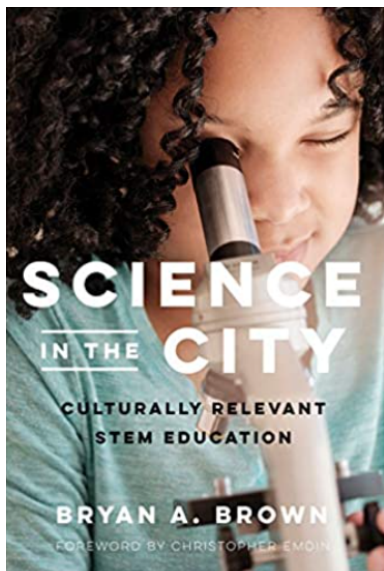


Science in the City: Culturally Relevant STEM Education

Brown, B. A. (2019). *Science in the city: Culturally relevant stem education*. Race and Education.

Reviewed by

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Dr. Bryan A. Brown, an associate professor of science education at Stanford University, produces work for the Center for Research on Teaching at Stanford. This particular research outlet emphasizes improving urban science education (Stanford, 2021). Brown is focused on the relationship between identity and learning, which often lends itself to the study of how language impacts learning. As a former high school science teacher who earned a bachelor's degree in Biological Sciences from Hampton University, a master's degree in educational psychology from the University of California, and a Ph.D. in Educational Psychology from the University of California, Santa Barbara,

Brown endeavors to focus on social meaning and cultural paradigms which impact learning opportunities in science (Stanford, 2021). He conducts multiple mixed methods studies, which are evident in his text, as he focuses on how culturally relevant teaching can lead to extreme innovation in the field of both teaching and learning science (Stanford, 2021).

In the book, Brown provides an overview of how language and culture play vital roles in science education. Brown (2019) skillfully weaves historical commentary in with pedagogical suggestions to expose readers to

the ways in which language, culture, and race impact students of color in science classrooms (p. 23). Brown emphasizes the importance of inclusivity in all classrooms, but specifically the science classroom when he states, “The simple message of *Science in the City* is that science teaching is the ultimate people business” (p. 25). Because of its focus on student assets, *Science in the City* reads as the history book every teacher wishes they had, and a practical guidebook for educators on how to incorporate a plethora of voices to form a scientific symphony of diversity.

In the first portion of the book, Brown uses the general educational dilemma theory to create an organized overview of how cultural and linguistic histories have negatively impacted the ways in which students learn science in schools (p. 17). Brown incorporates meaningful history lessons throughout the first portion of the text. These lessons for the reader build a purposeful foundation for his pedagogical recommendations. By defining the burden of “black tax” as the “imposed form of expectations about which language practices are deemed acceptable,” Brown shows readers that many students are judged as unsuitable for scientific innovation because their language practices are framed as “non-academic” (p. 34-35). Brown’s idea about linguistic norms and the ways in which language is valued or undervalued, provides a fitting introduction to the discussion on who establishes norms, and how those norms often place limitations on students (p. 40). Brown argues that extreme linguistic restrictions and racism are still evident in current classrooms and that people often discredit students because they do not “sound smart” (p. 50-51). Furthermore, Brown rightfully suggests that concepts can be explained and analyzed without incorporating “complex science discourse” (p. 52). He does not criticize scientific language or discourage its use in the classroom. However, he pushes educators to see that more knowledge can be both learned and given in the urban classroom when one allows students to freely engage in scientific discovery without worrying about if their word choice is sophisticated enough to employ.

One of the key strengths of *Science in the City* is Brown’s use of anecdotal research which serves to strengthen his arguments. To demonstrate his suggestion of using the lens of linguistic relativity, he adds credibility to his claims with stories of students who have proven successful because of teachers who have accepted, “science ideas may be represented in both science language and everyday language” (p. 56). Although this anecdotal evidence is used throughout the text, it is particularly effective in the first portion because it undergirds Brown’s ideas about “black tax” and linguistic racism. The stories about students in urban classrooms which combine their everyday language with scientific language beautifully demonstrate the notion that there is a lot to be gained when teachers highlight components of answers rather than choosing a simple “right or wrong” statement (p. 61). Brown rightfully points out that many students make meaning of new scientific knowledge by using analogies, and teachers should be careful to

validate what students *do* know as an opportunity to *begin* instruction (p. 65). The narratives outlined in this first portion of the text clearly and eloquently give educators an idea as to how history has impacted scientific learning in the urban classroom. Furthermore, Brown also introduces readers to the ways in which a science educator can rethink how science is “associated with vernacular and canonical language” (p. 63).

Science in the City is strengthened when Brown turns it from a historical overview into a practical guidebook for science educators. As he appreciates socioconstructivism, Brown challenges educators to connect learning to students’ backgrounds, identities, and cultures (p. 74). He expertly describes an instructional approach that empowers students to grow in their scientific knowledge and use what they already know to improve their understanding. By suggesting that teachers employ a disaggregated instruction pedagogy, Brown is proposing a four-stage teaching process that makes scientific concepts clear, but also uses “everyday content instruction” to draw connections using accessible language (p. 79). Again, Brown does not simply make suggestions, but he shows how his suggestions work in real classrooms. These examples from *real* students serve to strengthen his proposals. He does not merely tell the stories of how this instructional technique works, but he supplies the reader with quantitative research and graphs that examine positive learning results. *Science in the City* showcases this research in a way that proves to educators that the language-identity dilemma is one of the key roadblocks to scientific innovation in the urban classroom (p. 97).

Although *Science in the City* serves as a manual detailing how to create culturally relevant scientific studies in the classroom, little attention is given to promote these practices with administrators. Although the text acknowledges that there are cognitive challenges which emerge when, “...we do not prepare teachers to make nuanced distinctions between the use of the word and whether or not a student understands the ideas,” there is little attention given to how, when, or where the teacher is supposed to learn about such practices (p. 98). Perhaps *Science in the City* could be strengthened if Brown added a portion on the importance of administrative support and the ways in which administrators could find, develop, and implement professional development in these practices. Brown acknowledges that, through his time working at Stanford, he came across “world-class scholars” who were “engaging in incredible experimental studies about students” (p. 100). However, he does not acknowledge that most educators are not privy to this type of research and therefore need more accessible training on how to incorporate such culturally sustainable practices in their STEM classrooms. Brown does acknowledge that there needs to be a shift in curriculum and, “as teachers create curriculum, they should ensure there is time for students to practice language” (p. 107). Still, Brown does not touch on the fact that many teachers are under extreme pressure from their administrators and may not

have the time to incorporate such practices freely. The text could be strengthened if suggestions were made as to how teachers could approach their administrators with ideas, questions, and suggestions for such culturally sustaining practices. Brown states that schools need to rethink how they train teachers, but ultimately offers little information or suggestions as to how to go about providing this type of education to both pre-service and in-service teachers.

Science in the City is highly recommended for any educator who is involved in the STEM field, or interested in how they can create more inclusive classrooms while encouraging innovation in science in the urban classroom. As a whole, Brown's text would be a striking companion to Paris and Alim's text, *Culturally Sustaining Pedagogies: Teaching and Learning for Justice in a Changing World* (2017). *Culturally Sustaining Pedagogies* contributes to urban education as it is also a practical guidebook for educators who are on the frontlines. Paris and Alim (2017) emphasize the importance of creating pedagogies where both schools and communities must work together. This cultural hybridization is an urban education concept which is critical for asset-based approaches to learning. Paris and Alim inform urban educators of not only the implications of research, but also sustainable methods and examples that can be utilized. Brown's *Science in the City* is merely a more specific content area version of Paris and Alim's text. Both texts highlight the importance of building classroom communities from student experiences and identities. Brown states that, "there is no cultural distance between students of color and a successful science education" (p. 152). Paris and Alim (2017) similarly tell their readers that, "the divide that exists between many educational institutions and the students they are supposed to serve" because students feel out of place or that their identities do not connect to what they are learning (p. 95). The authors of both texts agree that students of all colors, backgrounds, and cultures have the immense capacity to learn and produce innovative ideas, but it is up to educators to "bridge theory to practice in meaningful ways" (Brown, 2019, p. 157). As a whole, Brown's text reinforces the notions that Paris and Alim (2017) outline in *Culturally Sustaining Pedagogies*. However, Brown's text is targeted more toward a STEM specialization. Although the scope of their arguments may differ, the authors of both *Science in the City* and *Culturally Sustaining Pedagogies* offer critical insight into how teachers on the front lines of urban education can bring asset-based teaching and culturally sustaining practices into every classroom.

References

- Brown, B. A. (2019). *Science in the city: Culturally relevant stem education*. Race and Education.
- Paris, D., & Alim, H. S. (2017). *Culturally sustaining pedagogies: Teaching and learning for justice in a changing world*. Teachers College Press.

About the reviewer

Lily Gates is a doctoral candidate at The University of North Carolina at Charlotte. She has been a high school English teacher for over a decade where she has taught every level of high school English both in the traditional, public high school classroom and in the virtual classroom. She has her own secondary English curriculum program where she creates engaging yet rigorous learning materials and experiences for reluctant readers at the high school level. She is also involved in developing, as well as teaching, alternative education programs within North Carolina. Lily's research interests include literacy programs within the alternative education setting, reimagining the high school English curriculum, and the intersection between life experiences and literacy development in secondary students. E-mail: LGibby@uncc.edu