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Lessons Learned: Collaborative Symbiosis and Responsive Disciplinary Literacy Teaching

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Teaser Text: To improve disciplinary literacy instruction, both disciplinary teachers and literacy coaches must harness collaborative knowledge and co-construct ways to respond to the disciplinary literacy needs of adolescents.

The Challenge of Literacy Instruction in Disciplines

Meeting the literacy needs of adolescents can be a daunting task. Secondary teachers have been charged with developing both adolescent literacies and disciplinary knowledge for a diverse range of adolescents - while keeping literacy instruction relevant to the interests of students (Alvermann, 2002). Yet, infusion of literacy instruction with disciplines has historically met resistance from secondary teachers (O'Brien, Steward, and Moje, 1995). In an era of increased teacher accountability witnessed by Value Added Models (VAM) and the alignment of standards with federally backed, high-stakes assessments, secondary teachers must also contend with limited federal funds, a diversity of student literacy needs, and fewer instructional interventions. If teachers are to navigate these increased demands, both disciplinary teachers and literacy coaches must harness collaborative knowledge and construct ways to respond to the disciplinary literacy needs of adolescents.

The Move Towards Disciplinary Literacies

Common Core State Standards (CCSS) suggest middle and high school students must hone subject matter and literacy skills to be successful. Key shifts described in English Language Arts (ELA) CCSS include: (1) regular practice with complex texts and their academic language; (2) reading, writing, and speaking grounded in textual evidence,

both literary and informational; and (3) building knowledge through content-rich nonfiction. (http://www.corestandards.org/ELA-Literacy). Although CCSS have been explicit about the need for disciplinary teaching, secondary teachers remain hesitant to enact literacy instruction in classrooms (Shanahan & Shanahan, 2014) citing lack of time or believing literacy practices are unrelated to their content (Zygouris-Coe, 2012).

As students progress further into secondary schools, this challenge increases as subject matter demands expand and texts and ways of knowing within disciplines become more complex and differentiated (Shanahan & Shanahan, 2008). Content knowledge and the language used to learn it are entwined (Schleppegrell Achugar, & Oteíza, 2004), so literacy functions as the vehicle for learning in secondary school classrooms. A disciplinary literacy approach views literacy practices as fused to the content and, therefore, inseparable from the disciplinary knowledge production (Moje, 2008). Far more than normed skills for reading, writing, and talking like chemists, biologists, etc. disciplinary literacy includes the "cognitive literacy processes used to make meaning, the cultural tools—including language and texts that mediate thinking—and the epistemic beliefs about knowledge and knowledge production that constitute the discipline" (Manderino, 2012, p. 121-122). Middle school students, then, need teachers who can apprentice them into the literate thinking of the discipline and provide opportunities to produce and critique mainstream disciplinary knowledge (Langer, 2010). Apprenticing adolescents into essential disciplinary concepts, driving questions, and literate practices requires a shift in the way teachers perceive content, students, and teaching.

Yet, how do these changes occur in light of disciplinary knowledge demands and increased accountability pressures? The purpose of this paper is to detail the tensions and

practices involved when a middle school science teacher and a former language arts teacher turned literacy coach attempted to improve disciplinary literacy teaching in sixth grade science. Case study methodology was used to reveal how two educators negotiated collaborative tensions through situated collaborative practices. First, we review theoretical tools and align the case to existing research and literature on collaborative inquiry and coaching. We then detail the collaborative efforts to improve literacy in a sixth grade science class while exposing disciplinary tensions and the ameliorating collaborative practices. Finally, the case provides implications for collaboratively inquiring into disciplinary literacy instruction.

Theoretical Tools

We rely on situated learning theory to understand enacted literacy instruction. Situated learning theory encompasses a powerful relationship in which knowledge is co-constructed based on the context and interactions (Lave & Wenger, 1991). When teaching is viewed as the unique interactions among teacher, adolescents and subject matter (Cohen & Ball, 1999), these daily interactions write the curriculum and define literacy opportunities for adolescents. In effect, teachers decide what and how to teach based on their own patterns of practice and beliefs about disciplinary knowledge, literacy, adolescents, and pedagogy. In the same way, collaborative practices are constructed based on unique interactions between specific teachers, disciplinary knowledge, and specific adolescents, bringing the notion of "best practice" into question. As Hlebowitsh (2012) argued, "there is a fallacy in assuming individual members of a group necessarily carry the average characteristics of the aggregate group" (p. 4). By learning in practice,

coach and teacher(s) co-construct knowledge of practice essential for responding to the unique students in their classrooms.

Coaching as Collaborative Teacher Inquiry

Joyce and Showers (1982) originally defined coaching as "helping teachers analyze the content to be taught and the approach to be taken, and making very specific plans to help the student adapt to the new teaching approach" (p. 384). Yet, literacy coaches can often be positioned as "disciplinary outsiders" in secondary school collaborations based on their own disciplinary teaching experiences and familiarity (or unfamiliarity) with disciplinary discourse communities (Wilder, 2013). In fact, as Wilder concluded, coaches, identifying as disciplinary outsiders, can strive to improve student literacy yet struggle to identify disciplinary literacy outcomes in disciplines they have not taught. Therefore, given the increased knowledge demands when attempting to "teach on the diagonal" (McConachie & Petrosky, 2010), it can often be difficult to identify who coaches and who is being coached in a secondary school collaboration. Literacy coaching provides a means for teachers and coaches to "deliberate problems of practice" and to "work together to uncover, articulate, and question their own assumptions about teaching, learning and schooling" (Cochran-Smith & Lytle, 2009, p. 144). Given the variance in disciplinary knowledge, neither coach nor teacher(s) hold the pedagogical answers, but collectively "raise fundamental questions about curriculum, teacher's roles, and the ends as well as the means of schooling" (Cochran-Smith & Lytle, 1999, p. 27).

Collaborative Planning and Teaching

With coaching conceptualized as collaborative inquiry, there are numerous documented benefits of collaborative planning and teaching. For example, a

comprehensive study of 23 schools across eight districts supporting collaborative planning and teaching within special education classrooms demonstrated students' improved academic and social skills, positive attitudes and peer relationships (Walther-Thomas, 1997). Among teachers, an improved sense of professional growth, personal support, and community within general education classrooms was reported. Co-teaching has been linked to increased student performance on standardized assessments (Noeth, 2004, as cited in Dhanapal & Kanapathy, 2014) and curricular assessments for both regular and special education students. Thousand, Villa & Nevin (2006) argued collaborative planning and teaching allow instructors to capitalize on specialized knowledge while modeling cooperative and collaborative skills for students. To that end, Darling-Hammond and Richardson (2009) reviewed literature suggesting effective professional learning includes collaborative planning and teaching enacted directly in classrooms where teachers supports one another and encourage risk taking. While there are many cited benefits, the approach entails numerous configurations, and efforts are dependent on the collaborative context and culture of specific classrooms.

Research Methods

This interpretive case study (Stake, 1995; Yin, 2008) was part of a larger, multi-case study (Wilder, 2013) analyzing how middle and secondary school literacy coaches attempted to "coach heavy" (Killion, 2009, 2010) and improve adolescent literacy. While studies aligning longitudinal coaching efforts to adolescent literacy outcomes are lacking in the research base (Knight, 2007), interpretive case studies offer a vital means of understanding both the tensions which complicate the "causal cascade" (Atteberry, Bryk,

Walker & Biancarosa, 2008) and the collaborative practices which can hone disciplinary literacy teaching.

The case of Scarlett Moinahan (all names of teachers and schools are pseudonyms), a third year middle school literacy coach and former language arts teacher of nine years, and Nathan Bloomfield, a first year middle school science teacher, describes *how* a literacy coach and science teacher attempted to improve disciplinary literacy instruction, *how* tensions complicated efforts, and *how* collaborative practices eased these tensions. Coaching in this context was bounded (Yin, 1994, p. 13) by the duration of the collaboration (seven weeks), the topic of their collaboration (improving disciplinary literacies), and an individual site classroom.

Data Collection and Analysis

Situated learning theory (Lave & Wenger, 1991) provided an analytical frame for identifying co-constructed knowledge, collaborative tensions and practices. As coaches and teachers interact around pressing questions of practice, they inevitably construct expertise and uncertainty, collectively problem-solve, and develop situated identities unique to the collaborative context. In this study, collaboration was viewed as a process of co-constructing *knowledge* about disciplinary literacies, teaching, and students with collaborative *practices* restructuring the naturally occurring *tensions*—conflicting beliefs about and teaching practices related to disciplinary literacy, teaching, and students. Therefore, this study used qualitative methods to understand these particular "slices of social life" (Saldana, 2010, p. 15) and the "immediate and local meanings of actions" (Erickson, 1986, p. 119) within the collaborative context where speech events constituted not just what happened but served as the unit of analysis. Data for this case consisted of

seventeen classroom observations, eleven teacher-coach debriefing sessions, twelve coach-researcher debriefing sessions, and two semi-structured individual interviews each with the coach and teacher. Semi-structured interviews were used to determine how teacher and coach viewed disciplinary subject matter and literacy, teaching, and students. Field notes, observations of classroom teaching enactments, and transcribed coach-teacher debriefings and coach-researcher debriefings illuminated collaborative knowledge, tensions and practices.

Data analysis represented an "exploratory problem solving technique" (Saldana, 2010, p. 11) used to understand the relationship between situated collaborative practices and co-constructed knowledge. A constant-comparison method of analysis (Glaser & Strauss, 1967) across collaborative events in a single day and then across multiple days provided a means of developing themes related to collaborative tensions and practices. Data were transcribed and analyzed to understand collaborative tensions, disciplinary knowledge, and collaborative practices. Initial codes (i.e. collaborative roles, pedagogical disagreements, literacy beliefs, etc.) were used to understand collaborative tensions. Scarcity of meeting time, first year teaching pressures, conflicting beliefs about literacy, deficit views of student literacies, and disciplinary knowledge were themes related to collaborative tensions. Then, codes related to disciplinary knowledge (i.e. scientific practices, crosscutting concepts, disciplinary core ideas) and disciplinary pedagogical content knowledge (i.e. scientific inquiry, writing scaffolds, discourse structure, etc.) illuminated disciplinary knowledge alignment or misalignment. Inquiry, uncertainty about disciplinary literacy objectives, content area strategies, gradual release of responsibility, modeling, and data-driven instruction were themes reflecting disciplinary

knowledge. Finally, codes reflecting situated learning theory identified how participants co-constructed collaborative practices and instructional practices in Nathan's sixth grade class. Analysis suggested formative assessment routines, discourse patterns during collaborative debriefings, collaborative roles, and instructional responses were ways Nathan and Scarlett jointly problem-solved complexities involved with improving literacy in a science unit on matter.

The Case - Science Exploration at Hobbs Middle School

Situated in a small Midwestern city, Glenville School District, at the time of this study, had recently exited a court-imposed consent decree to reduce the achievement gap between the dominant white student population and students representing historically disenfranchised populations. This decade-long court order provided a larger educational, social, and political context and impetus for district literacy initiatives in middle and secondary schools which produced numerous "Attempt, Attack, Abandon" reform cycles (Knight, 2007) and increased outcome pressure on literacy coaches. Job-embedded literacy coaching represented one such middle school reform effort with teacher participation remaining voluntary giving teacher and coaches autonomy over the topic, the structure, and the duration of their of collaborative work, but providing limited organizational and structural support. The principal at Hobbs Middle School appointed Scarlett Moinahan to the position of literacy coach prior to the 2010-2011 academic year and Scarlett remained the only literacy coach in the building in the spring of 2012.

Hobbs Middle School. Hobbs Middle School served a diverse student body of 700 students in 6th through 8th grades where 49.9% of students qualified for free and reduced lunch and 6% of students were classified as English Language Learners. Thirty-

four percent of students self-identified as African-American, 44% as Caucasian, 12% as Latino/Latina, and 9% Asian or Pacific Islander. Hobbs was the oldest middle school in the district and faced numerous challenges related to the literacy and learning of adolescents. At the time of this study, the school had failed in three consecutive years to meet annual yearly progress in reading and mathematics with African-American students, economically disadvantaged students and students who qualified for special education services.

A dedicated first-year science teacher, Nathan Bloomfield taught a Science Exploration class offered to every 6th grader at Hobbs Middle School. In an initial interview, Nathan stated feeling "overwhelmed with trying to do hands on stuff with classes of more than thirty students," so he wasted little time asking his middle school literacy coach, Scarlett, to help him "teach with text." An energetic and impassioned former teacher, Scarlett previously taught ELA for six years before arriving at Hobbs, making her a disciplinary outsider in this collaboration since she had never taught science. A third-year literacy coach, she desired to strengthen responsive disciplinary teaching at Hobbs.

Collaborative roles. During Nathan's initial interview he claimed he asked Scarlett to help him "learn to teach with text" in ways similar to *intermediate literacy*, or comprehension-based skills (Shanahan & Shanahan, 2008, p. 44) as opposed to *disciplinary literacy*, which helps students develop scientific conceptual understanding while improving their ability to articulate scientific claims, design methods for collecting evidence, and reason and communicate with scientific findings (McNeil and Krajcik, 2011, p. 12). Nathan also admitted he was "still figuring out what's in the curriculum"

and seldom framed units of study around essential disciplinary questions. At the onset of this study, Nathan's statements and teaching practices did not reflect a disciplinary literacy approach; he seldom asked students to construct explanations in science through claims, evidence and scientific reasoning.

On the contrary, Scarlett's initial interview reflected a conceptual understanding of disciplinary literacy and an understanding of disciplinary literacy in language arts even though she had no experience teaching for disciplinary literacy in science. Scarlett agreed to model literacy instruction focused on informational texts, to collect formative assessment data, and to co-teach lessons as Nathan desired. During an initial coach-researcher debriefing, Scarlett revealed she believed students needed literacy instruction focused on productive student talk, the construction of knowledge through disciplinary inquiry; and using scientific texts to construct and defend scientific arguments. At the onset of this study, and despite identifying as a disciplinary outsider, Scarlett desired to build disciplinary inquiry and provide literate spaces for students to construct scientific explanations.

Findings

Three distinct findings are presented related to how Scarlett and Nathan attempted to design and enact disciplinary literacy teaching in science. First, the primary collaborative tension will be discussed followed by a discussion of how the participants constructed two collaborative practices to ease this ongoing tension.

For Scarlett and Nathan, disciplinary knowledge mattered. The Next Generation Science Standards (NGSS Lead States, 2013) present three dimensions needed to provide students with high quality scientific learning in middle school classrooms. *Scientific*

Practices represent "a) the behaviors scientists engage in as they investigate and build models and theories about the natural world and b) a key set of engineering practices engineers use as they design and build systems" (p. 2). *Crosscutting Concepts* represent "key concepts applied across all domains of science (i.e. matter)" (p. 2). And, *Disciplinary Core Ideas* are "the key organizing concepts or tools related to the interests/life experiences of students" (p. 2). The greatest collaborative tension—Scarlett's limited disciplinary knowledge in science and Nathan's limited knowledge of literacy instruction—appeared as they attempted to design the unit on matter.

A week before starting the chemistry unit on matter, Scarlett, a disciplinary outsider with expertise in adolescent literacy, and Nathan, a novice, science teacher desiring to improve his literacy instruction, sat negotiating disciplinary literacy objectives for students. Nathan began:

Nathan: It affects their everyday life. I'm trying to think of a couple more questions that we could…because a main idea is matter can be classified into three states. It can't be destroyed or created. That's not really a…

Scarlett: …an overarching understanding or question. So, you're talking physical and chemical changes. And, then solid, liquid and…

Nathan: Well, another could be what makes up matter?

Scarlett: (Laughs) so, what matters?

Nathan: Yeah, I guess that doesn't work.

Scarlett: Yeah, what is matter? I mean, I'm trying to put myself in the chair of a 6th grader on our first day. Our first big idea is how does

chemistry affect your everyday lives? We could do some science experiments getting them thinking but when you're talking about classifying matter? I'm stuck.

Nathan: I am too.

Scarlett: I'm just thinking, in ten years, what's important for them to know about matter?

Nathan: Even with chemicals, they think all chemicals are harmful. Or, I would want them to see that when matter is changing, what evidence do I have that it's a physical change or a chemical change? Know what I mean?

Scarlett: No, not really. I'm thinking 'huh'? Okay, we're reaching a road block here because we've got this really big one and…

Nathan: It is really big.

Scarlett: It is very big but we're always going to be able to come back to this one. Okay, so I'm thinking. So, the physical and chemical change. You definitely want them to know differences between them, evidence of that change, but then you also have been talking about the states of matter.

Nathan: Yeah, and how that fits into those changes.

Scarlett: Okay. (Flips pages in science textbook) I won't lie to you. Chemistry makes my brain hurt. Wow, this is not higher up chemistry either. So…what is essential for them to get out of this unit? Is that it?

After an hour of debate, Scarlett intuitively felt she and Nathan should "lead with inquiry" as Cervetti & Pearson (2012) suggested, and while she desired students be "engaged in reading meaningful texts for meaningful purposes in knowledge-building contexts" (p. 582), Scarlett had limited experience reading science texts while also "coming to understand the methods of inquiry that produced those facts" (p. 583). Not only had Scarlett struggled to identify scientific practices, but, she dismissed Nathan's essential understandings and questions even though they directly aligned with crosscutting concepts described in MS-PS1.A: Structure of Matter for Grades 6-8 in the Next Generation Science Standards (NGSS Lead States, 2013). Instead, Scarlett labeled the idea a "road block" and put more trust in the textbook than Nathan's disciplinary insider knowledge. As a disciplinary outsider, Scarlett critiqued Nathan's suggestions even though she could not provide alternatives. As a disciplinary insider, Nathan's literacy goals emphasized discrete reading skills and deemphasized scientific practices while exposing his uncertainty about framing scientific inquiry for his students. Scarlett, having advocated for inquiry, sat unsure about disciplinary purposes for learning about matter. Nathan, having unsuccessfully offered crosscutting concepts related matter, sat unsure about how to frame inquiry and scaffold literate practices in science.

Addressing Collaborative Tension Through Symbiotic Practices

For students to develop scientific literacy, Scarlett and Nathan's primary tension needed to find a collaborative path forward. Two collaborative practices attended to this primary collaborative tension and grew a symbiotic collaborative relationship.

Collaborative transparency. Recognizing each other's disciplinary knowledge occurred only when both Nathan and Scarlett chose to be transparent about the limits of

their disciplinary knowledge. During the next planning session, Scarlett admittedly began:

Scarlett: What are you thinking? You are the science master. The content is not my thing. So, the essential questions…one about chemistry and life, another about characteristics of solids, liquids and gasses, and then one about explaining changes. Are you still okay with those?

Nathan: Yeah, sounds great. And, we should have them read about matter before the change of state experiments. But, I don't know how to do that. I'm not a literacy guy. I have a middle level degree from a state university and it's mostly teacher coursework.

Scarlett: Sure, but you know science so it's exciting. There are two brains to wrap around an idea. You've got really great ideas. I've got some okay ideas. It takes a lot of time, but we'll get it together.

Initially, when grappling with tough disciplinary purposes, they exposed the limits of each other's knowledge. Today, Scarlett altered her stance, recognizing Nathan's disciplinary knowledge. Through transparent talk, they reached consensus utilizing Nathan's knowledge of core concepts and Scarlett's knowledge of literacy instruction. After these planning sessions, Scarlett proposed meaningful student data needed to inform each day's impending instructional plan. As she stated, "How much would this be different if I could say 'Look here, Nathan, if you look at this student work, here are three kids that don't get it. Now what are we going to do about their needs? Right now, we're just relying on our blind expertise." For Scarlett and Nathan, transparent discourse regarding uncertainties meant the literacy needs of students took priority.

Responsive teaching. Responsive teaching can use a backwards design process to identify disciplinary literacy outcomes, design performance tasks, and use ongoing formative assessments to differentiate instructional scaffolds for students (Gutzmer & Wilder, 2012). Disciplinary literacy teaching in science scaffolds adolescent ability to engage in scientific inquiry, prioritize evidence, formulate explanations from evidence, connect explanations to scientific knowledge, and communicate and justify explanations (NGSS Lead States, 2013, p. 12). Using a claim, evidence, reasoning process, teachers can scaffold student understanding of key concepts and literate practices (McNeil & Krajcik, 2011). Along with transparent talk, Scarlet and Nathan relied on their second co-constructed collaborative practice--responsive teaching--to improve disciplinary literacy teaching. Akin to situated learning theory (Lave & Wenger, 1991), their knowledge acquisition emanated from their emerging practice of using shared observations of student discourse to inform the design of subsequent instructional responses.

Only a few days prior to the matter unit, Scarlett observed student reading and reasoning about sustainability of local water aquifers and suggested they modify a protocol for observing student literacy. After asking Nathan to identify three students who challenged him as a teacher, Scarlett used an "Eyes on Students Protocol" (Wilder, 2013) (see Figure 1) to record observations of each focal student's discourse and engagement. In column one, Scarlett recorded observations noting student confusion and engagement. After class, Scarlett and Nathan held a reflective conversation where they discussed her student observations and then used column two to brainstorm possible explanations for student actions. Nathan admitted his lengthy talking around text had disengaged students, and he suggested students were confused about how to reason with

the multiple water maps and table listing water depths and annual precipitation over the last fifty years. Finally, Scarlett and Nathan used observations from column one and discourse around column two to design possible instructional responses. [Insert Figure 1: "Eyes on Students Protocol"]. Nathan decided to modify the same afternoon lesson by previewing the texts (maps and tables) for students or "put it (talk) back on the kids" to increase student discourse. Their formative assessments elucidated the student need for meaningful scientific inquiry and opportunities to use discourse and texts as scaffolds for written scientific explanations. At Nathan's request, Scarlett modeled literacy instruction the next day and Nathan would use the protocol to observe student disciplinary discourse. Thus, Nathan and Scarlett constructed their own situated use of the protocol.

They also desired to increase disciplinary inquiry ("Why does matter change state?") and student voice through a new discursive structure for class. Starting the lesson exploring how temperature and pressure influenced changes in states of matter, Scarlet introduced "Ask A Chemist" (See Figure 2) to be permanently placed on the chalkboard and used each day. [Insert Figure 2: "Ask A Chemist"]. Scarlett explained the process to students:

> "Someone asked me a great question and there are so many of you asking really, really good questions about solids and liquids and matter, I'll be honest with you, I can't keep them all in my head. But, what if we kept them on a poster here in the room? I don't have all the answers. Mr. Bloomfield doesn't. Do you think that would be okay?"

Through the "Ask A Chemist," Scarlett built student background knowledge on matter by modeling how she recognized text features and generated questions while reading a short

informational article on chemical reactions. Students then paired up to read about how matter changes state, recording their questions in the margins of the text. Meanwhile, Nathan informally interviewed students about their predictions, noting how the same three students compared, contrasted, and explained changing states of matter.

With background information built, Nathan's demonstrations of candle wax burning and of water crystalizing took center stage. For the next fifteen minutes, students discussed and recorded observations with table partners while Scarlett now recorded observations on the Eyes on Students Protocol. Nathan asked, "How did the amount of wax increase or decrease? What might have caused the light smoke? Where did it come from?" Nathan diffused the flame, took a pot of water out of the freezer, put it under the document camera and zoomed in for students to analyze the crystals. Nathan paused, jotted down student observations on his own clipboard, and asked, "What do we notice about the size of the crystals? Is there more or less water in the bowl? What do we notice about the frost on the outside of the bowl?" Student groups wrote observations and additional explanations before recording group conclusions in a graphic organizer. Switching teaching roles once again, Nathan resumed recording observations and Scarlett walked to the back of the room, revealing a blank "Solids" poster and began:

> "Eyes on me. Follow me… what are some things you just observed and what might that prove about solids? A solid has a definite what? A volume. Thank you. What else? Right, it takes up space. How do you know this? What happened when he took the candle and held a lighter under the candle? Does this seem logical?"

With each question, students offered explanations, Scarlett asked for reasoning, and Nathan jotted down observations of the learning of his three focal students. "Exactly, it

melted. So, what did that tell us about solids?" she inquired. Unprompted, two students at the table by the door debated whether adding water to dirt resulted in a change of state. Another girl wondered if a semi-melted chocolate bar was still a solid. With the remaining minutes, students began writing scientific explanations of why matter changes state incorporating observations and reasoning from the melting wax and freezing water experiments. After class, Nathan and Scarlett used the protocol to share observations of student reasoning and discourse, discuss possible explanations for student actions, and design instructional responses. Before leaving, they concluded Nathan should model the "Ask A Chemist" structure in the next lesson before providing students differentiated feedback on the quality of reasoning in their written scientific explanations. Through their own situated use of the protocol, Nathan and Scarlett developed their own responsive teaching practices.

New Opportunities for Disciplinary Literacy Teaching: Lessons Learned

When Nathan, a first year teacher, invited Scarlett, a veteran teacher and literacy coach into his inquiry, their daily collaborative efforts exposed the edges of his understanding of literacy instruction and of her scientific knowledge. Negotiating this tension, their use of transparent discourse and responsive teaching suggest two implications for practitioners collaborating to improve disciplinary literacy instruction.

Recognize Teacher Knowledge

First, literacy reform efforts, like coaching in secondary schools, must resist positioning coaches as experts and teachers as unknowledgeable instead recognizing the shared expertise and knowledge co-constructed by teachers and coaches. Scarlett believed the "work of coaching should support kids" and "help teachers figure out what

works best with kids." Scarlett and Nathan regularly incorporated the Eyes on Students Protocol to ground collaborative discourse in the observed disciplinary literacy practices of adolescents. As a disciplinary outsider, Scarlett often struggled—as in the opening planning session—to identify disciplinary literacy outcomes based in scientific concepts and literacy practices. Scarlett's scientific knowledge was deepened through in-class teaching demonstrations and collaborative discourse where Nathan often explained scientific concepts. Inversely, through their reliance on formative assessments, use of think alouds, and enactment of discourse structures, Nathan expanded his understanding of literacy instruction. This collaborative symbiosis challenged each other's assumptions about scientific content, teaching, and students while collaboratively designing and enacting disciplinary literacy teaching.

Increase Participation in Disciplinary Literacy Collaborative Inquiry

If school districts persist in expecting secondary literacy coaches to impact the literacies of adolescents across multiple disciplines, coaches and teachers must be knowledgeable of disciplinary-specific literacies and pedagogies such as the claim, evidence, and reasoning pedagogical framework (McNeil and Krajcik, 2011). Even within the International Reading Association Standards for Middle and High School Literacy Coaches (2006), the unique disciplinary knowledge demands of each content area are minimized, assuming a single coach should employ generalizable literacy strategies within any discipline. Given the complexity of disciplinary literacy teaching, schools must intentionally design practitioner collaborative inquiry to include a wider cross-section of disciplinary teaching expertise. In this case, Nathan and Scarlett used situated collaborative practices to redress disciplinary knowledge tensions, used co-

constructed practice with a protocol to maintain a focus on adolescent literacy needs, and developed responsive teaching practices prompted by specific student needs. However, despite Scarlet's conceptual understanding of disciplinary literacy, neither Nathan nor Scarlet had previous experience teaching for disciplinary literacies in a middle school science classroom. In order to impact the disciplinary literacies of adolescents, entire disciplinary departments in schools must partner with literacy coaches to harness collective disciplinary knowledge and use collaborative knowledge to engender responsive disciplinary literacy teaching.

Figure 1: Eyes on Students Protocol

Figure 2: "Ask a Chemist" student visual

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Take Action

STEPS FOR IMMEDIATE IMPLEMENTATION

Recommended Ways to Improve Collaborative Inquiry into Disciplinary Literacy Teaching

1. Provide professional development opportunities for disciplinary teachers to experience the literate practices in their discipline, deconstruct their literate thinking, and to envision how adolescents might require additional scaffolding needs in the same disciplinary inquiry.
2. Work with literacy coaching and administrators to develop professional learning structures to support ongoing collaborative practitioner inquiry.
3. Plan disciplinary learning outcomes for students and then partner with literacy coaches and teachers to collect formative assessments and respond instructionally to student literacy needs.
4. Use professional development for discipline-alike colleagues to build a shared understanding of disciplinary literacy pedagogical frameworks.
5. Collect and discuss meaningful data related to both unit level disciplinary literacy outcomes for students and lesson level gaps in understanding.

More to Explore:

Watch the National Writing Project: "Inquiry as Stance: Practitioner Research for the Next Generation" Video introduction: http://www.youtube.com/watch?v=2H0AFtUreDA by co-author Susan Lytle.

Watch a video discussing Disciplinary Literacy by E.B. Moje: "Disciplinary Literacy: Navigating Literacy Contexts in Secondary Schools"

http://www.youtube.com/watch?v=8fMncjLc1iQ

Watch a video where adolescents use Literacy Partners to analyze scientific texts:

https://www.teachingchannel.org/videos/pairing-students-in-classroom

Explore a Claim, Evidence, Reasoning instructional framework in science:

http://www.edutopia.org/blog/science-inquiry-claim-evidence-reasoning-eric-brunsell

Read *Instructional Coaching: A Partnership Approach to Improving Instruction* by Jim Knight to explore a framework for student-centered coaching in academic disciplines