Teacher, Researcher, and Accountability Discourses

Creating Space for Democratic Science Teaching Practices in Middle Schools

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ABSTRACT

This study explores the role of competing discourses that shape current practices in U.S. schools and how professional development efforts can support teachers and researchers in finding ways to reinsert more democratic processes into their collaborative work. We examine the case of one research and professional development project with the goal of supporting middle school science and ESOL teachers in fostering more meaningful science learning for all their students but especially their English language learners. Using Gee's notion of big-D discourses and Fairclough's notion of interdiscursivity, we trace how the Discourse of accountability, the Discourse of science teaching, and the Discourse of education research, each constructed by different stakeholders for different purposes, may become interdiscursive and hybridized through interaction over time. Excerpts from interviews and conversations with participants during the various components of our project highlight both the challenges and the possibilities of teachers retaining or regaining agency in their classrooms within and against the structures of the accountability Discourse. At the same time, we explore how our researcher Discourse also became hybridized in order to better work with a system where an undemocratic accountability Discourse continues to be dominant.

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Critics of modern, assessment-driven schooling policies have argued that in order to revitalize educational democracy, we need a greater focus on process, rather than outcome, in all aspects of education, including teacher professional-learning settings as well as student learning contexts (Lobman, 2011; Newman, 2000). An education system grounded in democracy as process requires collective, creative, emergent, and participatory teacher learning practices where development of democratic decision making, not democratic results, is the goal. Indeed, Newman (2000) has argued that any efforts to rejuvenate democracy that do not simultaneously and continuously reinitiate democracy-as-process for all stakeholders (students, teachers, administrators, parents, and community members) are doomed to reinforce and further institutionalize the outcome framework that presently holds sway in educational reform (Lobman, 2011).

Research and teacher professional-development projects that strive to support democracy in education can readily fall prey to these same outcome-based assumptions about success or failure. Too often, we presuppose a successful outcome as one in which teachers accept new practices wholeheartedly and then "correctly" apply them to their instruction on a regular basis—what researchers may refer to as fidelity of implementation. Instead of taking up this outcome-oriented model, our research framework focuses on democracy-in-process by attempting to develop

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greater understanding of the complex interactions, tensions, and contextual contingencies that necessarily guide classroom instruction. Following Lobman (2011) we wish to hold researchers, teachers, and students as cocreators of democratic processes rather than focusing on democratic results that emphasize reducing achievement gaps.

The socializing purposes of the American public education system include preparing teachers to teach so as to enable young people to participate fully in the political, civic, and economic life of our society (Elmore, 2005). More and more, this participation in society requires that teachers imagine and support students as critical thinkers who possess the skills to solve social problems that are grounded in scientific and technological challenges. Making wise decisions about topics as complex and diverse as genetic engineering, factory farming, budget deficits, climate change, and weapons of mass destruction requires citizens both understand scientific and technological concepts and critically weigh competing priorities and agendas to reach well-reasoned conclusions. Citizens must also learn to effectively communicate their ideas about these complex and technical topics in clear and convincing ways. Thus, in the modern world, full civic and democratic participation requires that teachers provide students with an opportunity to develop familiarity with and fluency in the academic language of science as well as comfort applying a certain set of science and engineering practices that are necessary to gain understanding, to evaluate rhetoric, and to communicate ideas about science and technology (Buxton & Provenzo, 2011).

At odds with these evolving demands that schools and teachers promote engaged citizenship, however, the pressures of standardized testing and the current accountability practices in public schools have led to an overemphasis on decontexualized and technical aspects of teaching and learning. The resulting technical, basic-skills, and outcome-oriented curriculum pushes teachers to focus on test preparation and results in a devaluing of the social and democratic purposes of education as preparation for life (Monahan & Torres, 2010).

Further, the more at-risk a school or its students are perceived to be in terms of meeting accountability standards, the more teachers feel pressure to limit opportunities for students to engage in the kind of learning that fosters creative problem solving and democratic practices, due to its being perceived as taking too much time (Jones, Jones, & Hargrove, 2003). In the case of our research, our student population includes large numbers of immigrant English language learners (ELLs), who tend to perform poorly on standardized accountability measures due to the added linguistic challenge of taking assessments in a second language (National Center for Education Statistics, 2011). ELLs are typically perceived to be one of the most "at-risk" groups in schools, resulting in an even greater emphasis on teaching to the test for these students (Lee & Buxton, 2010). The ELL population is also one of the fastest-growing demographic subgroups in U.S. schools, and while more geographically dispersed than ever before, English learners still tend to cluster in particular schools and districts (U.S. Census Bureau, 2012; National Clearinghouse for English Language Acquisition [NCELA], 2012), where they disproportionately feel the negative effects of accountability policies.

LISELL Project Overview

In the context of the competing demands of democratic process and accountability measures, our research team developed the LISELL project, incorporating professional learning activities for teachers, curriculum and learning materials for students, meaningful assessments of student learning, and research about each of these aspects of the project. The LISELL project is an NSF-funded exploratory grant to develop a pedagogical model of language-rich science inquiry for middle school science and English for Speakers of Other Languages (ESOL) teachers to simultaneously support science and engineering practices and academic language practices for all students, with particular attention to the needs of ELLs. The project also developed a multipart teacher professional-learning framework to support middle school teachers in considering how to make use of the LISELL pedagogical model in their classrooms. The rationale for this project emerged from conceptualizing the expanding cultural and linguistic diversity of the U. S. student population as synergistic with the emerging framework and standards for science teaching (National Research Council [NRC], 2011) and linguistic challenges embedded in these frameworks (Lee, Quinn, & Valdés, 2013). We sought to support teachers in engaging their growing population of ELLs actively with the challenging science learning and dynamic multiliteracies called for in the new standards. For the research presented here, we focus on the professional-learning aspects of the project.

Our professional-learning framework is composed of four teacher-learning contexts meant to support a developing understanding of our pedagogical model. First, an annual, summer, teacher professional-learning institute served as a key setting for negotiating common understandings of the LISELL pedagogical practices and for codeveloping materials with teachers, including academic language resources and lesson starter activities and lab templates that promote language-rich engagement with science inquiry practices. The summer institute set the stage for subsequent collaborative work during the school year. Second, classroom observations with each teacher followed a grand rounds model (borrowed from medical grand rounds) in which all participating teachers in a school were invited to observe one teacher's lesson along with project staff and then debrief the lesson together in a workshop format. Third, our English-Spanish bilingual Steps to College through Science workshops created a space where LISELL teachers engaged as colearners with their students and their students' families on a range of science and engineering topics, including career possibilities, general academic success, and the importance of science and engineering in informed social decision making. Fourth, our teacher scoring sessions involved teachers examining samples of their students' responses to our LISELL written response assessment of science and engineering practices. We asked teachers to explore the evidence of their students' (and especially their ELLs') emergent understandings of science and academic language as expressed through their writing.

As we collaborated with teachers in this project over a three-year period, we became increasingly interested in how and why different teachers made decisions regarding implementation of the project practices in their classrooms. More specifically, while teachers overwhelmingly claimed that they saw value in the LISELL practices for all their students, and especially for their ELLs, we wondered what caused some project teachers to implement few of the practices, or implement them inconsistently, while other teachers implemented the practices more consistently. We began to consider this issue in terms of the interactions between varied discourses that were competing for the teachers' attention. Specifically, we came to focus on the discourse of accountability, the discourse of classroom science teaching, and the discourse of education research, each of which were constructed by different stakeholders for different purposes but which intertwined over time.

Theoretical Framework

Two theoretical ideas that have influenced our thinking about coconstructing spaces and discourses to support teachers in integrating democratic practices in their science teaching are used to frame this study: Gee's (1999) notion of big-D Discourse and Fairclough's (2003) notion of interdiscursivity.

BIG-D DISCOURSE

Gee (1999) posits the importance of considering big-D Discourse in contrast to little-d discourse in theorizing about how language is used to create meaning. Little-d discourse simply refers to the generally accepted understanding of discourse as the way people interact through and construct language to convey ideas to others. Big-D Discourse goes beyond basic language construction to also include the "socially accepted associations among ways of using language, of thinking, valuing, acting, and interacting, in the 'right' places and at the 'right' times with the 'right' objects" (p. 17). In other words, big-D Discourse includes a range of contextual features in addition to the actual use of language that work together to convey a convincing or compelling message.

For example, for ELLs to be taken seriously as successful science students, they must learn to enact a science student Discourse (big D) that includes but goes beyond the linguistic choices they make in the science classroom. That is, they must learn to use language according to clearly prescribed norms (i.e., speaking in a technical, rational way), but they must also learn to act, interact, dress, and use tools in certain ways that mark them as novice members of a scientific community. Working to create learning communities in which explicit discussion of how Discourses function to produce compelling messages in the context of science learning is an example of our attempt to support democracy-in-process as a way to better understand the interactions, tensions, and contexts that take place in classrooms. In the same way, the concept of big-D Discourse can help us to understand the construction of accountability in the schools that are the focus of this study (hereafter referred to as "accountability Discourse"), the Discourse of the classroom science teachers in these schools (hereafter referred to as "science teacher Discourse"), and the Discourse of the educational researchers engaged with these science teachers (hereafter referred to as "researcher Discourse"). From the perspective of democratic process, we can understand these Discourses to be enacted within communities of practice that are constructed and reconstructed in similar (but not identical) ways over time, such that Discourses are both culturally constrained and capable of gradual change (Buxton, 2005). In particular, we are interested in how we, as researchers, and the teachers in our project, together appropriated, negotiated, and reconstructed these Discourses in ways that might promote more democratic processes of science teaching.

INTERDISCURSIVITY

A second and related theoretical construct that we find helpful in understanding these Discourse practices is Fairclough's (2003) notion of interdiscursivity. Interdiscursivity refers to the presence or trace of one Discourse within another. These traces serve to blur social and discursive boundaries, leading to dynamic changes in otherwise stable Discourses (such as the accountability Discourse). Thus, seemingly less potent Discourses, such as the science teacher Discourse and the researcher Discourse in our work, can have transformative potential in that they may gradually push into and leave traces in the accountability Discourse as it is progressively reshaped over time.

We are interested in how our efforts to create and support a model of professional learning to promote language-rich science and engineering problem solving may have fostered an increased interdiscursivity that began to bridge and reformulate the accountability, science teacher, and researcher Discourses in our project schools (such as by leaving traces in the annual school improvement plans written in project schools). We wonder how projects such as ours may serve to highlight ways in which teachers can engage with researchers to promote increased democratic processes, while retaining or regaining agency in their classrooms within and against the structures of prominent accountability Discourses.

RESEARCH ON DISCOURSE IN SCIENCE EDUCATION

We should note, before moving on, that an attention to discourse in the science classroom, while relatively new, has become a robust line of inquiry in science education research over the past decade, often focusing on the needs of ELLs and other students from culturally and linguistically diverse backgrounds. Our thinking about how teacher- and student-talk both shape and are shaped by the goals of science education has been influenced by this scholarship. Hudicourt-Barnes (2003), for example, demonstrates how argumentative discussion is a major feature of social interaction among Haitians and how this discourse pattern can be leveraged as a resource for students as they practice argumentation in science class. As another example, Brown (2006) studies discursive identity as a tool for understanding student learning through his own teaching of a high school biology class. He concludes that science discourse serves as a potential gatekeeper that prevents some students from assimilating into the culture of science and that students' attempts to recast their discursive identities to incorporate the academic language of science can be seen and supported as a move to become multilingual, not just for ELLs, but for all students from marginalized

groups. As a final example, Hanrahan's (2005) critical discourse analysis of teacher-talk in middle-grade science classrooms highlights ways to challenge the dominant teacher-student discourse patterns in science classrooms and instead argues for the role of hybridity in shaping more socially just science classrooms.

Building on the ideas about discourse from this pervious work in science education, as well as the discourse frameworks proposed by Gee (1999) and Fairclough (2003), we wished to answer the following two research questions:

1. In what ways do accountability, science teacher, and researcher Discourses interact to create interdiscursive spaces in the context of a professional development project with an explicit focus on democracy-as-process for middle school science teachers?
2. In what ways do the interdiscursive spaces created through this project provide opportunities for science teachers to rethink how they work within the accountability Discourse to create classrooms that better serve the democratic purposes of schooling for all their students, but especially for their ELLs?

Methodology

To understand the accountability, science teacher, and researcher Discourses at work in the LISELL project, and to study how these Discourses intersected in interdiscursive ways that might support more democratic teaching processes, we explored our interactions over three years with the teachers in three of our project middle schools. Table 1 provides basic demographic information about these three schools. Each school has seen a rapid increase in the number of Latino/a students, predominantly from Mexico and Central America, and ELL students over the past decade. The schools are in two different districts that are both participating in the federal Race To The Top (RT^3, 2011) initiative that provides significant incentives for demonstrating student gains according to the state's accountability system. Table 2 provides basic information about the eight teachers whose voices are included in this study.

The district that includes John Lewis Middle appointed a new superintendent of schools during the first year of our project. This superintendent implemented new accountability measures for the school district that strongly influenced the accountability Discourse and made key aspects of that Discourse more explicit. The district that includes East Georgia Middle and North Georgia Middle also had a relatively new superintendent, who had gained a reputation for promoting innovative school design, including the creation of several new magnet schools. However, East Georgia Middle and North Georgia Middle, the two schools in this district that educated the highest numbers of ELL students, functioned as traditional neighborhood middle schools, with a strong emphasis on testing and accountability. The teachers we worked with in all three schools received similar messages from their school districts and administrators about accountability, while receiving the same messages from us about the language-rich science inquiry-focused goals of the LISELL project. Thus, we felt that our interactions with these teachers would allow us to study how interdiscursivity was traced in these settings.

For the purposes of the present study, we focused on data from interview conversations that took place between teachers and researchers in three of the professional-learning contexts, as well as from two types of documents produced by the schools and districts. The interview conversations included: (a) focus group interviews that were conducted with the group of teachers from each school each year during the summer professional-learning institute (9 total interviews); (b) teacher debrief conversations that took place as part of the grand rounds classroom observations (14 total interviews); and (c) teacher conversations that took place as part of the teacher scoring sessions looking at their students'

Table 1. Project Schools

School	*Student enrollment*	*Percent Latino/a*	*Percent ELL*	*# of teacher participants*
John Lewis Middle	593	32%	12%	7
East Georgia Middle	815	46%	18%	5
North Georgia Middle	1191	58%	25%	5

Table 2. Project Teachers

Teacher Name	*School*	*Grade*	*Total years teaching*	*Years of project participation*
Bobby	John Lewis	6th	5	3
Henry	John Lewis	7th	10	2
David	John Lewis	7th	8	1
Jessica	John Lewis	8th	6	2
Monica	East Georgia	8th ESOL	22	3
Barbara	East Georgia	8th	4	2
Anita	North Georgia	8th	12	3
Tracy	North Georgia	8th	24	3

written responses to our science inquiry assessments (5 total interviews). We audiotaped and transcribed all of these conversations for subsequent analysis.

In addition to these interviews, we included two types of documents in our analysis: the school improvement plans from the three schools, which embedded aspects of our research project and served as textual examples of interdiscursivity, and a poster of practices, generated by the new school superintendent in the first school district, which served to both enumerate and reify aspects of the accountability Discourse.

Analysis of these transcripts and documents involved coding based on themes linked to the three Discourses of accountability, science teacher, and researcher (e.g., coding categories such as "language that helps define the discourse," "actions that help define the discourse," and "tool use that helps define the discourse") as well as examples of interdiscursivity in which traces of one Discourse could be seen as partially penetrating into another (e.g., language, actions, or tool use associated with one Discourse being enacted as part of another Discourse). In the following section, we explore the themes of the accountability, science teacher, and researcher Discourses, how traces of one Discourse sometimes penetrated the other Discourses (interdiscursivity), and finally the emergent theme of hybrid Discourses that allowed us to more fully understand the progression that took place as we attempted to support more democratic processes for teaching science to all students, including ELLs.

Findings and Discussion

ACCOUNTABILITY DISCOURSE

The accountability Discourse currently being enacted in our focus schools has been broadly shaped by the implications of the No Child Left Behind (2002) and subsequent Race To The Top (RT^3, 2011) legislation but is also continually shaped and reshaped by forces at the state, district, and school levels (such as a recently granted state-level waiver from some of the most significant reporting mandates of NCLB). Following Gee (1999), we consider the associations among language use, thinking, valuing, and acting in specific places, at specific times, and with specific objects as all working together to bring this accountability Discourse to life in school. We focus our discussion primarily on how the accountability Discourse was enacted at John Lewis Middle because it was made most explicit in that context; however, the accountability Discourses in East Georgia Middle and North Georgia Middle were quite similar.

At the start of the first school year of the LISELL project, the new superintendent of the district where John Lewis Middle is located took rapid steps to codify the big-D accountability Discourse that he wished to see enacted in all of the schools in the district. He produced a list, referred to as the nonnegotiable classroom practices, that was circulated to all schools. Every teacher in every school received a glossy poster listing the practices, with the mandate that the poster be displayed clearly in each classroom. During each of our classroom visits and postobservation debrief sessions, a copy of this poster was in clear view.

The nonnegotiable practices are divided into five categories: teaching the state performance standards with fidelity; monitoring the progress of all students using the data team process; teaching all lessons using the common framework for instruction; creating a classroom environment built around the school district's core values; and having frequent communication with parents with the goal of partnering to improve student performance. The five categories are then subdivided into 21 specific practices for teachers to follow.

Of these 21 nonnegotiable practices, 10 explicitly address the need to focus teaching and learning on the state performance standards. These practices include "asking students to explain the standards in their own words," "opening each lesson with activating strategies centered on the standard," and "displaying evidence of student work that reflects the state performance standards."[1] Additionally, eight of the 21 practices refer directly to the need for accountability systems to track student progress in meeting the standards. The prescribed accountability practices include "developing formative assessments that are explicitly aligned to standards," "collecting, analyzing, and charting student work on a regular basis," and "identifying students who are not meeting, meeting, or exceeding standards."

These nonnegotiable practices provide a clear picture of the school system's efforts to explicitly codify the accountability Discourse and then use this Discourse to control the time, objects, and people in the classroom space through dictating how teachers and students are supposed to think, act, and use language—an explicitly powerful Discourse indeed.

Elements of the accountability Discourse are also explicit in the 2011–2012 school improvement plan for John Lewis Middle School. The school improvement plan is organized around six growth areas that each include district performance objectives, student performance targets, school initiatives/actions, and a professional-learning plan. Mathematics, language arts, writing, reading, science, and social studies are the six growth areas. The school improvement plan repeatedly cites two district performance objectives: performance objective A, which states, "Develop and implement a curriculum to make certain that all students know, do and understand the Georgia performance standards with fidelity," and performance objective D, which states, "Ensure that assessment and evaluation data are analyzed to plan for continuous improvement for each student, subgroup and the school as a whole."

Student performance targets were discussed solely in terms of the end-of-year, statewide assessment of standards. The school initiatives and professional-learning plan sections discuss a wider variety of topics, but 31 of a total 43 initiatives discussed in the plan reference performance standards and/or state assessments in some way. Thus, the school improvement plan serves as a second document that both instantiates and enforces the accountability Discourse in John Lewis Middle by setting clearly prescribed norms for acting and interacting and for using language and tools in ways that privilege standards-based accountability as the most important focus of students' and teachers' work. We note that the word *democracy* or *democratic* is never mentioned in the school

improvement plan, while the word *civic* is used once, in relation to student assessment goals: "% of 7th grade students correctly answering Civics/Gov't domain questions."

The accountability Discourse, as enacted in our project schools, can be seen as an attempt to create a stable and nonnegotiable Discourse that is results oriented and assumes an input-output model of teaching and learning in which the input of mandated teaching practices in each classroom is expected to provide an output of increased (narrowly measured) academic achievement for all students. Teachers and students are held accountable to this model with no room for negotiation and no space for a process of democratic decision making.

INITIAL SCIENCE TEACHER DISCOURSE

The science teacher Discourse at the inception of the LISELL project could best be described as emphasizing learning science through doing. Project teachers in all three schools expressed a shared commitment to providing students with hands-on science experiences. Most of the teachers strongly advocate hands-on science learning, saying that this approach is the best way to keep their students on task and engaged with science. As Jessica, a John Lewis Middle teacher, expresses in a postobservation interview during the first year:

> *We do [hands-on activities] with our kids because they don't get the opportunity that a lot of people do. . . . This may be the first time they've dealt with magnets. When we do something with our kids, it's the first time they've ever experienced them. . . . So they all went like, OOOHHH, what happens if you do this? (Postobservation interview, January 9, 2011)*

Jessica is expressing the belief common among our project teachers that economically disadvantaged students have not had the same opportunities to engage in hands-on science experiences that more economically privileged students might experience in their homes, in science museums, or in other informal science learning environments. Jessica continues,

> *We do a lot of inquiry-based activities because [students] really like it. They jump on that automatically. Even having [students] read procedures and instructions is difficult because [students] just want to start adding stuff and manipulating, but most everything that we do is pretty much inquiry based. We kind of let them go on their own. (Postobservation interview, January 9, 2011)*

In this excerpt, Jessica alludes to another common initial belief among our project teachers, that their students lack patience and skill for reading and planning but are excited to explore and manipulate materials to see what happens. In his initial postobservation debrief session, Henry, a new teacher in the second year of the project, makes similar comments, describing how reading and writing assignments are challenging to enact with his students, who would quickly lose interest when not engaged in something active,

> *With the kind of a population we have here, I try to give them less reading and writing and more doing. (Postobservation interview, January 23, 2012)*

Most of Henry's initial conversations involve an expression of a deficit perspective about his students' performance and skills. He articulates the belief that the language resources that minority and ELL students bring into the science classroom are often inadequate for building science content knowledge. He has decided that his instruction should focus on hands-on activities to avoid the language component of science instruction as much as possible.

While worrying about students' language abilities, the initial science teacher Discourse also resisted the idea that teaching language should be an expected part of middle school science teaching. This was seen as a responsibility that belonged to other teachers (elementary teachers or language arts teachers). As Anita reflects later in the project on the initial beliefs she had held about teaching language,

> *I did not see my job as being a language teacher. I thought science was language free. (Teacher scoring session interview, January 28, 2012)*

Thus, the initial science teacher Discourse is a stable, outcome-based Discourse, largely aligned with the accountability Discourse, that emphasizes a particular set of standard science knowledge that could best be developed through hands-on exploration, given the student population in our project schools. To satisfy school administrators, meet district requirements, and keep their jobs secure, teachers adhere to a Discursive framework that leaves little room for either teacher or student voice that could foster a more democratic process in terms of what they believe good science teaching and learning could look like. For example, during a postobservation debriefing session with David, we ask how frequently he uses the LISELL project practices and materials. David's response is grounded in elements of the accountability Discourse as he articulates the value he sees in the project resources:

> *It's just you have to really carve out a good chunk of time for [the materials]. But they're good. I mean, they're very good; that's the kind of stuff that's going to help [students] with the [standardized test] and other tests. A lot of science questions—you have to read this paragraph first and then pull out, make these deductions out of it. So, it's very helpful. I enjoy it, and I think that there's a lot of really good stuff in there. It's just always too short a time and lots to teach. I'd like to use [the project materials] even more. It's the time-crunch factor. (Postobservation interview, February 6, 2012)*

INITIAL RESEARCHER DISCOURSE

The initial researcher Discourse at the start of the LISELL project was informed by our theory-driven and research-based beliefs that students from diverse backgrounds, including ELLs, bring multiple resources to a classroom that can assist in their science learning and enrich the education of their peers and teachers. To support their science learning, ELL students need to be

engaged in disciplinary discourse that simultaneously supports the development of academic literacy and content knowledge. As Halliday (2004) argues, learning and being literate in science discourse—little-d, from Gee's (1999) perspective—includes being familiar with the disciplinary language. Here, the language of science is not regarded as a rigid set of conventions or systems of rules, but rather as "resources for transforming experience into meaning" (p. 11). We began our project enacting a researcher Discourse that presented arguments and resources to teachers for supporting the creation of spaces where all students could read, write, talk, think about, and act on scientific issues they found engaging and meaningful.

While we believed that these goals support democratic principles for teacher participation in professional development and student participation in the science classroom, we see in hindsight that our initial researcher Discourse was based on an outcome-based assumption that if teachers are presented with helpful instructional materials and knowledge, they would (or at least should) adopt these new practices in the way that outside experts designed them. The following excerpt from one of our first teacher scoring-session interviews highlights a teacher's attempt to negotiate aspects of the LISELL pedagogical model while the researcher argues for a more stable understanding.

> ***Tracy (Teacher)****: Since the important thing is "what is your evidence?" could you possibly also put, in parenthesis, "conclusion"? Since we have been teaching conclusion, and what I'm hearing [is] you guys saying that you want to start really seeing [students] take the evidence and put it back to their hypothesis. I mean, basically that's what your conclusion is, but now we're asking [our students] to step it up.*
>
> ***Researcher****: What's important is that we are helping the students see the value of coordinating their hypothesis with their observations and then using those observations as evidence for evaluating the hypothesis. (Scoring session interview, December 10, 2011)*

In retrospect, we note that this outcome-based approach we employed in working with the teachers is at odds with the process-based framework of democratic education that we wished to develop through collective and participatory practice.

INTERDISCURSIVITY

We have shown that the LISELL project began with three largely separate and stable Discourses—accountability, science teacher, and researcher—each of which various stakeholders in the project accepted as givens. We learned, however, that when Discourses intersect in new ways, they become interdiscursive, as participants begin, often unconsciously at first, to blend the Discourses. This step may precede actual change in practice, but can be heard in participant talk. Put another way, changes in little-d discourse may be seen to precede changes in big-D Discourse.

For example, fairly early in the project, we came to see that we were enacting our researcher Discourse within a context that often foregrounded the accountability Discourse. Because we, as university researchers, were not directly accountable to the school structures of nonnegotiable practices and school improvement plans, the researcher Discourse could, to some extent, remain grounded in our own understandings of student-centered pedagogies and the need for schools to function as sites that foster critical thinking. Once our work intersected with the work of school and teachers, however, we too became partially constrained by the practices of the accountability Discourse. We began, not fully intentionally, to adopt language and actions that both acknowledged and worked within the restrictive accountability framework. For example, when discussing LISELL project practices and materials with teachers during observation debriefs and the teacher institute, we heard multiple utterances of phrases such as:

> *"This language is going to help them during their [state] tests."*
>
> *"It is also applicable to state standards."*
>
> *"It is going to help with meeting benchmark goals too."*

Likewise, teachers began to let some of the language of the researcher Discourse push into their originally unquestioned assumptions about their classroom practices. Thus, while Henry was skeptical about our explicit focus on language development, he was also not satisfied with teaching the scripted curriculum that the district was promoting. He felt that what was happening in his classroom was not very productive for students, yet he did not know what else was possible. This dilemma emerges in Henry's dialogue with one of the researchers during a debriefing session after a classroom observation:

> ***Henry****: These students don't come with strong language backgrounds. To keep them on task and help them learn, I try to provide them with more hands-on activities and less language.*
>
> ***Researcher A****: But language is everywhere [in your classroom], even on the board for the lesson goals.*
>
> ***Henry****: True. I need to post those goals. The books and tests, everything has a heavy emphasis on language.*
>
> ***Researcher B****: Maybe [you could add] our lesson starters.*
>
> ***Henry****: Yeah, those are helpful. We need to do those. (Postobservation interview, February 6, 2012)*

Henry can be seen as beginning to consider ways to merge aspects of the accountability Discourse (the need to post daily goals, standards, and essential questions on the board despite being convinced that this language is unintelligible to many of his students), aspects of the school's shared science teacher Discourse (hands-on activities are the only way to keep students engaged and potentially teach them some science), and his emerging understanding of the researcher Discourse (we are providing tools and resources that could be beneficial for his students but would take time and are not clearly aligned with the accountability Discourse). However, this is still a nascent discourse that has not yet turned into action. Similarly, as teachers became part of the LISELL discourse community, they began to express their evolving thinking about classroom assessments as serving a purpose beyond just preparing students for end-of-year standardized tests.

***David**: That's really nice to look at their writing samples and see that I really do need to incorporate a lot more of [the writing assessments] instead of just my A-B-C questions. Even though I know that is what we are going to be held accountable for.*

***Jessica**: For me, we are going way back to [the start of the project] when [the researcher] was talking about how we're expected to teach [students] in a hands-on manner, but then we're expected to assess them A-B-C-D.*

***Bobby**: With these [LISELL] assessments you see growth better, but where do I draw the line as a teacher with my assessments? Am I going to say, "Sorry [school district], I can't have a five-day turnaround," and then I'm going to get in trouble, or am I going to have to look at the kids and say, "Sorry, I can't give you the awesome feedback you want cause I've got to do five-day feedback"? (Scoring session interview, January 28, 2012)*

In the above conversation from the second year of the project, each of the teachers demonstrate a shift in his or her discourse about assessment, as aspects of the researcher Discourse penetrated into their science teacher Discourse. However, the teachers also demonstrate a hesitance to enact actual changes in their classroom practice due to the power of the accountability Discourse. That is, interdiscursivity is implicated in the teacher talk but does not extend as far as teacher action. All three teachers agree on the importance of performance assessments but are concerned that while these assessments might have value for their students, they lack value within the accountability Discourse. Thus, the growth of interdiscursivity among actors may be seen as the start of increased democracy-as-process in our work together, but may not actually help students without a simultaneous move toward a conscious adoption and ownership of a reformulated Discourse, what we came to refer to as hybridized Discourse.

HYBRIDIZED DISCOURSES

As the accountability, science teacher, and researcher Discourses continued to intersect over time, we began to see participants take more conscious ownership of their interdiscursive moves to create blended or hybridized Discourses. These hybrid Discourses are not just the traces of one Discourse semiconsciously infused into another (interdiscursivity) but, rather, are the result of conscious appropriation of one Discourse while trying to work within another. Increased Discursive ownership in the form of hybridized Discourses is connected to increased changes in classroom practice, as shifts in little-d discourse give way to shifts in big-D Discourse. While teachers still routinely point out the challenges of implementing the LISELL practices within the constraints of the accountability Discourse, they also point to actions they take to meet these challenges and how continued interaction with our researcher Discourse support them in doing so.

***Tracy**: I think having LISELL [professional learning] year after year is better [than one-time workshops]. [In] some professional developments, you get a lot of good ideas, but then you try to think of how to implement [them], and then that's an issue. Implementing [LISELL] is an issue too, but then because we are coming back and we're talking about what we did, what worked, and what didn't . . . [it] is always a good idea. (Teacher interview, October 13, 2012)*

Over time, we saw our shared little-d discourses about science, language, and assessment lead to changes in our big-D Discourses in terms of how we use language, take action, and use tools differently as part of a process of supporting each other and the students in engaging with science and academic language. While the accountability Discourse is still ever-present in our conversations among teachers and researchers, it is no longer the primary driving force of our work together. Our focus has shifted, at least in the shared space of the LISELL project activities, to a more democratic process of participatory teacher-learning practices.

***Monica**: General academic vocabulary is a continual struggle for our students, but once they are reintroduced to the vocabulary, you see the light bulb go on and they say, "Oh, I know what that is now," or they think they know what it is, and their misconceptions can be [corrected]. This needs to be a regular part of instruction.*

***Barbara**: I think that there are some carryover words, academic science carryover words from sixth to seventh, but those will be used in a different way. . . . They are going to have to use the same word to describe some different concepts in science, and they cannot do that at the beginning of the year at all. But at least having exposure to those words before helps then to draw connections between the two sciences as they go through the year. (Scoring session interview, October 20, 2012)*

As Monica and Barbara talk, we hear a hybridized discourse about students' vocabulary knowledge. From engaging in the LISELL project, the teachers agree that vocabulary learning is a continual process for students and that all teachers must play a role in this work. At the same time, the comments reflect the persistent aspect of the earlier science teacher Discourse that these students (many of whom are Latino/a and/or ELLs) are coming to middle school with English-language deficits, and the teachers fail to consider the linguistic resources the students might possess that could support science learning. In another conversation, Anita makes a related point:

Being with LISELL and having English language learners, it makes perfect sense that science learning is also about language development. I need [the researchers'] help to get this through to our administration because now I believe that science will help with students' reading and writing. [Administrators] weren't paying enough attention to science, because it is not seen as important as language arts, where students are tested. (Postobservation interview, February 1, 2012)

Anita expresses worry that her administration largely ignores science because, as she herself notes, science teachers are generally not seen as responsible for language teaching. Anita's realization,

that through her work with the LISELL project she contributes to her students' language development, changed the way that she views her role in relation to the accountability Discourse and led to a hybrid Discourse in which she takes conscious ownership of her role as a language teacher as well as a science teacher within the accountability system. As a final example of teachers adopting a hybrid Discourse, Bobby, who in the second year expressed concern about having to choose between the requirements of the accountability Discourse and what was being asked by the researcher Discourse, came to adopt classroom practices that he believed would meet his needs, the needs of the school system, and the needs of his students.

> ***Bobby**: This year we really implemented the [LISELL practice of explaining] cause and effect relationships. And this week I did a mineral identification lab, and I felt like it was the first time I was able to walk around my room and my kids actually knew what the procedures were asking them because I taught them the language the way we do it here [LISELL]. It blew my mind. Even my lower ESOL [English for Speakers of Other Languages] students could do it on their own. I was unneeded. It was weird. All groups finished their inquiries and finished writing their analysis on their own. . . . I think I need to find a balance of meeting the goals of the school and meeting the needs that the world needs, or wants. School wants me to teach multiple choice, and I can start with teaching to the test like school wants me but leave [the choices] out as open-ended questions [the way we do it in LISELL] to benefit the kids. (Teacher interview, October 13, 2012)*

From the perspective of the researcher Discourse, our approach to professional learning also evolved as we became more conscious of the need to support different teachers in taking up different components of the project rather than attempting to promote a one-size-fits-all pedagogical model. On the one hand, we came to see the value of promoting teachers' agency in focusing on certain aspects of the model based on what they see as the needs of their classroom. We redesigned some classroom materials that did not fit well with aspects of the accountability Discourse, such as changing our LISELL lesson starters to fit within the common framework of instruction, which limits the length of lesson opener activities to between five and seven minutes. On the other hand, we were able to leverage the school data-team process as a way to infuse elements of our LISELL project goals into the formal school improvement plans of our project schools. For example, we worked with the authors of the school improvement plan at John Lewis Middle so that "the LISELL project school-wide academic vocabulary acquisition plan, including using LISELL vocabulary in lesson openings and unit tests" became a school-wide initiative in reality. Similarly, the language "selected students will engage in science-based field trip opportunities through the LISELL project" was included as one of three family engagement components highlighted in the school plan. Thus, we came to see that consciously hybridizing our researcher Discourse allows it to have greater power to penetrate both the science teacher and accountability Discourses in our project schools over time.

Conclusions

The current sociopolitical context of public education in the United States calls for teachers and researchers of teaching to work together in new ways to co-construct knowledge and materials that can be used to address the needs of diverse student populations while supporting the democratic goals of schooling. However, with greater and more explicit demands of prescribed curriculum and assessment systems, stringent accountability measures have served to discipline and control teachers' use of time and space.

We began with the assumption that for science education to support lasting democratic processes in schooling, students and teachers need access to the academic language of science in order to leverage their science knowledge for socially meaningful purposes. We also assumed that the close attention to linguistic practices in our research could help us to better understand how accountability systems work to influence teachers and teaching practices.

In studying our interactions with teachers in the LISELL project, we found Gee's (1999) notion of big-D Discourse and Fairclough's (2003) notion of interdiscursivity to be helpful concepts for interpreting the potential of our work for creating more democratic and interactive spaces for professional learning in science education. We examined how three distinct Discourses, constructed by accountability systems, teachers, and researchers were enacted, challenged, and negotiated and how the process of co-construction between researchers and teachers creates interdiscursive traces of science teacher and researcher Discourses within the seemingly monolithic and impenetrable accountability Discourse. Working with teachers over multiple years, and considering how Discourses are enacted across different professional learning contexts, we have come to understand that interdiscursivity, in which traces of one discourse appear within another, does not necessarily translate into changes in classroom practice. Interdiscursivity, which often begins semiconsciously, gradually evolves into more fully conscious hybrid Discourses in which the actors (in our case, teachers and researchers) take ownership of the necessary changes in language, actions, and tools in order to create classrooms that better serve the democratic purposes of schooling for all students, but especially for their ELLs.

We are optimistic that a better understanding of how such Discourses operate and evolve can be used to foster classroom interactions in which researchers, teachers, and students can move each other toward more democratic processes that will better prepare students to make thoughtful and informed decisions about their own futures and about the future of their communities and their society. Science and technology are inescapable players in these decisions, and informed decision making requires competent communication using the academic language of science. Further, in our current students' lifetimes, the majority of citizens of the United States will be non-White for the first time (U.S. Census Bureau, 2012), resulting in greater potential political power for members of groups who have traditionally been marginalized by the political process. To exercise this power, however, citizens must have been taught to think critically and to engage in academic Discourse (big D).

Our analysis of conversations with teachers in the LISELL project showcased both the struggle and the gradual change that is possible when concerted efforts are brought to bear against powerful structural Discourses such as the accountability Discourse in schools. We saw a variety of changes in how project teachers talked about and eventually acted on incorporating aspects of the LISELL pedagogical model in their classrooms. While the accountability Discourse continued to surface repeatedly as a factor that limited teacher choices and agency, over time the hybridized teacher Discourse pointed to ways in which teachers leverage aspects of the researcher Discourse to push back against the accountability Discourse based on what they feel is in the best interests of their students. At the same time, we found ways in which our researcher Discourse also became hybridized as we acknowledged the limits of teacher agency and as we considered how our materials and resources could be better fit into the structural constraints of the accountability Discourse. Like water being added to a flowerpot filled with soil, the interdiscursive and hybridized Discourse moves made by the actors in this project raised our collective awareness that even in a tightly controlled curriculum, there is still space to enact more democratic processes to support teaching and learning.

In our ongoing collaborative work with these and other teachers, we continue to study how the science teacher, researcher, and accountability Discourses evolve and how interdiscursive spaces and hybrid Discourses continue to form and expand (and sometimes close) as a result of the shifting tensions between the Discourses. Truly democratic teacher-researcher collaborations require space for participants to talk frankly about challenges such as the constraints posed by accountability structures or assumed limitations of student populations such as English language learners, as well as opportunities to consider ways to collectively push back against structures and limitations. We theorize that by more clearly understanding the science teacher, researcher, and accountability Discourses that influence our work, we can create more democratic processes for hybridizing these Discourses in ways that open up classrooms for teaching science (or other subjects) that will better prepare all students for the challenges they will face.

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Notes

1. All quotes referring to the nonnegotiable practices and school improvement plans are taken directly from the school district websites and are not cited more fully to preserve school and district anonymity in accordance with our human subjects approval for this research.