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The Role of the Elementary Science Teacher and Linguistic Diversity

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Abstract

This qualitative study looks at 23 elementary preservice teachers' roles as science teachers and the importance of understanding linguistic diversity for science instruction. Using individual and group reflection papers, two important points are made that reflect the importance of preparing preservice teachers in science. Explicit conversations and tasks to connect science and linguistic diversity to science teaching suggests that preservice teachers need to discuss the implications of scientific language and linguistic diversity in terms of power and science teaching and learning in urban classrooms.

Introduction

Bullock (1997) stated that, "Rather than being prepared for the diverse audiences they will soon meet, teachers are prepared for a monoculture, a mythical, culturally homogeneous aggregation of students" (p. 1025). For this, teacher education has a major task in preparing future teachers for diverse classrooms, whether in urban, suburban, or rural settings. For instance, the statistics often cited for preparing preservice teachers for diverse classrooms are the increasingly diverse populations of students who are linguistically, culturally, and economically diverse (Banks, 1994; Barrett, 1994; Garmon, 2004; Gomez, 1993; Houser & Chevalier, 1995; Irvine, 2003; Ladson-Billings, 1994; Lee, 2003; Sleeter, 2001). In the 100 largest school districts in the United States, 40% of the 18.4 million public school students are minorities—American Indian/Alaska Native, Asian/Pacific Islander, Hispanic, and Black non-Hispanic. Actually, from 1998 to 1999, eight out of the ten largest school districts had over 75% of the minority student membership. New York City was the largest school district in the United States, with more students than the sixth through tenth largest school districts combined (Young, 2000).

Additionally, statistics are used to argue for the preparation of minority teachers for diverse students. The U.S. Department of Education's National Center for Education Statistics (NCES) (1997) stated that the "proportion of minority teachers lags far behind that of minority students" (p. 10). From 1993 to 1994, "16% of all public school students were black, non-Hispanic but only 9% of their teachers were black, non-Hispanic" (p. 10). Furthermore, statistics show that within teacher education programs, enrollment is predominantly that of White, middle-class female students (Hodgkinson, 2002; Irvine, 2003; NCES, 1997; Sleeter, 2001), with decreasing enrollments of prospective teachers of color (Hodgkinson, 2002). Finally, statistics are used to argue for the preparation of teachers for increasing student enrollments in schools. The overall enrollment of schools for teachers and students will increase every year until 2013 (Snyder, Tan, & Hoffman, 2004). Considering these conditions and the need for preparation, recruitment, and retention of all teachers for diverse classrooms, teacher educators must heed to this

call with action, purpose, and the methods to do so. This call is especially needed in offering strategies to prepare every preservice teacher for diverse classrooms—urban, suburban, and rural—and considering the challenges of teaching in these varied settings.

As a science educator, this author has a personal call to prepare preservice teachers for urban elementary classrooms in New York City. Part of this call and preparation is developing strategies and assignments that help preservice teachers to reveal their assumptions and biases about diversity and teaching science (Moore, 2006, 2008). A social justice stance is taken here for preparing, teaching, and supporting elementary teachers to teach science in critical and equitable ways (Moore, in press). Many preservice teachers from mainstream backgrounds have had little or no contact with persons and cultures different from their own (Houser & Chevalier, 1995). Many preservice teachers within educational environments hold negative assumptions and biases about teaching diverse learners. Preparing preservice teachers for urban science classrooms means developing strategies and opportunities for them to think about their roles in this context. Therefore, this study discusses the Book Club as one strategy for preparing preservice elementary science teachers for diverse urban classrooms. Multicultural literature that focuses on language and culture as critical elements in science teaching in urban elementary classrooms was used. This study reports on the knowledge that preservice teachers gain about how vital their role as teacher is to teaching science to diverse learners and to understanding the interplay between teaching and language in the science classroom. The two research questions for this study were (1) "How do preservice teachers understand their role of science teacher and teaching science in urban elementary classrooms?," and (2) "What role does language play in helping preservice teachers in teaching science and in understanding linguistic diversity?"

Theoretical Framework

Critical and feminist poststructuralist perspectives of language guide this study. First, critical theory and poststructuralist views focus heavily on power and language. For instance, critical perspectives look at the role of social systems and their influence on individuals. It broadens the context for understanding how issues of power work in the social world. Critical inquiry keeps power relationships within society in the spotlight (Crotty, 1998), and language is one of many constructs in society that reflects power relationships. Taking on critical perspectives in science education encourages preservice teachers to think about themselves as actors for social change and to be reflective of their roles as teachers. Second, critical and feminist poststructural researchers realize the importance of language in society. Language is associated with power and is enacted in particular contexts for control. Thus, language "signifies access to or exclusion from communities of power" (Collins, 2000, p. 57). Delpit (1995) argued that teachers should teach the language, rules, and "culture of power" explicitly in order for students to succeed in schools and be able to interact with those holding the power. Furthermore, Moore (2007) argued that teacher education and professional development should focus on ways to prepare teachers to understand the purposes of language. Taken together, teaching explicitly the language or discourse of science is required for teacher and student learning. Preservice teachers of science thus need to know what this language of power is and then be able to teach science in ways that promote and empower students in learning and doing science.

Methodology

Setting, Participants, and the Book Club Groups

This study took place at a large urban university in New York City. Twenty-three preservice teachers enrolled in an elementary science methods course were the participants. The Book Club selection was *Ways with Words: Language, Life, and Work in Communities and Classrooms,* an ethnographic text written by Shirley Brice Heath (1983). The text, set in the piedmont Carolinas of two working-class communities of Roadville and Trackton, was certainly different from the urban context of the university and their current and/or future students. However, the rural/urban, southern/northern, working-class/middle-class, Black/White differences were foregrounded as the preservice teachers made conscious and subconscious references to teaching and their experiences in science. The text also revealed the relationship between home and school experiences and how language was a fundamental factor in the two communities. This connection was used to discuss language, teaching, and learning inside and outside the school setting and the impact of community on how students learn and how teachers teach. Thus, the text was advantageous for the preservice teachers to consider issues of diversity, science teaching, and language.

As a practical experience for learning about diversity, science teaching, and language, the Book Club groups were very diverse. Groups of three and four teachers were constructed, with preservice teachers having a range of teaching experiences (i.e., none to currently student teaching), different upbringing (i.e., growing up in New York City to suburban areas of California and Michigan), being in different life situations (i.e., recent undergraduates to second career changers to education), different levels of science content knowledge (i.e., from self-reported as weak to high), and age (i.e., from 22 to 31 years old). Also from self-reported racial and ethnic identities, the majority of the class was female White/Caucasian, Asian American, and Korean American. There was one Asian American male student, and two White/Caucasian male students.

The Book Club met four times over the 16-week semester. Using laptops, the groups recorded their notes from questions provided for discussion. Table 1 summarizes the themes of the questions. At the end of the meetings, a whole class debriefing session allowed groups to share part of their small group conversations. During the whole class debriefing session, the author served as "social advocate" (Moore, 2008) by posing questions for further thinking and addressing issues and implications of teaching science from critical perspectives. At the end of the semester, all groups were provided access to their Book Club group notes as well as other groups' notes via the Blackboard course website. Using these notes, individuals wrote their own reflections and then met for the fourth time to write a one- to two-page final Book Club group reflection paper on their learning. Table 2 shows the questions they used to write their individual reflections. Each group made a presentation on the last day of class to share what they learned from participating in the Book Club.

Table 1. Themes from Book Club Meetings

Book Club Meeting #1 First Section (pp. 1-126)	Book Club Meeting #2 Second Section (pp. 13-262)	Book Club Meeting #3 Third section (pp. 265-376)
• Discussion of personal reactions to the first section • Noting issues that seemed evident in the first section • Making connections to current/past teaching experiences • Similar and different characteristics between Trackton and Roadville parents' views of education • Language and learning in the two communities • Skills children from both communities learned from home that can be utilized in the science classroom • Importance of learning science and providing meaningful science activities based upon students' home experiences • Learning about self and other members of the group	• Discussion of implications for talk and language as "right" • Viewing science as a "right" way and how this view impacts the teaching and learning of science • Using language to function within communities • Teaching science to children whose communities' ways of knowing are different from science • Untapped skills that children have that can be used in the science classroom • School and science as "strange" for students • Learning about self and other members of the group	• Discussion of power of language for success and in the science classroom • Helping students to acquire the language of power in science • Revealing assumptions and biases from own mainstream values • Re-assessing success, failure, and learning • Being a culturally responsive teacher and sensitive to issues of diversity • Noting differences in language as "storytelling" and "tellin'-a-story" for learning science and connecting home and school • Using inquiry to build science skills and scientific literacy

Table 2. Final Book Club Individual Reflection Questions

- What did you learn about yourself as a teacher from reading and participating in this discussion? What did you learn from your group members? What do you think are the challenges set before you as teachers of diverse students?
- How was the Book Club beneficial in helping you to think critically about curriculum development, teaching, and about issues of diversity? How did the book connect with you as a science teacher and/or teacher in general?
- Did your ideas about curriculum, teaching, planning, and students change because of the Book Club? In what specific ways? What new ideas have you developed about issues of diversity and teaching science?
- In what ways do you see yourself as an agent of change concerning issues of diversity? What are worries and concerns you have about diversity and curriculum planning/ development?

Data Sources and Analysis

The group notes, individual reflection papers, and final group reflection papers were the primary data sources. Analysis began with compiling, condensing, organizing, classifying, and editing the data into a manageable and accessible file for each of the data sources (Coffey & Anderson, 1996; Creswell, 1998; Guba & Lincoln, 1989; Miles & Huberman, 1994; Moore, 2008; Patton, 2002; Strauss & Corbin, 1998). Emergent themes from all data sources were coded. First, the themes across the three sets of group notes were compared. The themes that were most relevant from each group were compared across groups, across the themes generated from individual reflection papers, and across the final group reflection papers. Throughout the analysis procedures, display methods were used (Miles & Huberman, 1994) to organize, compare, and link categories in order to make connections. For example, with a focus on the role of the science teacher and language, the analysis for group and individual data was used to create a composite list of themes and relationships that emerged from all of the data sources. The recurring, dominant themes of the role of the teacher and language emerged from the analysis. Thus, the reporting of findings highlights the role of the science teacher and linguistic diversity.

Findings

Analysis from the Book Club group notes, individual reflection papers, and group reflection papers revealed several categories and themes for discussion. This study focuses on two major themes: (1) the role of the teacher and (2) language or linguistic diversity. These themes point to the necessity of preservice teachers understanding and expanding their views of linguistic diversity in teaching and learning science and their role as science teachers.

The Role of the Science Teacher

The role of the science teacher is to build upon the prior knowledge that students have. One way to gain this knowledge is from using various instructional strategies such as pre-assessment activities and classroom discussions. Additionally, the role of the science teacher includes being open to linguistic diversity and preparing students to be "scientifically literate" and to pass state assessments:

> *Our role as teachers is to build upon students' prior knowledge, confront naïve misconceptions, and make science relevant to their everyday lives. Our group feels it's important to get to know students through various pre-assessment activities. For example, interviews, journal entries, class discussions, and other such mechanisms can help us gauge how our students' communities affect their knowledge and learning. Teachers need to be open to diverse linguistic backgrounds and present concepts in terms that their students understand. But at the same time, it's a teacher's responsibility to help his [or] her students be scientifically literate (especially in a city like New York where high stakes tests are such a large part of the educational system).* (Book Club [BC] #2, Group #1, March 9, 2005)

The role of the science teacher is to help students to reach conceptual understanding. Conceptual change (Posner, Strike, Hewson, & Gertzog, 1982; Smith, 1990) was an overarching theme within the elementary science methods

course. Conceptual change was discussed frequently in the Book Club groups as a method of teaching science. Fundamentally, for one group, the role of the science teacher is to "drive conceptual change" and to move students toward improved learning in science:

> *The role of the teacher is to create an open environment where all approaches and knowledge can be freely shared and expressed. The result being an inclusive environment where the teacher has the benefit of understanding current levels of understanding and naïve conceptions. From here, it becomes the teacher's job to convince children that what they currently know may not be correct or can be improved upon. It is the teacher's job to drive conceptual change.* (BC #2, Group #5, March 9, 2005)

Similarly, the role of the science teacher is to help students build upon their current ideas and experiences. For example, Clara stated on her final reflections that "In my experience, students essentially shut down when they simply do not connect with the material, and it is our jobs as teachers to make sure we connect science with students' prior information, correct or misconceived."

Additionally, the role of the science teacher is to help students move toward new ideas. This thought was built upon the preservice teachers knowing science vocabulary and being able to apply scientific terminology to help students develop more scientific understanding:

> *As a teacher, we should be concise and relevant to the specific context of use. We must know the vocabulary and apply them to everyday situations by helping students [move] beyond their own experiences to more concepts and ideas.* (BC #3, Group #3, March 30, 2005)

Finally, the role of the science teacher is to act as a facilitator. As the facilitator, the science teacher helps students to connect home experiences to learning science. Part of being the facilitator in the science classroom is to be observant and to listen to students:

> *Oftentimes we have to pass over students' ideas and questions because we do not have time, but we as facilitators should be able to connect their conversations and steer the discussion to connect back to the topic. Or, we could ask them to make that connection for themselves. Of the many things students bring to class, they bring their own experiences. We can learn so much from an individual and their observations and past experiences.* (BC #2, Group #4, March 9, 2005)

The role of the science teacher is to build conceptual understanding and to develop students who are scientifically literate. This means that the science teacher has to help students develop scientific literacy and the vocabulary of science. The science teacher enhances the learning environment by making science classrooms inclusive of students' ideas and helping students to connect science to their daily lives. By being the facilitator, the role of the science teacher again is to help students build knowledge and skills and to connect science to their experiences. Their role or responsibility as science teachers is to help students understand science, and language becomes a major factor to consider in building scientifically literate students.

Linguistic Diversity and Science

Language was a huge theme that permeated discussions in all of the Book Club notes and reflections. This was partly because of the emphasis on language in the book, but it was also because of this author's emphasis on getting the preservice teachers to understand language and science as powerful entities for teaching and learning science. The preservice teachers became more aware of linguistic diversity throughout the Book Club discussions. This awareness helped them to understand their students and plan for science instruction.

The implications of language in the science classroom were best understood as groups discussed how language was used in the two communities of Trackton and Roadville and how from these two communities students interacted in inquiry-based science classrooms. For example, one group spoke extensively about Roadville's ways with language and how students from this community would engage in inquiry-based science. By making a connection between language and science learning, the preservice teachers in this group noted implications of traditional teaching and language acquisition. They discussed how they would change their practices in order to support students in learning science because of their students' linguistic differences and home language learning:

> *Our group felt as if Roadville's view of talking "right" suggests that this town has traditional expectations of how language should be learned and used within schools. This implies that there's little room for creativity and independent thought that breaks the mold of what Roadville adults expect of their children. Thus, language is explicit, consistent. In terms of learning science, this method of language acquisition has both positive and negative implications. Students will most likely be able to function within a traditional classroom setting where they're asked to answer content questions, memorize terms, etc. Thus, a traditional science classroom that utilizes the didactic instructional approach would match the Roadville community's expectations regarding language.*
>
> *However, this approach limits creativity and, as such, these students may not be prepared for inquiry-based learning that values investigations. These students may also have trouble supporting their hypotheses using data and experimental results because they have always had answers handed to them and [been] told that they were either right or wrong. Knowing a student's language background would in turn help us as teachers to mold both our instruction and the level of scaffolding needed for particular activities. Observing the ways students communicate with each other and approach lessons would inform us of such language abilities.* (BC #2, Group #1, March 9, 2005)

One group discussed how language was closely connected to helping elementary students learn the skills and knowledge of science. In making these connections, the members in this group talked about how important it was for them as teachers to set activities, provide resources, and teach explicitly the differences between formal and informal language in science:

> *Students need to be able to read directions, interpret and articulate findings, develop direct questions, compare and contrast, defend conclusions, and create organized systems of documentation to name a few. Teachers need to guide students to the appropriate sources and provide them with activities that will require students to*

attain a higher level of science language. Teachers need to be explicit about what standard science language is and encourage students to distinguish between what is formal and informal. (BC #3, Group #5, March 30, 2005)

Language was also discussed in terms of its contextual nature and power of scientific language. For example, the way that scientific language was used or spoken in the classroom revealed its power. Additionally, learning scientific language was similar to "code switching" between contexts and people. This switching also supported the contextual nature of language:

Language is power in terms of the science classroom: the ability to articulate what it is that you understand. It is a way to assess what the students know and understand. To really master an area of science, you need to have a command of the language, to speak to other scientists, etc. It is easier if you understand scientific terminology. Being able to make connections, between folk terms with scientific terms, knowing when to use which is similar to code switching. (BC #3, Group #6, March 30, 2005)

The idea that the language of science was powerful was also expressed by another group. They felt that scientific language was not one that students would encounter typically in their everyday lives:

Language of science is specific. Students are unlikely to encounter this vocabulary in everyday life, although the class can learn this collaboratively (common language), and the knowledge of science language is powerful. (BC #3, Group #1, March 30, 2005)

One group, which had one deaf student and one hearing student who were both fluent in American Sign Language, discussed how the diversity of communication and language were important for understanding the power of scientific language. It was the teacher's responsibility to help make the distinction of how language was used in order to help all students develop a baseline knowledge of science through language. They believed acquiring a common language of science for students would empower them with the skills to communicate and interact with others. In the same way, it was important to note the experiential knowledge of language that students already have:

The set language of science allows people to start at the same point. It allows people to have the same foundational language so that they all understand each other and can speak about the same topic effectively. If this were not the case, in psychology for example, people would misdiagnose people because there was a lack of a common language. You need to have language in science because the language in vernacular language is different. For example, in American Sign Language, there are two signs for the word "conclusion." One sign correlates to the scientific vocabulary and the other correlates to the everyday use of the word conclusion. This distinction signifies the difference between the vocabulary of science and its necessity and the vocabulary of relaxed non-technical language outside the science classroom. It is the teacher's responsibility to know the language of science and to ensure that each student has a baseline knowledge of the language of science and not assume that they do. Teaching your students the language of science is empowering to them because they can feel part of a code society, of higher-level processing that reminds them that they are smart.

In addition, you demonstrate to them that they have been using these words and this language their whole life but may not have identified it. In the act of identifying the language, you empower the students because they enter the field not as novices but [as] individuals who already possess an expertise. (BC #3, Group #4, March 30, 2005)

Similarly, Gretal expressed her views of language, home, and science by explaining that students should learn the differences associated with language at home and in science:

Making connections is essential to learning any subject, so family and community life need to be integrated into the classroom curriculum and instruction. It is when these connections are not made that students have trouble learning "proper" English or science. Authenticity and relevancy are the keys to easing students into the school environment and language. The best example of these keys was given in the book when the teacher asked students to bring community language into the classroom in the form of signs, announcements, advertisements, etc. If students come to a school that expects them to do everything in a language that is different from their homes and community, this will only lead to dissatisfaction among students. First, they will not see the relevance of learning "proper" English when they never use it outside their class. Secondly, even if they want to learn, they will experience frustration from miscommunication since they are not aware of the differences.

Linguistic diversity was discussed in terms of the language students acquire as members of a culture and community and the diversity of common and scientific language. Linguistic diversity for the groups was discussed also in terms of power. The culture of power of language and the culture of power of science stimulated discourse and critical reflection about the role of language in the science classroom. As science teachers, they came to understand the power of language, the power of scientific language, and how to use both in the science classroom. With this understanding, they realized the power of language and considered appropriate ways to use the diversity found in scientific language to connect to the linguistic diversity of their students.

Discussion and Implications

In this study, the Book Club is one strategy for preparing preservice teachers for the cultural and linguistic diversity of urban classrooms. The study looks particularly at the role of preservice teachers as science teachers and the importance of understanding linguistic diversity when teaching and learning science. Through the use of the Book Club, two important points are made that reflect the importance of preparing preservice teachers in science and focusing their preparation on the role of the science teacher and on language.

First, learning about the role of the science teacher and linguistic diversity cannot be thought of as separate goals in the preparation of science teachers. The elementary preservice teachers in this study learn of their role as science teachers along with learning about the importance of language—language in terms of cultural diversity of the students they will teach, the culture of power of language (Delpit, 1988, 1995), and the culture of power of science (Calabrese Barton & Yang, 2000). In teacher education, explicitly teaching what and how to acquire the power of language generally and the language of power of science specifically is necessary.

Preservice teachers read and engage in conversations that reveal the diversity of language. Thus, discussions about language in the Book Club meetings and whole class contribute greatly to the preservice teachers expanding their views of science teaching and linguistic diversity.

For the preservice teachers to understand linguistic diversity, it means not taking language for granted, but understanding the inherent power relations that go with language as the culture of power (Moore, 2007). The preservice teachers look at language differently from this aspect of power, and they feel that effective science teachers take advantage of the language skills that diverse students have in order to teach science meaningfully. Additionally, being effective science teachers entails having an understanding of linguistic diversity within the classroom and the power attached to forms of language, even within Standard American English, in order to help diverse students to acquire this "culture of power" in language and science. The importance of language as power is central to the preservice teachers' beliefs about their role of the science teacher in helping students to achieve scientific literacy. Consequently, the science teacher is responsible for helping students to understand common or everyday language and scientific language. They take this responsibility further by wanting to know their students in order to make connections between home language (common/everyday) and school language (scientific/technical). These aspects of science instruction are important in helping diverse students to succeed in science (Calabrese Barton & Yang, 2000; Lee & Fradd, 1998). Thus, helping preservice teachers in science to build an understanding of language, science, and power are necessary for science teaching and learning.

Second, preservice teachers do not necessarily think about the implications of their role as the science teacher, linguistic diversity, and power, and how these together impact science instruction and how they view students who have different ways with words. They need explicit conversations and tasks to connect science and linguistic diversity to practice. For instance, Moore (2006) reports that preservice teachers' assumptions and biases about diverse students are connected to how diverse students use language. With that, preservice teachers must become critically aware of language and its impact on science instruction and how their views of language hinder academic achievement. Not only must they understand the challenges of teaching in other languages, generally foreign languages, but they also must realize differences within Standard American English—variations across dialect and linguistic style. These differences also create situations in which they must view linguistic diversity, home language, and differences in language use not as deficits but as points for building and achieving higher levels of learning. Thus, linguistic diversity means having an expanded view of language that encompasses students' cultural languages and linguistic styles, and also having a broader understanding of linguistic diversity of the subject matter such as common and technical language in science. They realize that language is power, and scientific language is power. They must be aware of these differences and the power of linguistic diversity in order to be effective science teachers of diverse learners.

In addition, talking about science as "right/wrong" and teaching as "right/wrong" creates a power hierarchy that is connected to particular practices and acceptable behaviors in the science classroom. The preservice teachers in this study come to know that science teaching and student learning in science are connected to understanding the language of science and viewing linguistic diversity found among students as a positive aspect and context for teaching. As a result, their roles as science teachers must accommodate these differences. Their teaching behaviors have to change, and the way they talk about their practices in relation to science and

language has to change. Cochrane-Smith (2004) refers to "rethinking the language of teaching" as a "collaborative process of uncovering the values and assumptions explicit in language and then rethinking through the nature of the relationships they legitimize" (p. 31). Language is one of the primary mechanisms of interaction that holds much of the power for understanding and being able to work within diverse settings. Certainly for science teacher preparation, preservice teachers need to discuss the implications of language and scientific language in terms of power and their own professional development as elementary science teachers.

Conclusion

As educators—science educators in particular—our task is to design meaningful learning opportunities so that preservice teachers may acquire knowledge and experiences about their role as teachers and the influence of linguistic diversity in classrooms. Similar to conceptual change approaches to learning (Posner et al., 1982; Smith, 1990), preservice teachers need time to think about existing ideas, become dissatisfied with ideas, develop alternative conceptions, and apply new ideas to different situations, especially concerning issues of language and the role of the science teacher. They need to "make more problematic their original beliefs of what constitutes being an effective science teacher" (Rodriguez, 1998, p. 613) for diverse learners and for teaching in urban school settings. As preservice teachers develop more practical knowledge of science teaching, the focus is on providing meaningful activities, support, and time to reflect on current learning and future practice within teacher education programs regarding language and science teaching. Strategies for the preparation of teachers for culturally and linguistically diverse classrooms are needed as well as many more strategies regarding issues of language and power.

For the preservice teachers in the science methods course who participated in the Book Club, the expectation is that they will continue to reflect on their role as science teacher and linguistic diversity. This means building upon their understanding of the impact of language in teaching and learning science for all students and reflecting on the culture of power in science and language. For preservice teachers to think critically about these issues, continual learning and support are vital. The role of the elementary science educator, therefore, is to provide ongoing support for teachers throughout their professional growth for teaching culturally and linguistically diverse students. With that, diversity of language, ways of knowing, and ways of thinking in science cannot be taken for granted and set apart from issues of power and the power of language. Providing opportunities for preservice teachers to understand the interplay of language and power within diverse urban classrooms are desirable goals for the preparation of preservice teachers in science.

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