steps:

- Identify scientific concept for lesson
- Identify Real World practical application related to the concept
- Provide opportunities for students to explore, collect and record information
- Develop a series of questions (using SR, BCR, and or format when possible)
- Provide explanations that will increase student understanding of the concept
- Evaluation occurs throughout the lesson

Maryland Instructional Leadership Outcomes Met Through Principal's Actions

The outcomes listed below will be demonstrated by principals taking the actions to support scaffolding instruction through the cross curricular strategies of:

- Providing appropriate practice, feedback, and assessment, and tie grading directly to mastery objectives, and
- Developing unit designs that promote increased cognitive demand and student independence

Monitor the Alignment of Curriculum, Instruction, and Assessment (Outcome 3) by:

- Holding ongoing conversations with teachers as to how state content standards, voluntary state curriculum and/or local curriculum, and research-based instructional strategies are integrated into daily classroom instructions (3.1)
- Ensuring that student work is rigorous and demonstrates new learning (3.2)
- There are assessments that regularly measure student mastery of content standards

Improve Instructional Practices Through the Purposeful Observation and Evaluation of Teachers (Outcome 4) by

- Supporting the development of a process to determine what students are reading, writing, producing, and learning (4.1)

Ensure the Regular Integration of Appropriate Assessments into Daily Classroom Instruction (Outcome 5) by:

- Ensuring that multiple and varied assessments are used that are collaboratively developed (5.1)
- Appropriate interventions are developed for individual students based on results of assessments (5.4)

Ensure the Use of Multiple Sources of Data to Improve Classroom Instruction (Outcome 6) by

- Regular use of the MSDE websites (6.1)
- Root cause analysis of student performance on school-wide data and decisions driven by those ongoing analyses (6.3)

Provide Staff with Focused, Sustained, Research-based Professional Development (Outcome 7) by

- Providing professional development that is connected to school improvement goals and is results oriented (7.1)

Resources

Hoy, A. W. and Hoy, W. K. (2003) *Instructional leadership: A learning-centered guide*. Boston, MA: Allyn and Bacon.

Maryland Assessment Consortium, at-
www.newhorizons.org/strategies/assessment/mctighe.htm

Influence of Performance-Based and Authentic Assessment, at-
<http://www.eduplace.com/rdg/res/literacy/assessment2.html>

Marzano, R. J. (2001). *Transforming Classroom Grading*. Association for Supervision and Curriculum Development, Arlington VA.

Marzano, R. J., Pickering, D. J., & Pollock, J. E. (2001). *Classroom Instruction That Works: Research-Based Strategies for Increasing Student Achievement*.

X. Standards-Based Professional Development

Maryland's Standards for Teacher Professional Development

In this section of our volume, we suggest standards-based professional development approaches that schools can use to enhance instructional capacity in designing similar strategies for scaffolding instruction. We highlight Maryland's Standards for Teacher Professional Development that we believe can provide guidance for schools seeking to increase capacity for scaffolding instruction to improve student learning.

Maryland's Standards for Teacher Professional Development

In our final section of the third volume of *Design Principals for Learner Centered Schools* we highlight how the *Maryland Standard's for Teacher Professional Development* can be used to guide the design of professional development to increase capacity for scaffolding instruction to improve student learning.

To do this we point to the practices of instructional leadership that we have highlighted when noting the ways in which principals can support the examples of how principles have been turned to practices through the following strategies for building teacher capacity for scaffolding instruction:

- for students in special education
- in reading
- through reading apprenticeships
- in writing
- in mathematics
- by providing appropriate practice, feedback, and assessment, and tie grading directly to mastery objectives, and
- by developing unit designs that promote increased cognitive demand and student independence

Lessons From Examples Of Turning Principles To Practices for Scaffolding Instruction

Lesson 1: Principals' Actions Matter

We ended each of our descriptions of ways that research-based principles have been turned to effective practices for scaffolding instruction for special education, in reading and language arts, mathematics and in assessment, grading and unit planning by outlining the ways in which principals who undertook the actions we recommended would meet the outcomes for effective instructional leadership set out in the Maryland Instructional Leadership Framework.

Lesson 2: Principals Must Provide Professional Development Opportunities for Teachers to Develop Capacities for Scaffolding Instruction.

Each of our examples of approaches to scaffolding instruction highlighted the critical importance of principals' support for professional development. Throughout our report we noted the relevant practices of professional development associated with Maryland's instructional leadership outcome:

Provide Staff with Focused, Sustained, Research-Based Professional Development (Outcome 7)

- Principals meeting this outcome should be able to demonstrate that in their schools there is/are:
- Professional development that is connected to school improvement goals and is results oriented (7.1)
- Opportunities for teachers to engage in collaborative planning and critical reflection during the regular school day (job- embedded) (7.2)
- Differentiated professional development according to career stages, needs of staff, and student performance (7.3)
- Personal involvement in professional development activities (7.4)

Lesson 3: In Order to Develop Capacities to Scaffold Instruction, Teachers Need Effective and Appropriate Professional Development

Each of our examples highlighted what teachers can do to scaffold instruction in specific areas of teaching special education students, reading and language arts, mathematics, assessment and grading, and unit planning.

Lesson 4: Design Principles Report Provides a Framework for Designing Effective and Appropriate Professional Development to Meet Maryland's Standards for Teacher Professional Development

We believe that schools that follow our research-based suggestions for what teachers can do and the actions that principals can take in each of these areas are well on their way to meeting most of the indicators associated with Maryland's *Standards for Teacher Professional Development* focused specifically on six areas of effective professional development that:

- Are designed to be data driven,
- Focus on design and teacher learning,
- Emphasize quality teaching,
- Is research-based,
- Encourages collaboration, and
- Emphasizes teacher understanding of practices supporting equity.

Lesson 5: In particular our report suggests that by using the suggestions for what teachers can do and the actions that principals can take, schools can design effective professional development to increase teacher capacity for scaffolding instruction to meet the following indicators of standards:

Standard 1: Effective professional development relies on rigorous analysis of disaggregated student data to focus adult learning priorities, teacher practice and student learning, and to sustain continuous improvement. (Data driven) by ensuring that:

- *School communities and providers have ready access to high-quality student data from various sources, including the Mdk12 website, that are organized in user-friendly formats (1a)*
- *School communities and providers have the knowledge and skills necessary to use disaggregated student data (by race, gender, English language learners, special education, and eligibility for free or reduced price meals) for planning, implementation, and evaluation of professional development and instructional programs (1.b)*
- *School communities and providers set aside time for teachers and others to examine student data as the starting point for planning professional development. (1.c)*
- *School communities and providers conduct careful analyses of a variety of disaggregated student data to identify gaps between student learning and standards for proficiency to inform the choice of the content of professional development (1d)*
- *As appropriate to school and district needs, data analysis focuses on results from approved national, state, and local assessments, as well as student work samples and portfolios and behavioral indicators such as attendance and disciplinary referrals (1e)*
- *School communities and providers (1) identify the kinds of evidence (including evidence about teaching behavior and student learning) that will be collected and used as indicators of the success of professional development, and (2) consistent with progress benchmarks and goals, determine how and when the data will be collected and reported (1f)*

Standard 3: The design of effective professional development applies knowledge about adult learning theory and effective practices to all teacher learning experiences. (Design and teacher learning)

- *Professional development combines a variety of learning experiences, including, but not limited to, individual study, demonstrations, observation, practice, feedback, and reflection as well as opportunities for collaboration and problem solving among colleagues (3b)*
- *Professional development includes extensive follow-up, including, but not limited to, further demonstrations in the classroom, feedback on practice of new knowledge or skill, and peer coaching. (3c)*
- *Professional development relies on information technology to provide more extensive and diverse content, and it also relies on communication technologies to expand access and participation and to create virtual professional learning communities. (3d)*
- *Professional development recognizes and draws on the knowledge, skills, and dispositions of successful teachers by including them as leaders, facilitators, and resources in professional learning opportunities (3e)*

Standard 4: Effective professional development (1) deepens all teachers' content knowledge and understanding of Maryland content standards, (2) ensures that all teachers understand and can apply research-based instructional strategies to assist students in mastering Maryland content standards, and (3) ensures that all teachers understand and can use various types of classroom assessments to accurately measure student mastery as well as gaps in mastery. (Quality teaching)

- *Professional development includes learning experiences and resources to ensure that teachers understand the relationships between the subjects they teach and other subjects in the curriculum, and understand how the subject(s) they teach addresses the Maryland content standards. (4a)*
- *Professional development provides opportunities for teachers to examine, observe, practice, and receive feedback on their use of research-based instructional strategies to help all of their students master Maryland content standards (4b)*
- *Professional development provides ongoing opportunities for teachers to examine a variety of classroom assessments, practice using them in their classrooms, and analyze the results to (1) understand and report on student mastery of Maryland content standards, (2) identify gaps in student learning, and (3) adjust instruction. (4c)*

Standard 5: Effective professional development ensures that all teachers have the knowledge, skills, and dispositions to apply research to decision making. (Research-based)

- *Professional development includes ongoing opportunities for teachers to read and reflect on current research on topics of interest to them and consistent with state and local school improvement priorities. (5a)*

- *Professional development involves two-way interactions with researchers to discuss research design, data collection, analysis, and reporting to assist teachers in understanding what works, particularly in areas where there may be competing perspectives and conclusions. (5b)*
- *Professional development involves individual teachers or teams of teachers, often in collaboration with researchers, in action research to test their own hypotheses and to report the results about professional development program impact or the effectiveness of particular instructional strategies and programs for teachers and students (5c)*

Standard 6: Effective professional development ensures that all teachers are able to collaborate with colleagues and others in the interest of improving instruction and eliminating student learning gaps. (Collaboration)

- *Professional development provides ongoing opportunities for teachers to practice working with colleagues and others and emphasizes that collaboration is a means and not an end in addressing issues related to school improvement and improved student learning (6a)*
- *Professional development relies on communication technologies to broaden the scope of collaboration (6c)*

Standard 7: Effective professional development ensures that all teachers (1) understand and are able to meet the learning needs of all students, (2) expect that all students will master Maryland's content standards and score well on approved national, state, and local assessments,¹ and (3) are able to create safe, orderly, and supportive learning environments to facilitate learning by all students. (Equity)

- *Professional development focuses on developing teachers' understanding of and disposition to acknowledge the diversity of student learning styles and needs (7a)*
- *Professional development provides opportunities for teachers to develop and demonstrate the knowledge and skills necessary to design and implement instructional and assessment strategies that meet diverse student learning needs and help all students master Maryland content standards (7c)*
- *Professional development provides opportunities for teachers to develop and demonstrate the knowledge and skills necessary to create and maintain classroom and school environments that are safe, orderly, and conducive to learning by all students (7c)*
- *Professional development fosters teachers' respect for all students and guides teachers in setting and maintaining high expectations for all students to demonstrate proficiency on Maryland content standards (7d)*

XI. Principle to Practice Scaffolding Instruction Using Instructional Technology

We end our report by turning our research-based principles for scaffolding instruction to practices by highlighting the ways in which one school has integrated technology into its efforts to improve student learning opportunities in ways called for by Rose and Meyer (2001). Throughout this volume of *Design Principles for Learner Centered Schools* we have referred to the work of David H. Rose and Anne Meyer in *Universal Design for Learning: Teaching Every Student in the Digital Age*. In this section we revisit how our design principles can be supported by technology enhanced instructional strategies for special education students, in reading and language arts, mathematics, and across the curriculum by introducing website resources.

Principle to Practice at Magnolia Elementary School, HCPS

In addition, on our CD ROM we provide an extended example of how one school has used technology in this way. Magnolia Elementary School in Harford County Public Schools has developed an exemplary approach to technology use that scaffolds instruction to improve the learning of its K to 5 students.

Magnolia Elementary School, located in Harford County Public Schools, Maryland, has had tremendous success in using technology to support its work in achieving Adequate Yearly Progress (AYP). At Magnolia, a Title I school, teachers have used technology to enrich their efforts to scaffold instruction to improve student learning. In the final section of our report we are pleased to highlight the exemplary work of Magnolia's teachers and Instructional Leadership Team and Technology Committee. For sharing this work we wish to thank

Superintendent of Harford County Public Schools, **Jackie Haas**,

Principal of Magnolia Elementary School, **Barbara Douglas**,

and **members of the Magnolia Elementary School Technology Committee:**

Mike Lackner: Instructional technology teacher, (M.Lackner@hcps.org)

Joanne Slagle, Media specialist, (Joanne.Slagle@hcps.org)

Gideon Twigg, Fourth grade teacher, (Gideon.Twigg@hcps.org)

Lessons from Magnolia Elementary

1. Develop a Vision for Technology Use by Faculty and by Students and Implement it:

Magnolia's Vision For Faculty is:

The entire faculty will become proficient at using, integrating, and modeling the use of technology to improve the academic achievement of children. The instructional staff will seamlessly integrate technology into the county and state learning outcomes (more specifically reading, writing and math outcomes). We will build a technology learning community, in which teachers will dialogue, receive staff development, mentor one another, share resources, team teach, and collaboratively plan technology integrated lessons.

Magnolia’s Vision For Students is:

Students will become more proficient at using technology to enhance their learning. The students will also have opportunities to experience real world applications of technology, during content-based instruction. They will be able to research topics, create projects, organize and process information, enhance their writing, and extend their thinking through the use of technology. As a result, students will gain an appreciation for ways that technology can be used to achieve both personal and educational goals.

2. Invest in creating the position of instructional technology teacher

Magnolia Elementary School has found that the work done by their instructional technology teacher with their technology committee has had significant impacts on

Students:

- Through the support of the instructional technology teacher and the work of their teachers in integrating technology in the classroom, Magnolia students have had increased exposure to technology
- gained confidence in using technology to identify and understand information
- had more opportunities to receive differentiated instruction
- increased their motivation to use technology mediated instructional materials
- gained a sense of pride in their capacities to use technology

“Since quite a number of the students don’t have access to a home computer, the technology instruction opens a pathway that the students might not experience otherwise. Knowledge of technology is not a luxury; it’s a necessity in today’s world.”
 --**Debbie Baker, Special Educator**

Teachers:

Through the support of the instructional technology teacher and the work of the technology committee Magnolia teachers have

- Increased their use of technology in the classroom

Chrissy Douglas, 5th Grade Teacher observes:

“Through staff development and encouragement, I have been able to add more technology connections into my instruction. This impact is definitely motivating my students.”

Elaine Burchfield, 1st grade teacher says: “It’s very hard to keep up with technology. It changes exponentially. I love to be shown what to do. I learn better that way. I also don’t have time to explore the sites. Mike does a great job finding valuable sites.”

- Teachers have been introduced to new websites and resources
- Teachers have become more willing to try new approaches to using technology

3. Create a Model for Integrating Technology

- In the Classroom
- In the Media Center
- In the Computer Lab

That:

- Goes beyond teaching our kids how to type and draw pictures using the computer
- At Magnolia teachers are building background,
- extending thinking,
- and engaging students in thought through the use of technology

John P. Bailey, the director of educational technology for the U.S. State Department of Education explains: *“It’s taking the right kind of technological tools and applying it to different tasks in problems that students face inside the classroom, and that we face in work as well. It’s not just {computer} programming.”*

4. Create a Technology Plan:

Magnolia instructional technology teacher, Mike Lackner: (M.Lackner@hcps.org) worked with the schools technology committee to develop a technology plan by using resources from A Web Tour of *Technology-Planning Sites* from “*Technology and Learning*” February 2004.

- [Net Day Compass](http://www.netdaycompass.org) Netdaycompass.org
- [Technology Briefs for NCLB Planners](http://www.neirtec.org/products/techbriefs/index_html.asp)
http://www.neirtec.org/products/techbriefs/index_html.asp
- [Guiding Questions for Technology Planning](http://www.ncrtec.org/capacity/guidewww/gqhome.htm)
http://www.ncrtec.org/capacity/guidewww/gqhome.htm
- [Profiler Online Collaboration Tool](http://profiler.hrptec.org) http://profiler.hrptec.org
- [Learning W/ Technology Profile Tool](http://www.ncrtec.org/capacity/profile/profile.htm)
http://www.ncrtec.org/capacity/profile/profile.htm
- [Planning for Technology: Putting the Pieces Together](http://www.edgateway.net/cs/tk/print/rtec_docs/tk_home.html)
http://www.edgateway.net/cs/tk/print/rtec_docs/tk_home.html
- [Resources for Guiding Questions for Technology Planning](http://www.netc.org/cdrom/guide/html/gqres.htm)
http://www.netc.org/cdrom/guide/html/gqres.htm
- [Technology Planning Guide](http://www.apple.com/education/planning) http://www.apple.com/education/planning
- [Learning Through Technology: A planning and Implementation Guide](http://www.ncrel.org/tandl/homepg.htm)
http://www.ncrel.org/tandl/homepg.htm
- [Technology planning tools](http://www.nsba.org/sbot/toolkit/tpt.html) http://www.nsba.org/sbot/toolkit/tpt.html
- [Technology Planning](http://www.seirtec.org/techplan.htm) www.seirtec.org/techplan.htm
- [Technology Program Evaluation](http://www.seirtec.org/eval.html) www.seirtec.org/eval.html
- [Successful k-12 Technology Planning: 10 Essential Elements](http://www.ericfacility.net/ericdigests/ed457858.html)
http://www.ericfacility.net/ericdigests/ed457858.html
- [Technology Planning for Adult Literacy](http://www.seirtec.org/techplan.pdf) http://www.seirtec.org/techplan.pdf

5. Use Technology to Develop Data Driven Lessons for Teachers:

At Magnolia the Instructional Technology Teacher, the Math Teacher Specialist and the Reading Teacher Specialists are in constant communication about student data.

- Specialists share with the instructional technology teacher data from math unit pre-tests, unit test results, math comprehensives, trimester milestone data just to name a few.
- They highlight areas of need in identified grade levels so that instructional technology teacher can plan integrated technology lessons to be delivered in the lab.
- Instructional Technology teacher works with teachers at grade levels and implements current or upcoming content into technology lessons.

Technology Tools used at Magnolia to Support Data Driven Instruction:

- Technology Resource Page (math websites, on-line stories, ILA activities)
- Inspiration
- KidPix 3

Magnolia's Resources for using Inspiration

Teachers at Magnolia Elementary School in Harford County use activities of Inspiration, using the following online ***Inspiration*** Links

Links courtesy www.mouseclicks.org (Maintained by Janey Mayo and Nina Ingram)

- Best Practices - lesson ideas from teachers in New York
<http://comsewogue.k12.ny.us/curriculum/conceptmaps/>
 - 4th and 5th Grade Inspiration Ideas-
 - <http://www.canby.k12.or.us/Technology/Projects/TIA/inspiration/inspiration.html>
 - Educational Resources - Kidspiration ideas that can be adapted for Inspiration
<http://www.lawrence.org/edlinks/menu.htm>
 - EdTech Online - lots of ideas and information
<http://edservices.aea7.k12.ia.us/edtech/classroom/visual/tchrexamp.html>
 - Inspiration Web Site -<http://www.inspiration.com>
 - Inspiration in the Classroom - a tutorial
http://www.internet4classrooms.com/inspiration_use.htm
 - Kidspired Tales - Kidspiration activities that can be adapted for Inspiration
<http://www.northcanton.sparcc.org/~ptk1nc/kidspired2002/samples.html>
 - Grade 2 - The Waterhole - an Inspiration template
<http://www.sfc.wcape.school.za/Waterhole02.htm>
 - Using Inspiration in the Classroom - practical ideas
<http://putnamvalleyschools.org/Lakeland/EDTECH/Inspir.htm>
 - The Virtual Institute - instructional tips using Inspiration
<http://www.ettc.net/techfellow/inspir.htm>
-

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The Design Principles for Learner Centered Schools Series

This volume of Design Principles for Learner Centered Schools is the third prepared for CEASOM by Dr. Mawhinney and her teams of graduate students from the Department of Education Policy and Leadership at the University of Maryland.

To view all reports please see the EDPL website:

<http://www.education.umd.edu/EDPA/faculty/mawhinney.htm>

Effective Strategies For Closing the Achievement Gap (2002, 25 pp.)

Promising Approaches to Data Based Decision Making to Improve Student Learning
(2003, 91 pp.)

Scaffolding Instruction to Improve Student Learning (2004, 72 pp.)

XIII. Contributors: *Scaffolding Instruction to Improve Student Learning* (2004)

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Dr. Shannon Bramblett joined the staff of the Virginia Department of Education in January of 2004 to serve as the migrant education specialist. She also works with Title III serves as director of Title I, Part D, children who are neglected, delinquent or at-risk, and serves as the state representative on the Virginia Association of Federal Education Program Administrators (VAFEPA). She received her B.A. in English from Belmont University in Nashville, Tennessee; her M.Ed. in curriculum and instruction from Tennessee State University in Nashville, Tennessee; and she recently completed her Ph.D. in education policy and leadership from the University of Maryland in College Park, Maryland. Previously she started and chaired an ESL program at McGavock High School in Nashville, Tennessee.

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Kathryn Kubic has worked for the Anne Arundel County Public Schools for 18 years; she has held a variety of positions including Mathematics teacher, Department Chair, Assistant Principal, and Coordinator of Mathematics. She has recently been appointed principal of Old Mill High School in Anne Arundel County Public Schools. Ms. Kubic is currently a doctoral candidate in the Education Policy and Leadership department at the University of Maryland. Her research interests are in student achievement in mathematics and school leadership.

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John Quinn has worked for 27 years in Howard County Public Schools; 17 years as a Science teacher at middle and high school levels, 2 years as Secondary Science Supervisor, 4 years as a High School Assistant Principal, and 2 years as the Principal of Wilde Lake High School. He has been serving in his current position as Coordinator of Secondary Science since the summer of 2003. Mr. Quinn is a doctoral candidate in the Education Policy and Leadership department at the University of Maryland. His dissertation research is focused on educational policy implementation and teacher sense-making.

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Bud Rorison is currently a Ph.D. student in the Organizational Leadership and Policy Studies program at the University of Maryland. His research interests include teacher quality, teacher retention, and professional learning communities. He was a Graduate Assistant to Dr. Jennifer Rice from 2001 to 2002 and a Research Assistant at the Economic Policy Institute from 2002 to 2003 where he worked with Dr. Richard Rothstein and Dr. Jennifer Rice. Mr. Rorison was a math teacher in Anne Arundel County for 5 years. He is currently the Staff Developer and Math Teacher in the Montgomery County Public Schools.

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Sharon Russell teaches both graduate and undergraduate courses in reading at the University of Maryland. She also teaches as an Adjunct Professor in the Reading Specialist program at Loyola College, Maryland. During the course of her study, Ms. Russell has served as the Literacy Coordinator for a low-performing high school on the K-12 school improvement project, a joint effort between UMD and Prince Georges County Schools. She has also worked as a Reading Specialist at a school for adjudicated adolescent boys and with the CORI program, both experiences leading to her work in adolescent literacy. She is a doctoral candidate in the Education Policy and Leadership department at the University of Maryland.

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Jane Lai Mah Woodburn

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Ms. Woodburn is a director of school performance in Montgomery County Public Schools. Working with a community superintendent, she supervises and supports principals at 29 schools—4 high schools with their feeder middle and elementary schools. Prior to her current position, she has worked as an administrative assistant to the associate superintendent for student and community services, personnel specialist in Human Resources, high school director of guidance and counseling, guidance counselor, special education itinerant resource teacher, high school vocational development teacher, elementary special education teacher, adult ESOL teacher, and reading clinician at the University of Maryland, College Park. She is certified in the areas of administration, guidance & counseling, reading specialist, special education, and elementary-middle school education; and is a National Board Certified Counselor and Certified Professional Counselor in the state of Maryland. She has a B.S. in special and elementary education, M.Ed. in reading, M.Ed. in guidance and counseling, and is currently working on her Ph.D. in educational leadership. Ms. Woodburn was founder and past president of the Washington-Metropolitan Chapter of the National Association for Asian Pacific American Education.

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