Leadership Content Knowledge: What Do We Know?

Working Papers for K-12 Educational Administration

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September, 2008

Support for this project was provided by the Department of Educational Administration through a Summer Research Fellowship. If you have questions or wish to participate in further work on this topic, please contact Dr. Susan Printy, sprinty@msu.edu.

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Increasingly, school leaders are called upon to improve the quality of teaching and learning in their schools. The evidence for this improvement comes largely from student scores on standard achievement tests. Meeting targets for student achievement on the timelines established by No Child Left Behind has proven a rigorous, even daunting, challenge for Michigan schools. Education professionals are working hard at reaching targets, and we do not ascribe persistent problems to a lack of administrator or teacher will. To some degree, we recognize that practicing educators are being asked to do things for which they have not been prepared. We take the perspective that improving the quality of teaching and learning is extremely complex, is related to multiple school, classroom and personal factors, and requires the adoption of new perspectives and the acquisition of new skills. Oriented to these realities, this set of working papers is intended to enhance the preparation of new and aspiring school leaders and was prepared for use by faculty and students in K-12 MA, EdS, and PhD programs.

The focus topic of these papers is Leadership Content Knowledge (LCK), a construct introduced into the educational lexicon in 2003 by Mary Kay Stein and Barbara Scott Nelson, researchers at the University of Pittsburgh. Briefly, LCK defines what educational leaders need to know about content, or disciplinary, knowledge required at various levels of schooling (and school organization) so that teachers can offer ambitious instruction to the students in their classrooms.

Stein and Nelson develop their LCK proposition around the instructional core – what happens in classrooms as teacher, students, and content materials (curriculum, lesson design, instructional materials, etc.) interact. It is easy to recognize that teachers are leaders in their classrooms, and they must orchestrate what happens in their classroom so that all students have opportunities to learn challenging and relevant material. Teachers design learning activities and interactions to make that happen. However, we know that the level of ambitious teaching and learning is bounded by teachers' content knowledge and skills, by their general instructional skills, and by their

knowledge about how to teach the particular content, what we have come to call pedagogical content knowledge (Schulman, 1986).

Leadership content knowledge is a parallel construct to pedagogical content knowledge. Defining the concept is, in fact, the answer to the question, "What does a leader need to know about a given content to ensure that ambitious teaching and learning is occurring in classrooms?" Stein and Nelson began to answer that question based on their extensive research in school districts. Principals, they say, need to understand not only how students learn the content, they also need to understand how teachers learn the content and learn how to teach it. Leaders need to know how to create the conditions (e.g. build structures, use resources) that help teachers learn deep content knowledge and associated pedagogical skills. Recognizing what a task it would be to know all of that about all the content areas, the researchers advocate that school leaders have deep content knowledge in at least one academic area so that they can then transfer that knowledge, or associate it, with other content areas.

LCK "telescopes" out from the school building. At each larger level of organization, the LCK responsibilities for educational leaders encompass the learning needs of all individuals embedded at lower levels. So, a district curriculum leader needs to understand the content learning needs of students, of teachers AND of principals. Notice the added responsibility: how to create conditions so that principals learn what they need to know to make sure quality teaching and learning is taking place. Administrators, in essence, become teachers of other adults in that they assume responsibility for their learning. This entails a heightened level of understanding about adult learning, surely. It also requires orchestrating social learning environments, introducing incentives for learning, and ensuring adequate resources for continuing development.

We are intrigued by the concept of LCK, but we admit that it remains a rather "vague" idea. We want to begin to put flesh on the bones for core academic subjects. What does LCK mean – at the deep content level – for literacy, for mathematics, and for science? Further, how does LCK differ for elementary, middle, and high school leaders? We wanted to begin to bring this abstract concept to life for on-the-ground practice of school principals, primarily. What are the implications of LCK for professional development, for example? Recognizing the important leadership contributions others make, we also ask, "How do school leaders use their LCK to optimize distributed leadership in the school?" We have many more questions that will drive our own dissertation and ongoing research studies.

The K-12 Educational Administration unit funded the preparation of these papers during Summer 2008. We emphasize the "working" nature of these papers, as they represent a beginning effort to organize at a concrete level what school principals need to know as leaders of literacy or mathematics or science. We will continue to work on them, and invite both critique and conversation about the important issues we introduce. We also welcome the development of additional facets of LCK to deepen theoretical understanding and strengthen practical application.

Melissa Usiak authored the sections related to literacy; Kari Krantz-Selleck contributed the information for mathematics, and Laura Otten addressed science topics. Dr. Printy wrote the papers on Distributed Leadership and the Intersection of Distributed Leadership and Leadership Content Knowledge.

Introduction

Recently there have been broad-based and deep changes in the recommendations for what students should know and be able to do. This has prompted building principals, as instructional leaders, to rethink their dispositions about the teaching and learning of subjects. There is a developing consensus that school leaders should take as their primary responsibilities student learning (Stein & Spillane, 2003; Leithwood & Riehl, 2003; Murphy, 2002), subject-matter knowledge (Stein & D'Amico, 1999), and the nature of teaching and learning (Prestine & Nelson, 2003). Stein and D'Amico (1999) and Stein and Nelson (2002) argue that administrators who claim to be instructional leaders must have some degree of understanding of how instruction and learning differ in various subject areas. Stodolsky (1988) agrees that, in the world of instruction and learning, content matters. "Subject-matter knowledge is as important to the work of school and district administrators as it is to teachers" (Stein & D'Amico, 1999, p. 31).

Research now shows that leadership is second only to classroom instruction among school-related factors that influence student outcomes according to extensive research (Leithwood et.al, 2004). Recent work to strengthen standards for administrator preparation and licensure programs reflect this finding. McREL's Balanced Leadership Framework (2004) describes leadership practices in terms of responsibilities. The first responsibility of curriculum, instruction, and assessment is directly involved in the design and implementation of curriculum, instruction, and assessment practices. The second responsibility of knowledge of curriculum, instruction, and assessment is knowledge about current curriculum, instruction, and assessment practices. Both responsibilities are influenced by a school leader's knowledge in specific content areas. In addition, the Interstate School Leaders Licensure Consortium's *Standards for School Leaders* (2008) offers high-level guidance by establishing six principles for school leaders. Standard 2 states that "a school administrator is an educational leader who promotes the success of all students by advocating, nurturing, and sustaining a school culture and instructional program conducive to student learning and staff professional growth." This requires the administrator to have knowledge and understanding of student growth and development, applied learning theories, curriculum design, implementation, evaluation, and refinement, principles of effective instruction, and adult learning and professional development models.

Administrator learning has raised questions of leadership content knowledge (Stein and Nelson, 2003) as a missing component in the analysis of school and

district leadership. Leadership content knowledge is defined as the knowledge of academic subjects used by administrators when they function as instructional leaders . Stein depicts the relationships between educators, including building administrators, at different level of the educational system and provides a framework for identifying and analyzing the knowledge they use in doing their work. She entitles the framework *nested learning communities.* Within the framework, the building administrator lands in the third of four layers with subject matter as the foundation or first layer. Through her case study of three administrators, one at the building level and two at the district level, Stein found that each of them required solid content knowledge of literacy to provide effective instructional leadership. No matter how far administrators are removed from the classroom and the direct instruction of content, they are responsible for the learning of teachers and students. This would indicate the essentiality of proficient leadership content knowledge for building principals.

Other researchers have found that principals' content knowledge influences the way they observe classroom practice (Nelson & Sassi, 2000; Nelson, Sassi, & Driscoll, 1999; Nelson, Sassi, & Grant, 2001), provide feedback to teachers (Nelson & Sassi, 2000; Nelson et al., 2001), and structure learning opportunities for faculty (Burch & Spillane, 2003; Nelson et al., 2001). Focusing on literacy, as an example, Coburn (2005) suggests that higher education institutions give due attention to school leaders' content knowledge. Specifically, she calls on these institutions, as well as leadership credential programs, to train school leaders in way that would increase their knowledge of how students learn to read, effective instructional strategies for helping students learn to read, and the variety of curricular tools to support instructional approaches.

Brief Histories of the Content Areas

Since the advent of the formal education system, there has been a constant focus on changing the system to improve student performance. Each of the content areas, specifically literacy, mathematics, and science, have gone through their own changes. Sometimes, these changes intertwine, while at other times, they occur independently.

The commonality between all of the education movements is that there is a "call" for a change in the current system. In curricular areas, this "call" came from a particular event that occurred or a report that was released. These events and reports spur the system into action, as they often show that the children of the United States are trailing behind the children of other nations.

No matter what changes or improvements have been made in each content area, education looks very different than it did fifty years ago. The following is a brief history in the content areas of literacy, mathematics, and science to illustrate the changes within education.

A Brief History of Literacy Instruction

The teaching of most subjects has experienced a shift over the past fifty years. These shifts are representative of philosophical, methodological, and pedagogical predominancies in education, as well as beliefs of the day about goals in education. Various researchers have framed these changes with a slightly different perspective. Some of them are introduced below and reflect different historical paradigms.

From the late 1960s to until the mid-1980s a basic skills approach predominated in the United States and is concomitant with the *behaviorist* theories of learning, which rely heavily on the observation of characteristics and behaviors of the learner. Learning is considered to be a sequence of skills to be mastered where the learner absorbs knowledge as it is sequentially "delivered" by the teacher in small, discrete chunks, typically following a textbook. *Constructivist* theories sparked approaches in which the learner is actively constructing knowledge. This includes the practices of modeling, facilitating, and guiding. Teachers encourage students to become meta-cognitive about their own use of strategies and to make connections.

The timeline below highlights critical shifts in thinking and instruction for literacy. Understanding what these shifts entail and how they came about are important literacy knowledge for school leaders.

A Timeline of Literacy Education

Time	Event/Publication	Description
1934	Smith's *American Reading Instruction*	Provided insight and historical perspective on reading instruction in the United States beginning with the Colonial Era(published again in 1965 and 1986)
1955	Resch's *Why Johnny Can't Read: And What You Can Do About It?*	Revealed the apparent neglect of phonics instruction
1956	International Reading Association (IRA) established	Merged the International Council for the Improvement of Reading Instruction and the National Association of Remedial Teachers
1965-1991	Shift from basal readers to trade books	Highlighted changing goals of literacy instruction
1967	Chall's *Learning To Read: The Great Debate*	Developed a framework for identifying stages of reading

1977	Resnick & Resnick's *The Nature of Literacy*	Indicated that instructional changes in literacy were needed
1983	*A Nation at Risk*	Created urgency for comprehensive school reform
1989	Advent of "whole language"	Introduced new approach to literacy instruction that proceeds from the whole to the various parts
Late 1990s	Advent of "balanced literacy"	Promoted reading skills and literacy among school-age children based on decoding, comprehension, and motivation, as well as the characteristics of reading stages: early, emergent, developing, fluent, and independent
2000	Report of the National Reading Panel*: Teaching Children to Read*	Defined essential elements of reading instruction (alphabetic, phonemic awareness, phonics, fluency, comprehension, vocabulary, text comprehension)
2002	*No Child Left Behind*	Introduced the Reading First initiative which invests in scientifically-based reading instruction programs in the early grades.

Elementary school leaders, particularly, need to be well informed on the above concepts, reports, and legislation since literacy is a critical gateway competency for elementary education. Most literacy curricula take a balanced approach integrating reading and writing competencies.

A Brief History of Mathematics Education

Mathematics education has a long history of conflicting ideals that have surrounded various philosophies and eras. Long regarded as a necessary tool for social and economic development, mathematics education has political ties. Most education leaders are aware of the notable publications, A Nation at Risk (1983), Everybody Counts (NRC, 1989), and *National Council of Teaches of Mathematics (NCTM) Standards* (NCTM, 1989) followed by the release of the *NCTM Frameworks* (NCTM, 1999). Each of these documents was released as a result of heavy debate and political action to rally large-scale efforts to improve mathematics achievement across the U.S.

It should not be surprising to know that with the release of each document, a host of divisive ramifications followed. These ramifications were largely dependent upon the philosophical viewpoint of the organizer(s). Although overly simplified, it is fair to say that the mathematic "camps" are the result of extreme positions on both ends of the learning spectrum. Traditionalists, holding firm to behaviorist assumptions (knowing facts, procedures, and conceptual understanding) opposed notions of constructivist assumptions (learning procedures and conceptual understanding while experiencing and constructing mathematics).

Although most adults understand the importance of a strong mathematical background as a gateway subject to higher education, many fail to fully understand the discipline. It is still common to hear educated people claim, "I just didn't inherit the math gene." Others openly claim that "Math was simply never my best subject." It continues to be a widespread misconception that math understanding is independent of one's education. Math reformers assume a very different position, that mathematics understanding is something that can be learned with the same level of success as one learns to read and write. Historically speaking, educational programs centering on mathematical understanding for the majority of learners, rather than a select few, are a recent phenomenon.

A Timeline of Math Education

Time	Event/Publication	Description
1890-1940s		Limited expectations for mathematics knowledge beyond elementary school (high school not appropriate for all students)

1950	National Science Foundation established	Developed national policies for math/science m education Fragmented high school curriculum (tracks)
1957	*Sputnik*	Prompted a federally funded curriculum (by National Science Foundation) *Parents and community did not understand this "new math"*
1970	Back to basics movement	Focused on arithmetic computation and algebra skills
1980	An Agenda for Action (National deficit soaring)	Emphasized problem solving
1983	A Nation at Risk	Created urgency for comprehensive school reform
	National Council of Teachers of Mathematics	Established non-federal professional group for teachers
	The cognitive revolution	A call for students to think mathematically
1987	Second International Math Science Study	U.S. students score below the international average
1989	Everybody Counts	A call for Excellence for All (equity)
1989	NCTM Standards	A coherent vision of what it means to be mathematically literate
1991	NCTM Professional Standards for Teaching Mathematics	Professional preparation and practice
1994	NCTM Frameworks	Emphasized constructivist principles
1990-1995	NSF Standards	Field-tested and implemented curricula
1995	NCTM Assessment Standards for School Mathematics	Move away from questions with "correct" answers
	National anti-reform movement	Argued against "fuzzy math" and for traditional approach
2000	NCTM Principles and Standards for School Mathematics	Stays the course for reform
2002	No Child Left Behind	Increased accountability, used narrowly defined assessments, imposed sanctions

While it appears that there is a current attempt to find a middle ground for mathematics education, leaders should be prepared to understand the politically charged debate that still surrounds many reform efforts in mathematics. The potential for political ramifications exist at all levels of the system. This means that leaders desiring to implement district or school level curricular changes in mathematics should attend to the social and cultural context surrounding the change. In reviewing the events and measures taken by experts across the field of mathematics as noted in the above outline, it is interesting to note that problems during implementation of reform provided the impetus for uprooting many of the efforts. Leaders should beware and learn from former challenges that proved to unleash well-intended change efforts. Knowledge of the nation's history of mathematics in education as well as of particular local histories would likely provide a foundation from which important decisions about mathematics curriculum and teaching can result. Knowledge of historical milestones across mathematics education can add to the breadth and depth of content knowledge among school leaders.

A Brief History of Science Education

While reading and mathematics have been at the forefront of education movements, the area of science has not always been a priority (Lewthwaite, 2004). When the Soviet Union launched Sputnik in 1957, the United States began to evaluate the science programs and continue focusing on math. The history of science and mathematics are highly related and intersect at several points.

The nation continued to evaluate education programs over the years, comparing the United States to other "powerful" countries in the world. The U.S. usually came up on the losing end of these reports and new reforms were called for as each report was released.

When the United States began evaluating the science program fifty years ago, there was a push to teach students as much science content as possible. At first, it was thought that learning a multitude of scientific facts was the best way for the students of the United States to get ahead. Scientific content knowledge was the key. As time went on, *Science for All Americans*, and eventually the *National Science Education Standards* made a case for more inquiry based learning. By using inquiry, students were able to learn problem solving skills and apply them to any scientific situation, instead of relying solely on being able to repeat facts (Sunal & Wright, 2006).

A Timeline of Science Education

Time	Event/Publication	Description
1957	Sputnik	Spurred the US to evaluate science education and "catch up" to the USSR
1983	A Nation at Risk	Called for effort to "raise the level of competence of American students in all academic areas"
1987	Second International Math Science Study	U.S. students score below the international average
1989	Science for All Americans	Created a vision for science literacy
1994	Goals 2000	Outlined eight educational goals to be achieved by the year 2000
1996	National Science Education Standards	Introduced standards for science education in the US, demanding a

		scientifically literate population
1990-1995	NSF Standards	Field-tested and implemented curricula

As events around the world have developed and evolved the educational system throughout history, the impact on the individual subject areas has been profound. As illustrated in the previous timelines, each new development has spurred reform and change. These changes not only have an effect on the classroom teacher, but on the school leader as well. Educational leaders need to be able to assess these reforms and evaluate their impact on their schools and districts. Their role is to understand how students will learn this new information, recognize how teachers will learn the new reform, monitor how teachers will present these reforms, and supply the appropriate resources to ensure the successful implementation of the programs (Stein & Nelson, 2003).

While general knowledge of learning and instruction is essential for school leaders, understanding the basics of each individual subject area is the fundamental idea behind leadership content knowledge. Obtaining additional information in the content areas will only strengthen the achievement efforts of the leader.

Domains of Knowledge

Formal curriculum documents have been prepared by nationally recognized organizations to help clarify and define the components of each subject matter. These documents reflect current research in the particular field as well as reflect the beliefs and understandings of esteemed leaders. These documents have been organized in ways that assist educators to better understand the components of each subject area. Each subject area is organized around key principles and standards --assumptions and beliefs that guide particular knowledge. Typically, the guiding principles and standards for learning and teaching are followed by more specific information about the various domains of each subject that combine to make up a comprehensive framework. Following you will find a general idea of the domains of knowledge that exist for literacy, science, and mathematics. For educational leaders, these domains of knowledge are the foundation for the beginnings of understanding the content areas.

Mathematics

The Principles and Standards for School Mathematics outline six principles that are deemed necessary for excellence in math education. The equity principle clarifies that mathematics education must include all students. The curriculum principle reminds educators that coherence and alignment are critical. The teaching and learning principles focus on the required teacher knowledge and active student involvement in mathematics education. The assessment and technology principles remind educators of the role of assessment to inform and guide teachers' decision making as well as to support mathematics instruction.

The five content standards outline the areas of math that should be included in K-12 math programs. These include, number and operations, algebra, geometry, measurement, and data analysis and probability (NCTM). Next, the curriculum principles and standards address the mathematics process skills that should be included. These are *problem solving*, *reasoning and proof*, *communication*, *connections*, and *representation*.

Next, one would find the strands of mathematics which further illuminate the complexities of the subject. Included in the strands of mathematics are *conceptual understanding*, *procedural fluency*, *strategic competence*, *adaptive reasoning*, and *productive dispositions*.

Finally, the NCTM Curriculum Frameworks specifies the domains of knowledge that are distinct to mathematics. In mathematics, these include *number and operations*, *algebra*, *geometry*, *measurement, data analysis and probability*, *problem solving*, *reasoning and proof*, *communication*, *connections*, and *representation*. As one further examines this guiding document, specific grade level content expectations can also be found.

While the above descriptions are meant to only illustrate the many facets of math content knowledge, it is important to note that not all materials and program choices align similarly to these guiding principles. Education leaders would be well served to understand the important considerations reflected in guiding documents like the NCTM *Principles and Standards.*

Literacy

An understanding of the following domains of knowledge can begin to shape a school leader's understanding of the teaching and learning of literacy at the elementary and secondary levels.

A balanced literacy curriculum in grades K-8, is composed of instruction in reading, writing, speaking, listening and viewing. These correlate with the strands of the *Michigan English Language Arts Grade Level Content Expectations* (GLCEs).

> **Reading** "involves skills using print and language in ways that change as skills develop" (Snow et al., 1991, p. 5). The reading process is composed of "two cognitive tasks" (NICHHD, 2000, 3:8) known as decoding, or word recognition, and language comprehension.
>
> **Writing** is the process of conveying ideas to an audience through printed language (GLCE ELA Companion Document).
>
> Oracy is fluency in the **speaking** (expressive) and **listening** (receptive) aspects of language.
>
> **Viewing** is knowledgeably observing genres, texts, and messages.

The *Report of the National Reading Panel: Teaching Children to Read* describes necessary elements of reading instruction, specifically, as alphabetic, including phonemic awareness and phonics instruction, fluency, and comprehension, including vocabulary and text comprehension instruction.

> **Alphabetic** understanding is closely related to phonemic awareness but the importance is linking sounds to letters. The alphabetic principle comprises three elements: (1) alphabetic letter knowledge; (2) letter-sound association; (3) familiarity with spelling patterns from which frequent words and syllables are comprised.
>
> **Phonemic awareness** involves understanding that words are composed of individual distinct sounds, and that these sounds can be manipulated (Copeland, Winsor, & Osborn, 1994, p. 29). Phonemic awareness is a "skill that does not involve print" (Nicholson, 1999, p. 11) and deals with "the sound structure of spoken words" (Hatcher et al., 1994, p. 41).

Phonics instruction is a way of teaching reading that stresses the acquisition of letter-sound correspondences and their use in reading and spelling. Phonics instruction entails teaching students how to use letter-sound relations to read or spell words.

Fluency occurs when readers are able to read orally with speed, accuracy, and proper expression. Fluency is one of several critical factors necessary for reading comprehension.

Comprehension is making sense of text and is critically important to the development of children's reading skills and therefore to the ability to obtain an education. Indeed, reading comprehension has come to be the "essence of reading" (Durkin, 1993), essential not only to academic learning in all subject areas but to lifelong learning as well.

Vocabulary knowledge has long been recognized in the development of reading skills. As early as 1924, researchers noted that growth in reading power means continuous growth in word knowledge (Whipple, 1925). Vocabulary is critically important in oral reading instruction. There are two types of vocabulary—oral and print. A reader who encounters a strange word in print can decode the word to speech. If it is in the reader's oral vocabulary, the reader will be able to understand it. If the word is not in the reader's oral vocabulary, the reader will have to determine the meaning by other means, if possible. Consequently, the larger the reader's vocabulary (either oral or print), the easier it is to make sense of the text.

At the secondary level, the *Michigan High School Content Expectations* (HSCEs) *for English Language Arts* emphasize instruction in writing, speaking, and representing; reading, listening, and viewing; literature and culture; and language.

Writing, speaking, and representing involve a complex process of inquiry and the discovery of meaning. Through writing, speaking, and visually expressing, students understand themselves, communicate with others, advance personal and professional goals, and participate in a democratic society. Effective communication requires an understanding of purpose and audience, and reflects well-developed ideas using appropriate conventions of genre, content, form, style, voice, and mechanics.

In Reading, listening, or viewing students draw upon prior knowledge and engage complex skills and strategies of comprehension and interpretation,

and critical thinking. They develop skill, confidence, and independence in understanding narrative and expository texts, including aural, visual, and multimodal works. Students synthesize information through reading, listening, and viewing and also generate new thinking.

Literature and culture provide students opportunities to study and appreciate a rich and varied selection of classical and contemporary literary, cultural, and historical texts from American, British, and world traditions. They learn to make meaning from the experiences, ideas, and emotions of others across the ages, applying their understanding to contemporary circumstances.

Language is an evolving tool with powerful personal, cultural, economic, and political implications. Knowledge of the structures of language (e.g., the history, meaning, and use of words; varying sentence structures and patterns of language; the conventions of standard English) is essential for the effective use of language for varying purposes (e.g., the development of a rich vocabulary, sentence structures for different rhetorical purposes, appropriate speech patterns for different social contexts). Understanding the political implications of language use is also critical for fostering a democratic society in which all voices are valued.

Science

The fast-paced advancement of science and technology in the late 20th and early 21st century has led for a call for students to learn more science than ever. Although there is a push by the *National Science Education Standards* (NRC, 1996) to promote science for all students, a common understanding of science and its concepts must first be understood. Whether conducted in a classroom, lab, or outdoors, the concepts of science remain constant. These concepts also remain constant in all classrooms, from Kindergarten through twelfth grade and beyond.

> *Science*: The construction of meaning through systematically using particular ways of observing, thinking, experimenting, and validating to develop interconnected ideas about the physical and biological worlds (Sunal & Sunal, 2003).
>
> *Scientific Literacy*: An awareness, appreciation, and understanding of key scientific concepts and processes required for personal decision making and participation in society (Sunal & Sunal, 2003; NRC, 1996).
>
> *Inquiry*: Students use skills (observation, inference, and experimentation) to "combine processes and scientific knowledge as they use scientific reasoning and critical thinking to develop their understanding of science" (NRC, 1996, 105). Students ask a question, complete an investigation, answer the question, and present results to others (NRC, 1996; Sunal & Sunal, 2003).
>
> *Scientific Content Knowledge*: Knowledge about science concepts, key ideas, and terminology.

Once a leader has basic knowledge within the content areas, the focus now turns to the third layer of Stein and Nelson's nested learning communities. It is within this layer that the school leader assists teachers with their instruction. This requires a leader to understand the content areas and how children learn, but "knowing something about teachers-as-learners and about effective ways of teaching teachers" (Stein & Nelson, 2003, p. 426).

Organizing for Adult Learning

State certification requirements, as well as No Child Left Behind, mandate that teachers continuously update their content knowledge and knowledge of best teaching practices through continued education. Educators must attend workshops, take college courses, and participate in ongoing professional development sessions to retain or advance their teaching certificates as well as learn the most up to date topics in their areas.

To a building principal, the challenges of providing quality professional development programs to teachers can be daunting. A principal needs to consider the curriculum, test score data, budget, and the calendar when planning for professional development activities. The content areas often battle with each other for time in the professional development schedule, as each is important for overall student achievement.

Whatever content areas the principal chooses to focus on, there are several formats to choose from:

- On and off-site workshops or conferences
- Courses for college credit
- Teacher study groups
- Book clubs
- Teacher collaborative networks or communities
- Mentoring relationships
- Internships
- Teacher work groups

During these sessions, teachers need to be actively involved within the activities and participate as a collective group. Overall, when designing and delivering a professional development program, the building principal needs to ensure that the program is intensive and sustained over a period of time (Garet, et al, 2001). To be effective, teacher learning cannot be a one shot deal; it must be an ongoing, comprehensive agenda.

Desimone, et al (2002) found that all professional development formats share common essential components that cross over all content areas. Sessions should focus on content, instead of just how to deliver instruction. The notion of deep content, or subject matter knowledge, can be considered from varying perspectives. Attitudes, perceptions, philosophical dispositions, one's personal background in schooling, and political preferences often influence one's

definition of deep content knowledge. There are multiple views of just what "deep content knowledge" means as it applies to subject matters.

Organizing for Adult Learning in Mathematics

It isn't difficult to examine any of the available math resource guides to clarify the domains of knowledge included under the umbrella of mathematics or the kinds of pedagogical knowledge necessary to gain active involvement for students. One can see concise overviews of the strands of mathematics and example of rigorous, real life problems. It is the conceptual knowledge of mathematics that needs a closer examination to better illuminate the kind of depth of understanding upon which today's leader must draw to organize the adult learning and professional development needed to bring about the greater levels of math achievement called for by national leaders.

Liping Ma, in her insightful account of her study which illuminated important and fundamental differences between U.S. and Chinese educators' knowledge of mathematics concepts, provides multiple examples of misconceptions held by well meaning U.S. teachers. The differences are startling and pose significant challenges for school leaders, educational policy makers and teacher preparation program developers. In fact, the kind of professional learning that may be necessary for adults to grasp the depth of content knowledge called upon by experts like Liping Ma may mean organizing adult experiences which will uproot long-standing, rarely questioned math concepts.

Examining the differences in the manner in which U.S. and Chinese teachers differed in thinking about the foundation concept of subtraction using regrouping can illuminate the kind of depth of understanding of mathematics that is crucial. For example, when describing the manner in which they would teach regrouping in subtraction, U.S. teachers used phrases like, "you need to borrow from the tens place because you can't subtract a bigger number from a smaller number." To many, this explanation seems accurate. Yet, upon further examination and comparison to the conceptual differences stated by Chinese educators, there are misconceptions that are being introduced that hinder later conceptual understanding.

First, the idea of "borrowing" is misleading since "borrowing" falsely suggests that one is only temporarily using something. Further, that "one can't subtract a larger number from a smaller number" is a statement that poses barriers to later understanding of negative numbers. Each of these examples represents a common educational flaw that can be found across most elementary math programs in the U.S. The concept of exchanging and place value is not truly a "borrowing for the short term" phenomenon. Rather, as Chinese educators understand and are able to demonstrate, subtracting using regrouping should be

explained using the notion of "decomposing a higher value unit." The difference between understanding subtraction using regrouping as "borrowing" or understanding subtraction using regrouping as "decomposing a higher value unit" is simply one of many incidences where teachers learned math in very different ways. Chinese educators maintained a very different and more accurate understanding of fundamental, elementary math concepts than U.S. educators. These striking differences, Ma argues, contribute in an accumulated manner to students' abilities to understand higher levels of mathematics at the secondary levels.

U.S. teachers focused on procedures and concepts, rooted in a long history of "general knowledge" perpetuated through most education settings, furthering misconceptions, rather than providing an accurate foundation upon which students must draw to attain higher levels of mathematics, particularly at the secondary level. Profound understanding of fundamental mathematics "PUFM" (Ma, 1999) must begin using parallel professional development aimed at improving both the existing teaching base while also improving the potential teaching base through teacher preparation programs. Education leaders must be included in these efforts to allow them to foster the necessary improvements in teacher scholarship and efficacy in mathematics.

What might a professional development plan include to begin to examine the important revelations described above?

Professional Development Activity	Targeted Audience	Timeframe
Book study – Knowing and Teaching Elementary Mathematics	All teachers and paraprofessionals	First semester
Lesson study of potential "misconceptions" taught in each grade level	All teachers	Second semester

Organizing for Adult Learning in Literacy

There is growing body of research describing the relationship between what teachers know and what students can do (National Reading Panel). Ongoing professional development is an essential component of a school's or district's literacy plan. Any teacher learning experience should be context specific, connect directly to practice, and reflect on what the teachers already know about the teaching and learning of literacy. Below are some suggestions of professional development activities building leaders, along with their literacy teams, can facilitate. This is, of course, just a brief sample of collaborative activities that can be done to foster the adult learning of teachers.

Title	Target Audience	Objectives	Materials	Time Frame
Collegial conversations	Grade level teachers teaching reading and/or writing, literacy leader or instructional leader	Provide basic skills in analyzing MEAP reports; translate MEAP data into classroom practices	GLCEs, curriculum, lesson plans	2 hours, 30 minute peer observation, 90 minutes to debrief
Analyzing student work	Grade level teachers teaching writing	Teachers collectively identify student work that meets, doesn't meet, and exceeds expectations to foster conversation about common expectations; initiate conversations around the teaching and learning of writing; Become more familiar with rubrics	Common writing prompt, student papers, rubrics	2 hours for analysis
Examining and understanding reading	All teachers and administrators involved in	Allow teachers time to examine and discuss the reading	Copies of assessments, student assessment	4 hours (two 2 hour sessions)

assessments	testing	assessments used in the building; provide specifics as to what information can be gained from each test; and clarify commonly used terms, such as independent and instructional reading level, decoding skills, etc.	data	

Organizing for Adult Learning in Science

Embedded within the *National Science Education Standards* are standards for professional development for teachers of science.

- "Standard A: Professional development for teachers of science requires learning essential science content through the perspectives and method of inquiry" (NRC, 1996, 59).
- "Standard B: Professional development for teachers of science requires integrating knowledge of science, learning, pedagogy, and students; it also requires applying that knowledge to science teaching" (NRC, 1996, 62).
- "Standard C: Professional development for teachers of science requires building understanding and ability for lifelong learning" (NRC, 1996, 68).
- "Standard D: Professional development programs for teachers of science must be coherent and integrated" (NRC, 1996, 70).

What do these standards mean for building principals who are responsible for scheduling and providing professional development sessions for their teaching staffs? School leaders can tie these standards into their professional development schedules by ensuring that science is a part of the program. Identifying the staff members needing additional science training (Young, 2007), as well as providing time in the schedule for the training will give teachers the opportunities they need to learn more about science content and inquiry methods.

When planning for science professional development for educators, school leaders can draw from the following examples to guide their planning and delivery.

Title	Target Audience	Objectives	Materials	Time Frame
Understanding the Science MEAP Results	Teachers administering the science MEAP, as well as those teachers one grade level above and below those grades	Provide basic skills in analyzing MEAP reports; translate MEAP data into classroom practices	MEAP results, GLCEs, curriculum, lesson plans	4 Hours of data analysis and instruction; 3 additional grade level meetings to implement classroom practices
Teaching Inquiry Using Gravity*	Elementary teachers assigned to a science class	This hands-on session will use the Science Process GLCEs and the	Curriculum, GLCEs	3 Hours of Instruction

		newly revised KC4* Science to model instruction using science inquiry and specific grade-level physical science content.		

*From www.kentisd.org

Obtaining an understanding of the content areas themselves and providing education for their teaching staffs is just the beginning for school leaders. Acquiring content knowledge, and remaining current with this information, gives leaders the information needed to appropriately structure their school and district buildings and programs.

How Leadership Content Knowledge Influences Organizational Decision Making

Principals and leaders of educational institutions significantly impact organizational decisions relating to the structures and strategies employed throughout the organization. Education leaders influence structural decisions that cover a broad and varied spectrum including decisions that directly influence the lives of both adults and students within each learning community. Consider some of the endless organizational decisions for which school leaders are responsible.

Organizational Decisions	Considerations
Principles of practice Learning expectations Classroom grouping practices	What philosophical principles will serve as the basis for the learning organization? Can all students learn and understand all core subjects? Should we utilize homogeneous or heterogeneous grouping practices?
Length of instructional periods Curricular schedules Recess and extra curricular schedules	Should all subject areas receive equal instructional time? How might moving from a six period day to a seven period day impact learning? What impact will trimesters or block scheduling have toward learning? Which instructional block of time will be interrupted to allow physical education and fine arts classes to be scheduled at the elementary level? Which instructional course will be interrupted to allow lunch schedules to proceed? How many elementary recesses will be allowed? Morning? Afternoon?
Student assignment to course sections Teacher/student ratios	What prerequisite coursework will be required to enter particular courses as freshmen? Sophomores? Juniors? Which courses will have the smallest

	teacher/student ratio? Largest?
Intervention program priorities Paraprofessional assignments and usage Content and methods for intervention programs	Which subject areas will receive paraprofessional assistance for in-class instructional support? How will paraprofessionals be assigned to classrooms? Who will provide before/after school support services? What will be the focus of this support?
Instructional planning time Planning period assignments Content of department and grade level leadership meetings	Will schedules be built to provide common planning time for teachers? How much time will be provided within the regular school day? Outside the regular school day? How will limited release time for teacher planning be allocated?
Communication practices	What content relating to learning will be included in forums for communicating with parents? What will be the focus for parent information sessions for the upcoming year?
Professional development	What will be the content and focus for adult learning? How will this learning be organized?
Grading practices	What proportion of student grades will include homework? Exams? Quizzes? How will student growth be determined?
Classroom material purchases	How will the limited funds available for classroom resources be allocated? Which subject area will receive priority? How will boundaries be established for the use of these funds?

It is hard to imagine an educational leader making decisions as cited above without a foundation of deep and current content knowledge from which to base

these important recommendations or conclusions. For example, consider how decisions about usage of paraprofessionals might be influenced based on a leader's content knowledge regarding mathematics.

Scenario A

The Assistant Superintendent for Curriculum and Instruction brings all secondary building principals together to determine the best usage of limited Section 31 funds (federal dollars allocated for specific purpose of providing targeted interventions and support for at-risk students) for the academic year. Allocations of funds are expected to provide intervention and support services to students identified as needing specific academic support across all subject areas. There is never enough funding to provide the services needed for all students in all subject areas as discretionary funding sources are a prime commodity. Limited in scope, the leadership team must carefully determine the targeted use of these funds. A direct reflection of the leadership team's limited content knowledge in standards based mathematics instruction, it is determined that secondary class sizes in mathematics will be allowed to reach contractual maximums. An additional teacher is hired to provide direct support to high school ELA classes during the regular school day while it is decided that after school math tutoring will be provided by parent volunteers. These decisions reflect the leadership team's limited knowledge of mathematics. Indeed, important decisions about the use of limited support resources are directly influenced by the knowledge and dispositions held by the leadership team. Had the leaders in the above vignette possessed a much deeper knowledge base of standards based mathematics, it is likely that a different set of decisions would have resulted.

Scenario B

The Assistant Superintendent for Curriculum and Instruction brings all building principals together to determine the best usage of limited Title I and Section 31a funds for the academic year. Both allocations of funds are expected to provide intervention and support services to students identified as needing specific academic support. A direct reflection of the leadership team's content knowledge, it is determined that targeted mathematics instructional support will be provided on a weekly basis by flexibly grouping students for re-teaching or extending important math concepts while paraprofessional support is available.

The instructional plans will be implemented by the certified teachers. Paraprofessionals will assist in ways determined by lead teachers. In addition, before and after school learning sessions for targeted students will focus on additional instruction conducted by certified teachers. This shift in practice from instructional support offered through use of paraprofessionals to instructional support utilizing certified teachers has led to additions to the extra pay schedule within the teachers' contract for before and after school teaching. The leadership team is confident that these decisions support their own knowledge of best practices in mathematics. Their decisions adhere to a philosophy that aligns multiple resources toward providing additional help during the difficult implementation of a new, reformed mathematics curriculum using National Science Foundation developed materials. Leaders are committed to insuring that the problem based curriculum will have the necessary instructional support to help targeted students learn critical skills in mathematical reasoning and problem solving.

Now consider how organizational decisions might be influenced based on a leader's content knowledge regarding literacy.

Organizational Decisions and Literacy

The need for school leaders to establish a literacy vision of a comprehensive literacy program is growing. Guth and Pettengill (2005) suggest seven literacy principles of a comprehensive program: (1) Access to a wide range of interesting material; (2) Instruction that builds the desire and skill to read; (3) Assessments that inform the students and the teachers of students' needs and strengths; (4) Content area teachers who model and apply reading strategies; (5) Reading specialists and coaches who are available to assist struggling students; (6) Teachers who understand adolescents' complex literacy needs; (7) A home-school literacy connection.

School leaders often use their knowledge of the teaching and learning of literacy to make teacher assignments, including how teachers learn to teach literacy. For example, if a building principal identifies an individual as a highly effective literacy teacher, she may decide to place that teacher in a lower elementary position to support early intervention. Understanding how students learn literacy can determine classroom placement as a building's leadership team use literacy assessment data to balance the student needs and abilities across a grade level.

Along with a balanced literacy approach comes the establishment and maintenance of a book room that houses a variety of resources, including trade books, books on CD, big books, classroom magazines, and books that support the other content areas. This requires a specific space, time and energy to keep it organized, and funds to add new titles and replace lost ones. This common space is used by all teachers and support staff which means some books become commodities. Not only are students reading the books in class, they are collecting in students' individual book boxes (filled with books at their independent reading levels), and traveling to students' homes as a part of a take-home book program to promote reading outside the school day. Because these resources can be spread thin, a system for requesting, receiving, and replacing materials should be established.

Research shows that reading is perhaps the most important activity in which students can engage to improve their reading ability (Krashen, 2004; Rasinski & Padak, 2000). The learning of literacy will not occur if there is not ample time set aside for literacy instruction and teachers who allocate more instructional time to reading produce readers with higher achievement (Allington, 1983). Teachers should carefully structure reading programs in which a significant

block of uninterrupted time is devoted to reading and related language arts (Fountas & Pinnell, 1999).

Taylor et al. (1999) suggest 2.5 to 3 hours a day should be dedicated and protected time for literacy: teacher-directed small-group instruction, 60 minutes; independent reading, 30 minutes; whole-group instruction, 30 minutes; writing in response to reading, 15 minutes; and other related activities, 10 minutes. Once the accurate amount of instructional time is set aside, school leaders need to assess the quality of the learning activities and protect instructional time some of which is done by establishing organizational culture conducive to learning. Of course, this has significant implications on the scheduling of recess, specials, lunch, assemblies, and other activities that could be perceived as interruptions to the literacy block.

Literacy Scenario

Principal Dewey has just received the schedules of her physical education, music, and art teachers for the upcoming school year. At the end of the previous year, the kindergarten, first, and second grade teachers all made requests to schedule specials in the afternoon to protect their literacy block in the early morning. Along with the early elementary teachers, the third and fourth grade teachers made the same request so that they could have their "switches" (students moving from ELA to math to science teachers) uninterrupted in the morning.

As in most years, the music teachers can only be in the building in the morning so that they can make it to the middle school and junior high in the afternoon for classes. Both physical education teachers are there sporadically throughout the school day, and the art teacher is there two full days a week.

Principal Dewey fully understands the requests from both groups of teachers but is faced with making an organizational decision that will ultimately leave one group of teachers disgruntled and student instructional time interrupted.

School leaders must make decisions that are rarely easy. The above scenario illuminates the complexities leaders face. A depth of content knowledge can serve as an important indicator and gauge in prioritizing often competing values within schools.

Organizational Decisions for Science Education

The area of science has not always been a priority as a curriculum area (Lewthwaite, 2004). A school leader's role is to serve as a "catalyst" (Young, 2007, 144) for the implementation and delivery of the school curriculum. Using their knowledge of best practices in science teaching and focusing on teachers delivering the curriculum or essential content will build a stronger science program.

Teacher certification is an essential component of student achievement in science. A review of research on science education by Druva and Anderson (1983) found positive relationships between student achievement in science and their teachers' backgrounds in education and science courses. Science, however, is a difficult area of certification with the passage of No Child Left Behind and the newly defined Highly Qualified teacher. Some states require certification in the individual areas of science, such as earth science, biology, or chemistry, while others only require a general science certification to be able to teach all courses (Darling-Hammond, Berry & Thoreson, 2008). Regardless of the requirements of each state, the building principal is responsible for finding a qualified teacher, with a certification in science, to maximize student learning in his or her building.

Instructional materials for supporting the science classroom include textbooks, lab materials, science kits, software, books, and other types of multimedia materials (NRC, 1999). When designing spaces for science learning, it is important to remember that "classroom facilities and resources used in teaching science should reflect the goals and learning outcomes" (Sunal & Sunal, 2006, 310) set by the curriculum and the classroom teacher. Keeping the objectives and *NSES* in mind, the school leader has the responsibility to provide appropriate resources for teaching and learning science, from textbooks to lab supplies (NRC, 1996). This enables the teacher to focus on science instruction in the classroom with the students (Young, 2007).

While considering what supplies to purchase for a science classroom, a school leader must consider the school budget and make decisions for all subject areas as well. Consider the following scenario when faced with the difficult decision of which programs and materials to fund.

Science Scenario

The ABC school district is faced with budget cuts as enrollment has declined and per pupil funding has remained constant. Each building principal has been given the annual budget for their building, based on their individual needs and programs. As the school leader for XYZ school reads through her budget, she notices that she has to be more creative with her spending this year.

When the principal assigns an amount to "Instructional Materials" she decides that each classroom teacher will be allotted a certain amount of money to spend throughout the year. It is initially set evenly between all teachers, so that each teacher receives the same amount. As she thinks about it, she realizes that science teachers use many more consumable materials in their classrooms than other teachers and that they should be given more money than the rest of the classroom teachers.

A principal will need to determine the consequences of the allocation of resources to different groups of teachers to lessen the conflict that could arise from this type of situation. Every teacher has unique and individual needs for their classrooms. It is up to the school leader to determine how to write and deliver a budget that will meet the needs of all students.

Budget and the allocation of resources is just one of many decisions that a school leader will face when working with all subject areas, not just science. Gaining input from multiple sources, as well as keeping the mission of the school district and the needs of the students in mind will help guide a leader to better decision making.

The scenarios presented above provide important examples of how leadership content knowledge impacts decisions that greatly influence learning and teaching. Indeed, each scenario might have had significantly different outcomes based on the currency, depth, and breadth of the present leadership team's content knowledge base. One must ponder the route educational leaders might take in order to possess the depth of knowledge necessary to be informed instructional leaders who are best equipped to help guide and shape important decisions as highlighted above. It is hard to imagine instructional leaders failing to possess deep content knowledge given the likelihood that they must draw upon this base in order to make appropriate and reflective decisions as the above contexts denote. These real life examples were selected to further extend and support the notion that leadership content knowledge provides critical foundations upon which all school leaders draw to make important structural decisions.

Resources for Leadership Content Knowledge

As our work has shown, it is imperative that school leaders have knowledge in the areas of literacy, mathematics, and science. In order to become more knowledgeable, administrators will need to search beyond the classroom walls.

Of course, if school leaders venture out to find that succinct handbook on everything-you-need-to know-about-every-content-area, they will be sorely disappointed. After extensive searching, we do not believe such a resource exists. Instead, school leaders must gather knowledge from several sources, ranging from primary resources to national reports and recommendations. The following is a brief list that will prompt thinking and lead to a more extensive and on-going set of readings.

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Distributed Leadership: A Quick Tour of Theory and Practice

By Susan Printy

Michigan educators have encountered the phrase "distributed leadership" from multiple sources, including state policy and school improvement documents. Most often, however, the phrase goes by without any specific definition, so the listener or reader is left to fill in that gap with his or her own understanding. Pause in your reading and call to mind your own definition of the term. What is "distributed leadership"?

Did you respond in one of these ways?

A. Distributed leadership refers to efforts of various school personnel to "take the lead" on projects of interest.
B. Distributed leadership means that the principal has delegated leadership responsibility for a project to a specific individual.
C. Distributed leadership means that teachers take leadership of their professional learning communities (or teams), generally by appointing a leader or by asking someone to volunteer.
D. Distributed leadership simply means that the principal can't "do it all" and so must depend on others to contribute leadership at various times.
E. Distributed leadership means that teachers influence their colleagues to collaborate in order to improve teaching and learning in the school.

If you have another definition of distributed leadership, write it here:

Many people interested in leadership have used the term synonymously with other terms: shared leadership, leadership capacity, parallel leadership, leadership density, democratic or participatory leadership, etc.

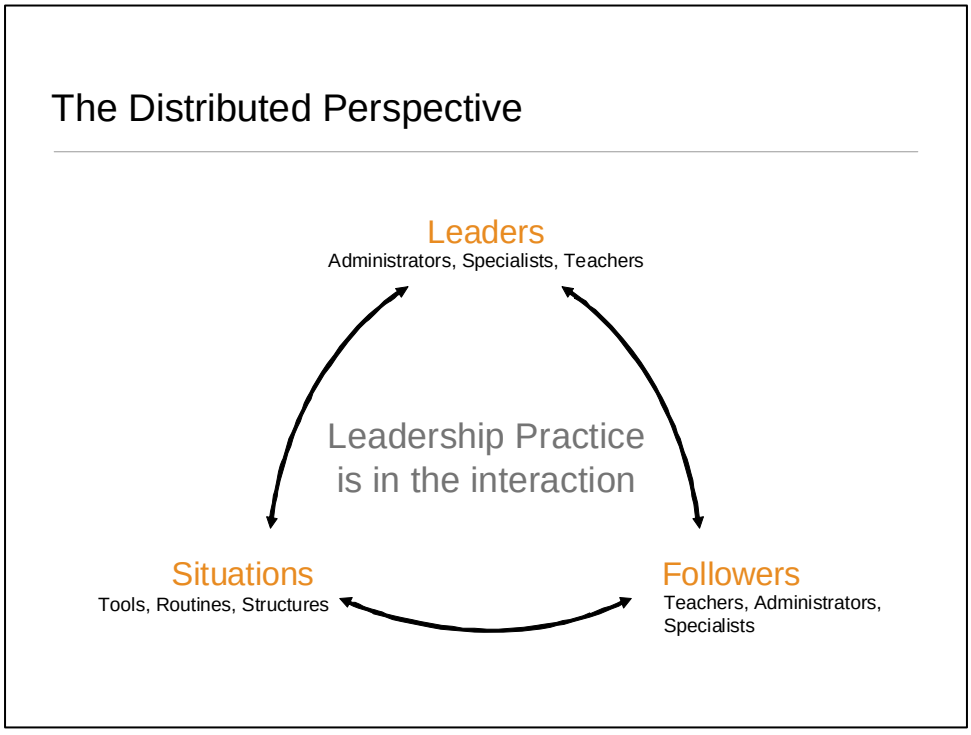
Those writing about and conducting research on distributed leadership, however, have a very specific meaning of the term. Helping you to understand this particular meaning is a major goal of this paper. Once you have a good grip on the theoretical and operational (how researchers measure) meaning of distributed leadership, you can begin to *analyze or diagnose* your organization to determine how much distributed leadership is present. With that knowledge, you can begin to make *design decisions* for your organization such that distributed leadership will increase in a way that supports the coherence of your educational program.

The Theoretical Bases of Distributed Leadership.

Distributed leadership (DL) is a constructivist perspective, suggesting that leadership is "constructed" by multiple individuals, so the relationship between "leaders" and "followers" is important. (More about leaders and followers in a minute.) Individuals are engaged in some activity, and through this engagement, certain individuals are able to influence others. A researcher is able to study the activity – and those engaged in it – to understand how meaning is constructed, learning is undertaken, or leadership influence is exerted. Generally, this is the realm of "activity theory." Another theory that is important is "distributed cognition." This means that knowledge (or skill or expertise) is more than the sum total of what individuals know and can do. Distributed cognition has been studied on aircraft carriers, where every individual has an essential role to play in the safe take off or landing of aircraft. The intelligence of the crew together is substantially more than the total knowledge of individuals. There is a certain dance or choreography that individuals understand collectively; this accounts for the intelligence of the group, sometimes called organizational knowledge or learning. The knowledge is "stretched over" all the people and the situation (e.g., What is the weather? Are we under attack? Is the sea calm or rough?)

So, too, DL is stretched over leaders, followers, and the situation. As the situation changes, so, does the interaction between leaders and followers. Think about how similar this is to how teachers, students, and content interact within classrooms. Because of this similarity, there is much for leaders to learn from a deep understanding of the classroom dynamics that occur as teachers organize students' engagement with subject content and instructional materials, often referred to as the instructional (or technical) core of schooling.

These relationships are depicted in the figure that follows. (Spillane et al., Distributed Leadership Study).



Getting Clearer on Distributed Leadership

James Spillane and his colleagues have completed an extensive study of Distributed Leadership. The ideas summarized here are taken from their

working papers and published documents. (Visit their website at http://www.sesp.northwestern.edu/dls/)
They use the following definition:

> *[Leadership refers to] those activities that are either understood by, or designed by, organizational members to influence the motivation, knowledge, affect, and practice of other organizational members in the service of the organization's core work.*

A distributed perspective on leadership challenges ideas that equate leadership with the gallant acts of one or more leaders in an organization. A distributed leadership perspective moves beyond the Superman and Wonder Woman view on school leadership. Formal leaders, such as the principal, are central to many of the things that happen in the school, but they also depend on other individuals in key positions to get things done. However, moving beyond the principal or head teacher to include other potential leaders is just the tip of the proverbial iceberg from a distributed perspective.

A distributed perspective is first and foremost about *leadership practice*. Further, it frames leadership practice in a very particular way; it sees leadership practice as a product of the interactions of school leaders, followers, and their situation. Leadership practice is co-performed in interactions of leaders, followers, and aspects of the situation such as tools and routines. This suggests that leadership does not reside only in the principal's office or even in the formal roles held by specialists or head teachers. In fact, a distributed perspective on leadership moves us beyond seeing leadership as synonymous with what those individuals in formal leadership positions do. Position alone is inadequate.

How we think about *leaders and followers* is central to the DL perspective. We are very accustomed to think about the school principal as the central leadership figure, and, in fact, research has supported this centrality. But leadership requires followers. Leadership depends on relationships among people. Further, the leadership relationship is reciprocal, that is, as leaders influence followers, leaders are also being influenced by followers. It is also true that a person who is a leader one day might be a follower the next, as individuals with expertise step to the foreground, are recruited into leadership, or try to fill a leadership vacuum. That said, the ability to understand the dynamic, interactive relationships of leadership is enhanced by distinguishing between leaders and followers.

Particularly as we focus in on instructional practice, we recognize the important leadership contributions of many teachers, specialists, and consultants, in both formal and informal leadership ways. Importantly, the DL perspective unpacks the ways in which multiple leaders' work is interdependent. Various types of "co-leading" have been identified: collaborated distribution, collective distribution, and coordinated distribution. In collaborated distribution, multiple leaders work together at one time and place. In collective distribution, the work of individual leaders, performed separately, is interdependent. As an example, two school leaders might divide the work of summative and evaluative components for teacher supervision. Co-ordinated distribution refers to the completion of different leadership tasks in a sequential routine.

By moving beyond a pre-occupation with those in leadership positions, the distributed perspective enriches our understanding of leadership, urging us to focus on others in the school who by virtue of formal position or informal role take responsibility for leadership activities. Leadership activity typically involves multiple leaders who may or may not hold a formal leadership position. Aside from the principal, other potential school leaders include assistant principals, curriculum or subject specialists, and reading or Title 1 teachers. Teachers, either individually or collectively, take on leadership responsibilities including mentoring peers and providing professional development. Within teams, leadership often resides in subtle efforts to change the direction of conversation (e.g., away from deficit thinking to teacher agency) or in motivational efforts with resistant colleagues.

While leadership is distributed among formally designated leaders and teachers, this does not mean that everyone in the school has a hand in every leadership function or routine. The distribution of leadership differs depending on the leadership function or routine, the subject matter, the type of school, a school or school leadership team's developmental stage, and school size.

How a Distributed Perspective on Leadership Can Help in Schools

Distributed leadership is frequently talked about as a cure-all for schools. Frankly, not enough is known yet about DL to make this case. It is likely that research on DL will generate important insights into how leadership can be practiced effectively.

Rather than a prescription for leadership practice, a distributed perspective on leadership is best thought of as a framework for thinking about and analyzing leadership. It is a tool for helping us think about leadership in new and unfamiliar

ways. It can be used as a theoretical frame that helps researchers focus what they look at when they investigate leadership. It can be used as a diagnostic instrument that draws practitioners' and interventionists' attention to particular dimensions of school leadership. It can be a lens that helps practitioners approach their work in new ways. A distributed perspective on leadership, then, is neither friend nor foe. It is not a prescription for how leadership ought to be done in schools in and of itself. Distributed leadership is descriptive before prescriptive; a means to prescription rather than a prescription in itself.

Diagnosis of DL

Schools members can begin a diagnosis of DL by looking at their organizational charts and considering the relationships between the different positions and the kinds of interactions that occur among people holding those positions. There might also be other formally designated leadership positions not on the organizational chart. At this stage of analysis, basic understanding of roles and responsibilities are important to get on the table for further conversation.

The next state of diagnosis is to examine routines in place in the school. Routines are an important component of how leadership is distributed in practice. Organizational routines are "repetitive, recognizable patterns of interdependent actions carried out by multiple actors." Organizational routines include: class level meetings, staff meetings, teacher evaluations, school assemblies, literacy committee meetings, professional development days, etc. In essence, these are the situations that bring individuals together in some way to accomplish work.

Routines evolve over time. They are important in organizational life. Routines allow efficient, coordinated action by multiple people. They provide stability in organizational operations and reduce conflict about how to do work. An analysis of the routines in place in your organization is a key step in diagnosing the extent of DL (and the nature of DL) currently in place. You want to have a good idea of all routines that influence the educational program in your school. The following table is a look at routines in Adams Elementary, one of the schools in Spillane's study.

Routine	Functions	Tools	People
Five Week Assessment	- Formative evaluation - Teacher Accountability - Monitor Instruction	- Standardized Tests - Standards - Student Assessments	- Language Arts Coordinator - Deputy Principal - Principal - Teachers
Breakfast Club	- Teacher Development - Build Professional Community	- Research Articles	- Teachers - Language Arts Coordinator - Principal
School Improvement Planning (SIP)	- Identify Instructional Priorities & Resources	- Previous Year SIP - District Guidelines - Test Score Data	- Principal - Administration - Teachers (approved LSC)
Classroom Observations	- Teacher Development - Monitor Instruction - Accountability	- School Protocol, - District Protocol	- Principal - Deputy Principal
Real Men Read	- Academic Press	- Books	- Language Arts Coordinator - Deputy Principal - Principal

The Routines are listed in the left-hand column. These were identified by school members as being activities they engaged in to improve the quality of teaching and learning taking place in their classrooms. They are recognizable by teachers and administrators. They happen regularly. They depend on interactions among multiple persons. They also require interdependence among people in order to accomplish tasks required by the routine (not expressly shown in the above table).

The Function, or purpose, of the routines is listed in the second column. When considering these functions, it's probably useful to return to the definition of leadership used by the DL study researchers: *[Leadership refers to] those activities that are either understood by, or designed by, organizational members to influence the motivation, knowledge, affect, and practice of other organizational members in the service of the organization's core work.* The function suggests what the routine is intended to accomplish – increase knowledge and skills, motivate through intrinsic or extrinsic means, maintain the quality of practice, etc.

The third column contains a listing of Tools used in the routine. Think about tools as "mediating" devices. This means that they organize or direct the interactions among individuals in some particular way. A tool can be a text that people come together to discuss. It can be a policy document that indicates priorities, content, or sequencing. It can be a protocol that guides how a meeting will unfold. Tools are often referred to as "artifacts," particularly when they are products generated in an earlier meeting. They can be "boundary objects" that structure interactions and conversations between members of very different groups who come together to "make sense" of a situation important to all. Multiple tools are generally at use in a routine.

The People column, above, suggests the extent to which leadership is distributed among multiple individuals. Again, it is important to understand that the activities embedded in the routine rely on tasks completed by members who are dependent on others. The characteristics of "multiple tasks" and "interdependence" are important principles to remember.

Any of the above routines can be "exploded" or examined in much greater depth. As an example, look at the table below for the Five Week Assessment at Adams Elementary. In this view, we see the deliberate tasks that need to be completed, who is responsible, and what tools are used. This level of detail – and perhaps even more detail – is necessary in order to truly get a good picture of how leadership is distributed.

The Five Week Assessment Routine demands that various individuals accomplish tasks. In some cases, one individual is responsible (Literacy coordinator). In other cases, multiple individuals are responsible (Literacy coordinator, Literacy team, and Assistant principal). The sequencing is important; certain tasks must be completed before others can be done. There are critical points, however, when formal leaders are involved. The principal, for instance, doesn't do all the work, but is involved in the interpretation and planning stage. The principal is in the loop on the important information, e.g., that the data are being used, the information gleaned from the data, how the information is being interpreted, and what will be done as a result. The principal is connected to the work of instructional improvement in important, relevant, and appropriate ways. As a result of this participation, the principal knows what to look for in future visits to classes and what to discuss with teachers.

THE FIVE WEEK ASSESSMENT ROUTINE

Function: Formative evaluation
Teacher Accountability
Monitor Instruction

Task	**People**	**Tools (e.g.)**
Schedule test	Literacy Coordinator	None
Create Test	Literacy Coordinator	Standards ITBS Practice Tests
Administer Assessment	Teachers	Test
Score Assessment	Literacy Coordinator Literacy Team Assistant Principal	Graphing
Analyze Results	Literacy Coordinator	Graphing problem
Interpret Results/ Plan Intervention	Literacy Coordinator Principal Assistant Principal Teachers	Graphs

Once the details of a routine have been specified, participants could come together to evaluate how well the routine works. Consider the following questions:

- What is the function(s) of the routine?
- What is the structure and what are the tools for the routine (e.g., components, materials, properties, relations)?
- What arguments explain and evaluate the routine?
    - Why should it work?
    - Why might it not work?
    - What are the advantages of this routine?
    - What are the disadvantages of this routine?
- How does it connect with learning and teaching?
- How well is the routine working and how do you know?

A primary concern in this evaluation is the extent to which the routine supports or detracts from educational program *Coherence*. (Note: a discussion of

instructional program coherence is beyond the scope of this paper, but is an essential part of an effective school.) A decision can now be made. Do we keep the routine? Do we eliminate the routine? Do we modify the routine? Do we design a new routine?

Design of DL

If the decision reached is to modify or design a new routine, you are in the *design phase* for DL. The diagnosis of organizational routines provides essential information that you will use.

An educational writer who has applied the principles of DL tells a story about a school that identified all of the leadership routines they associated with reading pedagogical strategies (McBeth, 2008). The team discovered nearly 50 different leadership routines. First they were impressed about the level of activity… but then they were perplexed. "How did all these practices come about?" they wondered. And, how did this multitude of practices affect instructional coherence?

On further analysis, the team recognized that many of the routines operated at the subconscious level and had accumulated over time as past administrators introduced new ways of doing things. (Note that the old ways were never eliminated!) When teachers perceived gaps (intuitively if not consciously), they created new routines. On the surface, some routines seemed unique, but in actuality, many were replicas of others. Most surprising in this case was the fact that the team could only identify one practice that enhanced and changed teachers' classroom practices in a way that enhanced student learning!

This analysis led the way for the school team to deliberately and intentionally design a better plan for allocating their resources to improve reading instruction. The team was able to rethink their leadership practice; they kept their one impact routine, enhanced a few others, deleted 40-plus ineffective routines, and added a few additional ones. The school created a meaningful DL system to improve teachers' skills and to monitor changes to classroom practices and student outcomes.

The following suggest certain *design principles* that a design team can address in the process of modifying or creating new routines.

- Who would the leaders and followers be?

- When, and how, would they interact around this issue? How could these interactions be regular?
- What tools could be used to mediate these interactions?
- What "micro" tasks need to be done to accomplish the work?
- In what ways are these tasks interdependent?
- How will these tasks and tools enable others to take on leadership responsibilities?

Efficient and effective DL practice developed around priority issues can enhance the coherence of the educational program. Multiple individuals play key roles in carrying out activities. Their responsibilities are clear, legitimate, and valued. People know how to interact with others because they have structures, tools, and norms in place to guide, support, and ease challenging joint work. Teachers know that students coming to their classroom are prepared to do appropriate work. Similarly, teachers know that they are responsible to prepare their students to move on. Mutual dependencies are supported by open communication, access to resources, and shared expectations and understandings. Further, teachers all have a clear sense of how they can contribute to the collective educational enterprise of the school.

The Principal's Role in DL

Recall that leadership does not rest solely with those in formal leadership roles and that who is a leader and who is a follower changes over time. Leaders, in fact, can emerge for any number of reasons in a given situation. Research has shown that formal leaders are often disconnected from the front line work of teachers (Printy, 2008). The DL perspective can help formal leaders figure out where to make connections with teachers' work in an efficient and effective way.

Research also suggests that how formal leaders connect with teachers' work is critical to improving instruction and increasing learning outcomes of students. Formal leaders, research shows, create the conditions for teachers to collaborate on improving their work. This research says a great deal for how formal leaders design the organization for continuous improvement. It is crucial that teachers perceive that the organization of the school (the designed organization) is intended to enhance their day to day work (the organization they live in).

Formal leaders, who should have some say in the design of DL routines, need to pay careful attention to designed practices so that emergent and creative

qualities of teachers' professional work (both individual and collaborative) are not squelched. This requires careful and artful balance from the formal leader. A concrete example will help make the point.

As principal of a school, with an eye toward coherence, you have required teachers to align their reading curriculum vertically and horizontally. Teachers at all grade levels have identified instructional goals, performance targets, and key lessons, all in line with new state content expectations. A team of teachers has selected textbook and curricular materials with scripted, detailed instructional techniques (and with your approval). Pacing guides are in place. Curricular consultants help teachers put classroom routines in place for comprehensive attention to vocabulary, reading comprehension, phonological awareness, and expository composition.

Some veteran teachers resent this "routinized" approach to instruction. They have complained that they feel like they are no longer professional teachers. They feel like they are merely enacting routines rather than drawing on their expertise to make decisions for the students in their classes. As principal, you have noticed their inertia. You have listened as they complain of "de-skilling" and "de-motivation."

You remain committed to the core curriculum and instructional support materials, recognizing that the centralized approach will minimize the variation in educational experiences students receive. It is no longer up to individual teachers or to small teams of teachers to decide what their fifth graders need to know in math or how much fact based writing their students do. Because you want to equalize the opportunity for learning for all your students, you support the state instructional frameworks. You want your teachers to commit to an agreed upon set of learning targets. And you intend to hold teachers accountable to their commitments. You also intend to support teachers' work through professional development to improve their deep content knowledge and you commit to providing them with adequate resources to do their jobs well.

All of the above are things you want to be "tight" on. Given this set of conditions, what are some things you can be "loose" on, that is, what might teachers make individual or small group decisions on?

How any individual principal answers these questions is very much dependent on the context, or the situation. In thinking through how you might react in your school, a return to the design principles above can be productive. However,

assuring that teachers have latitude over certain parameters of their work is a critical balance to the parts of the work that are carefully aligned.

Comprehensive School Reform organizations have grappled with these issues. Organizations such as Success for All recognize that coherence and maximum learning depend on shared agreements, common practice, and tight linkages. These interdependencies are enhanced by routines, made up of smaller tasks distributed over multiple school members. Interactions among these members are mediated by tools that structure meetings, give focus to discussions, and build shared understandings. Distributed leadership is central to their work.

Formal leaders are better positioned to create productive conditions when they understand the theory and practice of DL. Spillane and colleagues suggest that leadership is distributed by design, by default, or by emergency. The preferred method is by design, obviously. But if there is a leadership vacuum – that is, if no appropriate leadership routine is in place –a routine will emerge over time, by default, without intentional design. Often, because something needs to be done quickly in an emergency situation, a routine will be appropriated or imported from somewhere else. These are less than optimal routes to the distribution of leadership.

Conclusion

School leaders will benefit from a solid understanding of the distributed leadership perspective. By using this perspective to analyze existing leadership practice, formal leaders and leadership teams can examine current routines with an eye toward improving coherence, increasing the leadership skills of teachers, improving instructional expertise, and transforming school norms and culture. Effective routines can be retained; outdated routines can be amended or discarded; new routines can be designed. The approach to sharing leadership and enhancing leadership capacity entailed in the distributed leadership perspective is concrete and provides a structured way of exploring a complex phenomenon. It invites broad participation of school members and empowers them to step forward into leadership activity. It challenges the norms of autonomy and volunteerism that have dominated educational practice for much of our educational history. And with an increasing research base, DL seems to make an important difference to how teachers teach and students learn.

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How Leadership Content Knowledge Intersects with Distributed Leadership

by Susan Printy

Recent research on instructional leadership suggests that deep knowledge of a core academic subject can "transform" how a school leader enacts leadership in relevant situations (Stein & Nelson, 2003). As one example, how much a principal understands about mathematical thinking has implications for how the principal works individually with teachers in their evaluation process. In another case, how much a district assistant superintendent understands about how students learned mathematics and teachers learned to teach mathematics plays a big part in how the leader organizes and facilitates curricular evaluation and selection. Stein and Nelson have termed this application of subject matter to leadership as Leadership Content Knowledge (LCK). They deliberately parallel Lee Schulman's (1986) notion of pedagogical content knowledge, that is, the knowledge of how to teach a specific content area.

The very idea of LCK issues a challenge to new and aspiring school leaders by stating clearly the responsibility they have for the learning of their teachers. Stein and Nelson illuminate this responsibility. First, because teachers do not generally have the content knowledge and related pedagogical skills to offer ambitious instructional experiences and optimize learning for all students, principals need to be able to discern teachers' level of knowledge and skill and arrange appropriate professional development. Second, teachers need to have access to continuous, interactive social environments focused on learning, and principals need to ensure that appropriate opportunities are in place. Third, principals need to create the right mix of incentives and sanctions to motivate individuals to learn. Finally, leaders need to ensure that adequate resources are directed to learning.

That school leaders know enough about content to shoulder this responsibility in all core academic areas is doubtful. Admitting to the daunting nature of the task, Stein and Nelson emphasize that, at minimum, school leaders need deep content knowledge in at least one academic area, and that they then engage in the practice of "post-holing" or digging deeply into a small area or domain, of other disciplines.

Developing leadership content knowledge is a clear challenge for incoming and emerging school leaders, and it calls for them to continue to learn about content

and about how to teach the content in order to be an effective instructional leader. Further, it emphasizes how important it is to develop distributed instructional leadership in a school. Principals need to create a leadership practice whereby many individuals contribute their particular strengths and areas of expertise to leading their school's educational endeavors.

This brief working paper explores the relationship of LCK to distributed leadership (DL) which is detailed in an accompanying paper. In the preceding papers, the concept of LCK has been dealt with extensively by my colleagues. I begin by presenting some "take away" ideas about LCK and DL. These are intended to be very brief summaries of the concepts; some general principles that can be used regardless of content area or contexts of schooling. By way of illustration of this intersection, I extend the five week assessment routine introduced in the DL paper to illustrate how LCK "mediates" (extends, enriches, optimizes) the distributed leadership practice.

Leadership Content Knowledge

In their original article introducing LCK, Stein and Nelson (2003) assert that most research on school leaders is focused on what leaders do, not on how they think about what they do. When these researchers looked at strong instructional leaders, they found that "how they think" is extremely critical, particularly in relationship to disciplinary, or content, knowledge. Subject matter – mathematics or literacy or science or social studies – is an important context for leadership. They suggest that subject matter knowledge is transformed for purposes of leadership, or perhaps that leadership is transformed when guided by subject matter knowledge. When school leaders they studied participated in extensive professional development that helped them learn how to think like a writer or like a mathematician, they began to act differently as leaders. Where the leaders were in the system also had implications for how they led and introduces the idea of nested learning communities, discussed in the next section.

At the heart of leadership content knowledge is the disciplinary subject, as shown in Figure 1 (Stein & Nelson, 2003). Teachers, in their classrooms, are responsible for arranging students' engagement with the subject matter. This interaction represents the technical core of schooling, teaching and learning in classrooms, located in the second circle out. In the third circle out, teachers learn how to teach the given subject matter – that is, their pedagogical content knowledge (Shulman, 1986) – and principals are key in arranging how that learning will take place. Moving out to the fourth circle, district leaders have

the responsibility to guide the learning of all adult professionals in the district such that quality interactions take place in classrooms, including principals, curriculum specialists, and teachers.

In Figure 1, the "teacher" or person responsible that learning occurs is on the left side; the "learner" is on the right. A key point in leadership content knowledge is that "the substance of what is taught, learned, and managed consists of all content and practices 'beneath' the 'teachers' and 'learners' at each level" (p. 426). Significant learning challenges, indeed!

In fact, we generally recognize that teaching so that all students learn is extremely complex. As Stein and Nelson acknowledge:

> *Like never before, teachers are charged with socializing students into particular ways of thinking, into specific methods of interacting with others about ideas, and into modes of reasoning that allow them to interpret, judge, critique, and even create new knowledge that will be recognized and accepted by their peers and the discipline. (p. 442)*

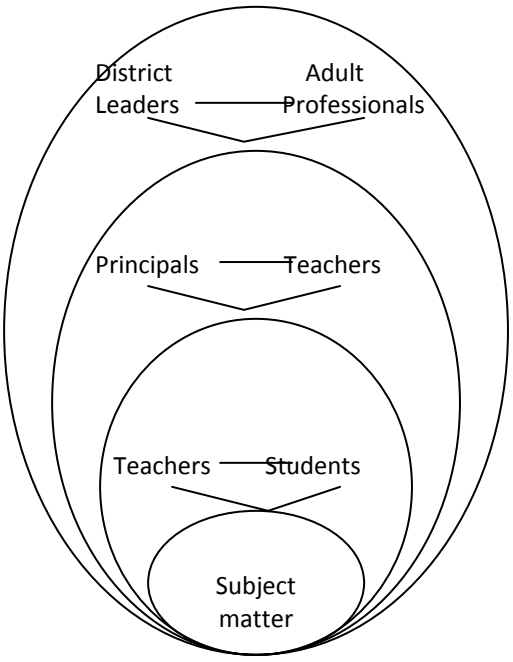

Figure 1: Nested Learning Communities
(Stein & Nelson, 2003)

Teachers socialize students into the "world of literate knowers" (p. 425) for the various subjects. To do so, teachers need to know more than just the subject matter. They need to know how students learn the subject and how to best teach the subject. This requires intense preparation for connecting the subject to students' prior knowledge, knowing the misconceptions students have, anticipating challenges and other stumbling blocks to learning, and connecting ideas from prior learning. Teachers need a rich pedagogical repertoire of how to represent subject concepts and experience in pulling together various student conceptions of those topics.

For building leaders, the challenge gets more complex. If the goal is to improve the performance of teachers in classrooms, the principal needs to have knowledge of the two inner circles – the subject, how students learn, and how teachers teach – in order to organize opportunities for teachers' professional development. More, the principal will benefit from understanding something about teachers as learners and how to teach teachers.

The scope of the learning challenge broadens in the fourth circle, as the focus goes beyond the school and the number of adult learners expands. District leaders have to consider the learning needs of curriculum specialists, special educators, and principals. When one considers that principals need to mobilize a whole group of teachers to improve instruction, district responsibility to organize principals' learning goes beyond just what a principal needs to know personally.

At each level of the school enterprise, learning needs get more complex. One can also argue that the learning engagement of school actors gets broader, more diffuse and not as focused on core disciplinary content as one moves away from the classroom.

Constructivist Learning and Leadership

Figure 1 does not sufficiently emphasize the communal nature of learning entailed in LCK. Educators are working and learning together in communities at each level. The learning perspective is a constructivist one, that individuals are engaged together in constructing knowledge as they collectively make sense of the situation or problem using the resources at hand. Learning involves social interaction and active participation. New ideas and competencies develop through engagement in common interests. Critically, learning is enhanced when there are varying levels of expertise available as resources. For more

information on social learning theories, see Lave & Wenger, 1991; Wenger, 1998; Wertsch, 1985; Rogoff, 1994; and Vygotsky, 1978.

Administrators at all levels, then, take on roles as teachers as they demonstrate LCK. Stein and Nelson contend:

> *Hence, the role of administrators-as-teachers (like the role of teachers in the classroom) is not one of transmitting knowledge, but of assuming responsibility for (a) understanding the learning needs of individuals; (b) arranging the interactive social environments that embody the right mix of expertise and appropriate tasks to spur learning; (c) putting the right mix of incentives and sanctions into the environment to motivate individuals to learn; and (d) ensuring that there are adequate resources available to support the learning. We view knowledge of how to create these kinds of environments for learning as an important competency specifically related to how to lead the improvement of teaching and learning in an organization. (p. 426)*

The linkage between constructivist learning perspectives and leadership, articulated here, shares a learning orientation with the conception of distributed leadership (DL) advanced by Spillane and colleagues. It is generally easy to understand that classroom learning results from interactions among teachers and students as they engage with content. Learning is situated in a particular context created in the classroom. Similarly, Spillane, Halverson, and Diamond (2001) were the first to suggest that leadership is "stretched over" leaders, followers, and the situation. Leadership is constructed within the interactions of individuals in the particular context. In any given situation, some individuals will be leaders and some will be followers. Note that these positions can change quickly as the situation changes. "Situation" has a relatively broad meaning and can include a range of resources such as documents, tools, agendas, protocols, guidelines, and frameworks, as well as physical surroundings, external events and history.

Distributed Leadership

The notion that leadership is stretched over leaders, followers, and situation requires a re-thinking of leadership, that it is greater than any one individual or role. Leadership constitutes a "practice" that results from the continuous

interactions of people in reciprocal relationships that change (i.e. leaders or followers) as contexts change.

When we think about instructional leadership, the DL perspective comes into focus with the contributions that multiple individuals place (e.g. teachers, department chairs, specialists, consultants, assistant principals and principals). The DL approach also emphasizes the interdependence of aspects of instructional leadership, as individuals participate in frequently occurring organizational routines. Moving beyond a preoccupation with formal leadership roles, we can acknowledge and promote the leadership contributions of others and also highlight how individuals depend on the contributions of others. Given the challenge of instructional leadership – particularly given the responsibilities framed by LCK – the notion of a leadership practice seems appealing, perhaps even necessary.

Spillane cautions that DL is not a prescription for how to "do" leadership or develop leadership practice. But knowledge of the "theory" can shape how one "thinks about" leadership and approaches it. Understanding DL can help one diagnose DL in terms of current practice and can assist in designing DL for future practice. Looking at in-place organizational routines and who takes part in them is key to diagnosis. Taking a hard look at what works and what doesn't – and then culling the less than effective from the practice – is a step on the way to design.

Routines are recognizable by teachers and administrators. They happen regularly. They depend on interactions among multiple individuals. They require interdependence among people in order to accomplish micro-tasks required by the routine. In analyzing or designing routines for leadership practice, key characteristics to keep in mind include:

1) the function or purpose of the routine;
2) the micro-tasks that need to be accomplished;
3) the tools that will be used in the routine;
4) the people who will be involved.

Crafting new routines to support or deepen current practices should be guided by logical arguments for why the new routine should work, why it supports teaching and learning, and how to assess whether or not it is functioning appropriately. Design activities should look at very fine-grained detail about how things work together.

The Intersection of LCK and DL

Bringing LCK and DL into conversation enriches our understanding of what it takes to provide sound, broad-based, motivating leadership around instruction in our schools. If you start from the LCK point of view, you recognize that a formal leader (i.e., district leader, principal, teacher) is responsible for the learning of all individuals underneath (or embedded within) a particular organizational level. The enormity of this responsibility demands that formal leaders share it with others who take allied formal and informal leadership roles. And, as Stein and Nelson (2003) note about learning theory, having individuals of varied levels of knowledge and expertise involved promotes learning. A condition of asymmetry in terms of knowledge and expertise motivates individuals to learn and activates social learning processes. In sum, if you accept the importance of LCK you have no choice but to adopt a DL perspective in order to accomplish all that needs to be done.

If DL is your entry-point into this conversation, you embrace the general idea that leadership comes from individuals throughout an organization. More specifically, you know the importance of routines that guide your participation and emphasize regularity and stability over spontaneous, perhaps chaotic, action. Finally, you recognize that routines orchestrate interdependent tasks to which many persons can contribute. More than anything, you have a clear sense that leadership is constituted in interaction facilitated by established, trusting relationships. Knowing how important LCK is to quality teaching and learning at all levels of education, you are armed with information that can assist in the design of routines – what tasks need to be accomplished, with what tools, and by whom.

An instructional leadership routine designed by leaders who have a pretty secure knowledge of LCK is likely to be more detailed and include micro-tasks that others would overlook. Additionally, it is likely to reserve the engagement of formal leaders to priority interactions. In Figure 2 that follows, the Five Week Assessment Routine is expanded as an example of how LCK would call for a more detailed routine.

Importantly, the function of the routine now includes learning priorities and clear focus on improving instructional quality and student achievement. The added micro-tasks (shaded in gray) include in-house professional development (perhaps designed as "just in time"), negotiated commitments to instructional trials and related classroom assessments, regular meetings of teacher community members, and reports to formal administrators. The added micro-

tasks represent attention to the continuous, embedded learning that we have come to associate with ambitious instruction.

Figure 2: Intersecting LCK and DL Routines

THE FIVE WEEK ASSESSMENT ROUTINE Function: Formative evaluation Teacher Accountability Monitor Instruction Teacher Learning Instructional improvement Improved student learning		
Task	**People**	**Tools (e.g.)**
Schedule test	Literacy Coordinator	None
Create Test	Literacy Coordinator	Standards ITBS Practice Tests
Administer Assessment	Teachers	Test
Score Assessment	Literacy Coordinator Literacy Team Assistant Principal	Graphing
Analyze Results	Literacy Coordinator	Graphing problem area
Interpret Results/ Plan Intervention	Literacy Coordinator Principal Assistant Principal Teachers	Graphs
In-house Professional Development	Literacy Coordinator Teacher Leaders Principal (resources)	Graphs PD Materials
PD Follow-up commitments Target lessons Common methods	Teachers Literacy Team Literacy Coordinator	PD Materials
Formative student assessment	Teachers Literacy Team	Weekly teacher made assessment

Weekly Teacher Learning Community meetings	Teachers Literacy Team	Agenda Assessments PD materials
Mid-term reports to principal	Teacher Leader	Commitments Agenda Assessment summary

This intersection of LCK and DL gives the formal leader – generally the principal – a way to see to instructional leadership responsibilities in a reasoned and sustainable way. The principal is connected to instructional practice at key priority points having to do with the following: results, resources, and reciprocal accountability.

1. Results. Principals, who have ultimate responsibility for everything that happens in their buildings, need to know whether students are learning at expected levels. Beyond annual assessment data, the five week assessment routine ensures that more frequent achievement data reaches the principal. Further, the principal is actively engaged in making sense of the data, defining problematic areas, and crafting strategies for intervention. The added micro-tasks that address the teacher learning routines will ultimately bring to the principal's desk an even finer-grained report of student learning. Without knowledge of results, principals are hard-pressed to make legitimate, well-received decisions that impact the instructional program.

2. Resources. As the person responsible for resource expenditure, the principal should play a central role in professional development arrangements. With regular, real time analysis of data represented in the expanded Five Week Routine, the principal can arrange for the support teachers need to advance their own learning, often just as they need it, whether through materials, consultants or specialists, or released time.

3. Reciprocal Accountability. The expanded Five Week Assessment routine includes timely (importantly, not laborious) reports to the principal about teachers' professional engagements in addition to student achievement data. This report provides an important window into teachers' learning activities and highlights the interdependent nature of their distributed leadership practice. The report targets an instructional problem identified through the analysis of five week assessments and a correlated teacher learning plan (i.e. in house professional development). It also includes

teachers' plans and commitments to put their new learning into practice via target lessons using common instructional methods. The principal has a sense of how the faculty are working together, the kinds of things they are working on, and formative data reporting how well or poorly the work is going. More, the principal has some insight into the level of commitment teachers have to each other – what is often termed internal accountability.

The report also activates a more hierarchical accountability – that between teachers and administrators. The accountability here is for evidence of continuous learning, not necessarily evidence of performance. If this kind of learning routine is to work, the principal needs to ensure that these data generated are used for learning, not for evaluation per se.

Importantly, principals or other formal leaders could use such reports in demonstrating accountability to teachers and students. The information generated allows the leader to make decisions in the service of learning at all embedded levels. It also informs the daily interactions between principal and teachers and possibly even between principal and students. Understanding where the challenges to learning are and how the faculty have decided to address them allows the principal to engage teachers in brief, though informed, conversations about how things are going, to prompt reflection by asking relevant questions, and to provide formative feedback from a school-wide perspective. Knowing what kids are working on, the principal can even elicit student comments about what's working. And, as discussed above, the principal can act quickly to get teachers what they need when they need it, demonstrating the principal's accountability to teachers.

Conclusion

In order to offer excellent instructional leadership, school leaders need to have Leadership Content Knowledge sufficient to make appropriate decisions regarding staffing, evaluation, curricula, materials, professional development as well as organizational decisions related to how instructional occurs. The challenge of maintaining appropriate knowledge and skills in all content areas can be daunting to both new and experienced principals. Taking a Distributed Leadership perspective can guide school leaders in how to design and support school routines that enable the sharing of essential instructional design and monitoring activity. An understanding of the compatability of these two concepts

enlarges the instructional leadership capacity of individuals and the school.

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