EMPIRICAL RESEARCH

Centering the Marginalized Student's Voice Through Autoethnography: Implications for Engineering Education Research

Julie P. Martin[1] and Chavone Garza[2]

[1] The Ohio State University, US

[2] Clemson University, US

Corresponding author: Julie P. Martin (martin.4071@osu.edu)

Background: This autoethnography focuses on the voice of a woman of color in her journey becoming an engineering undergraduate.

Purpose: Drawing on critical race theory, this counterstory illustrates structural challenges that some underrepresented students face when they pursue STEM degrees. At the same time, drawing on autoethnography, this article challenges engineering education researchers to reconsider how we engage with participants in our work.

Design/Method: This collaboratively written autoethnography demonstrates how qualitative engineering education researchers might deploy relational ethics with marginalized participants.

Results: This counterstory challenges the deficit-based theorizing prevalent in engineering education research and practice and, instead, shifts to an asset-based theorizing as well as needed systemic changes.

Conclusions: We suggest that by collaborating as coresearchers and coauthors, participants gain the opportunity to reflect on lived experiences in unexpected ways and share power in how their stories are told. We also suggest that researchers using this alternative paradigm will recognize participants as holders and creators of knowledge and acknowledge participants as experts of their own experiences.

Keywords: autoethnography; counterstory; deficit theorizing; asset-based; women of color; critical race theory; relational ethics; power

Introduction and Literature Review

Chavone, who identifies as an African American woman, and Julie, who identifies as a White woman and educator in engineering education, collaboratively co-authored this paper. Our article seeks to perform two goals. First, by interpreting Chavone's narrative through the lens of Critical Race Theory (CRT), we seek to present a counterstory to dominant narratives about low African American student achievement in engineering. In doing so, we seek to shift the focus from deficit-based narratives to asset-based narratives, as well as to much-needed systemic changes. Second, by explicitly foregrounding the co-constructed nature of this work and by dismantling the researcher-participant hierarchy, we seek to challenge engineering educators to reconsider how they engage with participants who provide the "data" for their work. As we use collaborative autoethnography to center Chavone's voice, we demonstrate a different kind of research paradigm that invests authority and control in the individual whose story is at the center of this research.

Majoritarian stories employ deficit thinking and cultural deficit theorizing to explain the low educational achievement by African American, Native American, and Latinx students (Solórzano & Yosso, 2002). This deficit theorizing is *person-centered* (Valencia, 1997) and is what we colloquially might call a "fix-the-student" mentality. Deficit theorizing blames the individual student and their presumed innate deficiencies such as "limited intellectual abilities, linguistic shortcomings, lack of motivation to learn, and immoral behavior" (Valencia, 1997, p. 2), as well as their family, community, or culture for educational underperformance or failure (Castro, 2014; Garcia & Guerra, 2004; Huber, 2009; Lewis et al., 2008; Solórzano & Yosso, 2002; Valencia, 1997; Valencia & Solórzano, 1997). This blame is cast with the premise that students lack "normative cultural knowledge and skills" (Yosso 2005, p. 75). For example, on one hand, when parental behaviors do not conform

to the widely accepted, middle-class cultural norm of school participation, deficit theorizing asserts that these parents do not value education (Garcia & Guerra, 2004; Yosso, 2005). Schools themselves, teachers, inequitable educational policies and practice, on the other hand, are held faultless (Lewis et al., 2008; Valencia, 1997; Solórzano & Yosso, 2002). Lewis and colleagues note that this paradigm of blaming students, rather than educational systems, "creates, justifies, and maintains unequal education experiences for African-American learners" (2008, p. 141).

Counterstories are narratives that challenge majoritarian stories (Delgado Bernal, 2002; Delgado, 1989, 1993; Fernández, 2002; Solórzano & Yosso, 2002). Counterstories give voice to those who are marginalized (Solórzano & Yosso, 2002) and are often "resistant responses" (Harper, 2009, p. 702) to majoritarian narratives. Solórzano and Yosso (2002, p. 39) explain that "a story becomes a counterstory when it begins to incorporate the five elements of critical race theory." CRT, which foregrounds race, gender, and class, is central to rejecting narratives of failure that blame the individual for perceived deficits because CRT highlights the structural inequities students of color must overcome while pursing STEM education. Chavone's counterstory stands in contrast to the deficit narrative prevalent in engineering education research and practice, and it joins a growing discourse that is rejecting deficit-based theories of underrepresentation in STEM fields (Castro, 2014; Johnson et al., 2011; Pawley, 2019; Rahm & Moore, 2016; Syed, Azmitia, & Cooper, 2011).

Chavone's story highlights the different forms of capital, including aspirational, resistant, and navigational capital (Yosso, 2005), developed on her journey to an undergraduate engineering degree, and shows she how used that capital to navigate around educational obstacles. We hope this counterstory of Chavone's educational journey will inspire engineering educators to shift towards an asset-based perspective of students. Like Chavone, many engineering students possess varying life experiences prior to and during pursuit of their degree. These life experiences, such as work and familial commitments, should be recognized as *assets* students bring to their education, not deficits. The shift to an asset-based perspective will not be easy as it necessitates deconstructing practices, beliefs, and policies, but it is imperative because as things stand now, we are (re)creating social realities and norms that privilege some, while oppressing others.

Chavone's counterstory also illustrates how she resisted and negotiated the structural inequities in her everyday life to enroll in an undergraduate engineering program. Chavone's reflections demonstrate how "[people are] not simply *acted upon* by structures"; and her narrative "*show[s] how individuals negotiate and struggle with structures* and *create meaning* from their interactions*" (Solórzano & Delgado Bernal, 2001, p. 315). These structures for Chavone included living in a ghetto on public assistance and being part of her school district's bussing policy enacted as a stopgap measure to racial segregation. Her counterstory also shows how Chavone struggled with the higher education system once enrolled in college as a parent and as a person with a learning disability.

At the same time, by publishing as a team, we are enacting a new research paradigm that dismantles the researcher-participant hierarchy. We co-constructed this work; neither could have done it without the other. Chavone is not merely the object of study; she has co-constructed her own narrative. Fernández (2002) advocates that researchers use students' stories "not as accessories to our research, but as the centerpiece for qualitative studies" (p. 45). The metaphor of accessories versus centerpieces guided our decisions throughout the research. In recognizing Chavone as a coauthor, we are attesting to her value in the research process and are recognizing her as an expert about her own experiences. Julie has shared the authority she typically exerts over participants' stories in her standard research practice. Our model illustrates one way that participants and researchers can share the power around how experiences are represented in research (for other examples, see: Pawley, 2019; Sochacka, Walther, & Pawley 2018; Secules et al., 2018).

By presenting Chavone's story as an autoethnography combined with analytic passages, we are also deliberately challenging accepted qualitative research practices in engineering education. And we are also challenging the approaches engineering education researchers typically take in studying marginalized populations. We want engineering education researchers to explore the ways in which their standard research practices may disempower marginalized research participants and contribute to the reification of marginalization. We encourage engineering education researchers to find new ways to center the experiences of marginalized participants as they conduct research.

The rest of our paper discusses our epistemology and theoretical framework, the methodology of autoethnography, with participant profiles and our positionality, data collection and analysis; and a brief historical background of the socio-political context of Kansas City, MO. We then walk the reader through five vignettes, or scenes, written in the form of layered accounts: Scene 1: Living in a Dome; Scene 2: Discovering the Black Quota System; Scene 3: Interpreting an Aptitude Test and a Movie; Scene 4: The Journey to Getting In; and Scene 5: The University Wasn't Made for Me. We conclude with a discussion of the product and process of our collaboration and with some implications of this work for engineering education practice and research.

Epistemology and Theoretical Framework

A researcher's epistemology profoundly shapes their research process. We approached our work through a critical raced-gendered epistemological perspective in order to push against dominant Eurocentric epistemologies (Delgado Bernal, 2002). These epistemologies are grounded in ideologies such as meritocracy, individuality, and objectivity (Huber, 2009).

CRT asserts that these Eurocentric ideologies are drawn from "a narrow foundation of knowledge" (Delgado Bernal, 2002, p. 107) and reflect epistemologies that hold "the belief that the perspective of the Euro-Americans is the norm" (2002, p. 111).

Against that epistemological frame, CRT has five widely recognized tenets that influenced both the process and the product of our research: acknowledging the intersectionality of race and racism with other forms of subordination such as class and gender, challenging the dominant ideology, working towards social justice, recognizing the centrality of experiential knowledge, and crossing disciplinary boundaries (Solórzano 1997, 1998; Solórzano & Delgado Bernal, 2001; Yosso, 2005). These tenets of CRT guide the telling of counterstories such as Chavone's story here. CRT seeks to center the lived experiences of people of color as well as the interpretations of those experiences by people of color, and in doing so provides alternatives for analyzing inequity (Zamudio et al., 2011). CRT recognizes the "intersectionality of subordination" (Delgado Bernal, 2002, p. 118) that arises at the intersection of "racism, sexism, classism, and other oppressions" (Delgado Bernal, 2002, p. 107). Collins calls this intersection a "matrix of oppression" or "matrix of domination" (Collins, 2000; 2009, p. 21). By focusing on race and racism and their intersection with classism and sexism, CRT challenges normative history, narratives, and beliefs that collectively perpetuate systems of privilege, power, and oppression and create marginalized experiences like Chavone's (Delgado, 1989; Duncan, 2005; Foor, Walden, & Trytten, 2007).

Through centering Chavone's voice and experiences, we challenge dominant ideologies around what underrepresented students know and do (i.e., deficit-theorizing), as well as how researchers go about knowing what students know and do (i.e., approaching students as "objects" of research). Our co-authored autoethnography seeks to bring justice to women like Chavone and other marginalized participants whose experiences are sought as "data" for research studies. We center Chavone's experiential knowledge, and we complement and build upon her knowledge by drawing on a research methodology that sits outside of her focus on engineering. CRT offers benefits to Chavone as other researchers have suggested it does. When a person of color is invited to reflect on their lived experience, giving public voice to their story has the potential to "subvert" the socially-constructed dominant story (Fernández, 2002, p. 48; see also Secules et al., 2018).

Built on this epistemology, we see Chavone as a holder and creator of knowledge (Delgado Bernal, 2002). We disavow the "apartheid of knowledge" (Delgado Bernal & Villalpando, 2002, p. 169) in academic research that separates "'legitimate' and 'illegitimate' forms of knowledge" (Huber, 2009, p. 640) based on Eurocentric ideologies (Delgado Bernal & Villalpando, 2002). We endorse Chavone's experiential knowledge as an asset and a strength (Delgado Bernal, 2002). Our work also disavows the myth of American meritocracy (Ladson-Billings, 2000; Delgado Bernal, 2002). In Chavone's experience, we critique the (un)willingness and (in)ability of multiple institutions to be holistically responsive and proactive to the needs of adult learners in general and to black female students from impoverished families specifically. CRT also guides our analysis of her experience and brings us to better understand the nuanced ways engineering education culture is unwelcoming for individuals from marginalized populations.

Methodology

To bring CRT to bear on Chavone's experiences, we use collaborative autoethnography. Ellis and Bochner (2000, p. 739) describe autoethnography as both a "process and a product." We focus on both process and product throughout the paper, and pay special attention to the process, because this is where we feel the real narrative of our collaboration emerges. Autoethnographies connect the personal to the cultural context by using personal accounts to "illustrate facets of a cultural experience … that make characteristics of a culture familiar for insiders and outsiders" (Ellis, Adams, & Bochner, 2011, p. 276). Hughes and Pennington (2016) describe 23 types of autoethnography in their work. The autoethnography in this paper most closely aligns with Hughes and Pennington's (2016) description of layered accounts that "focus on the author's experience alongside data, abstract analysis and relevant literature" and uses "vignettes, reflexivity, multiple voices and introspection" (p. 20). The five vignettes, or scenes, we present focus on Chavone's educational experiences, particularly her journey to college and engineering, in order to focus on her voice and her experience without the additional barrier of the researcher. These accounts are what Ellis, Adams, and Bochner (2011) call "aesthetic and evocative thick descriptions" (p. 277).

We begin with our autobiographical data written in third person as participant profiles. Each profile is followed by our first-person positionality statement. We then present layered accounts that align with Ellis et al.'s (2011) description of layered autoethnographies told from the first- and third- person point of view. These scenes include Chavone's memories written in first person. We use short third-person descriptions to introduce readers to the scenes, establishing the historical and autobiographical context. We selected these scenes because Chavone considers them to be epiphanies in her educational experiences. Epiphanies, as defined in layered autoethnographies, are "remembered moments perceived to have significantly impacted the trajectory of a person's life … after which life does not seem quite the same" (Ellis, Adams, & Bochner 2011, p. 275).

This paper, however, is more than an autobiographical narrative of one individual; it contributes substantively our understanding of social life because we tie Chavone's autoethnographic account as a student in the Kansas City, Missouri School District (KCMSD) and as an undergraduate at Clemson University to the larger social experience inside complex systems of

Table 1: Research Quality.

Quality criterion	Consideration/application in our study
Reflexivity	Inclusion of autobiographical data and first-person positionality statements that foreground the authors' perspectives on underrepresentation in STEM.
Substantive contribution	Grounding of the study in relevant academic discourse that rejects deficit-based theories of underrepresentation in STEM.
	Tying of Chavone's experiences to broader educational structures and systems.
Aesthetic merit	An attention in our writing to what Ellis, Adams, and Bochner (2011) call "aesthetic and evocative thick descriptions" (p. 277).
Expression of a reality	Selection of the scenes according to Chavone's perception of how specific experiences "significantly impacted the trajectory of… [her] life… after which life does not seem quite the same" (Ellis, Adams, & Bochner 2011, p. 275).

oppression. We do this by including historical background on KCMSD's hyper segregation and desegregation plan, discussing implications and recommendations for engineering researchers and educators, and specifically addressing transferability considerations in the discussion and conclusions section. By including Julie's account of the journey to collaboration with Chavone, we have included both "emic" (internal) and "etic" (external) perspectives (Hughes & Pennington, 2016, p. 66).

Research Quality

Patton (2015) describes six criteria for judging the quality of autoethnography: reflexivity, substantive contribution, aesthetic merit, impact, expression of a reality, and relational ethics. In **Table 1** we summarize how we sought to ensure the quality of our work according to four of these criteria. We discuss impact and relational ethics in more detail below.

Patton (2015) tests the impact of an autoethnography by querying, "Does this affect me? Emotionally? Intellectually? Does it generate new questions? … Move me to action?" (p. 103) Ellis et al. (2011) frame this question about impact as, "To what uses might the story be put?" (p. 282). This quality consideration can only really be established post-publication, but to explore the potential impact prior to submitting the manuscript, Julie gave multiple talks about the project, gathered feedback from audiences, and used the work as the basis for two Hero's Journey skits and improvisations based on Theatre of the Oppressed (Jordan et al., 2018; Jordan et al., 2019). She has used this work as the basis for another project, which focuses on challenging the system of engineering education to be more holistically inclusive. We shared drafts of this manuscript with multiple people, including engineering educators, individuals with student affairs backgrounds, individuals who conduct research in the P-16 space, individuals who direct programs, and university administrators. We also considered relational ethics (Ellis, Adams, & Bochner, 2011; Hughes & Pennington, 2016) by member checking, using pseudonyms, and co-authorship with the key informant. Knowing that her mother's history of addiction would be revealed with this paper, Chavone was obligated by relational ethics to discuss the content with her mother. She asked her mother (who is no longer addicted) to read the drafts of the work. They discussed her feelings; and ultimately, Chavone received explicit permission to publish this work from her mother.

Our eventual choice of autoethnography as a methodology (described below in "The Evolution of our Collaboration" section) was strongly influenced by Sochacka, Walther, and Pawley's (2018) concept of ethical validation as an element of research quality. They discuss how "an engaged, in-process consideration of ethics also opens up opportunities for alternative research designs and methodological choices," and "lead to higher quality, more impactful, and transferable research findings" (p. 376).

Participant Profiles & Positionality Statements

Our in-depth profiles and positionality statements are included here because we want to highlight the process of this work as much as the product. We offer profiles to help the reader grasp who we are at the time of writing. We each provide information that we feel is relevant to our collaboration and our positionality. Writing a first-person positionality statement is one way we as researchers reflect about ourselves, our place in the world, our personal characteristics, privilege and power, marginalization and disadvantage, and how we view our relationship to this project.

Chavone's Profile

Chavone is 37 years old. At the time of this writing, she has been enrolled at Clemson University for four semesters after transferring from a local two-year college. She has two children, one in high school and one in middle school. Her daughter lives with her, while her son lives with her ex-husband in another state. Growing up, the only people Chavone knew who had attended college were her teachers, but they did not talk about college. She got her information about college from

watching television, specifically *The Cosby Show*, which depicted an affluent African American family. College was embedded in the plot via the family's five children, and the mother, Claire Huxtable, who was a lawyer, and the father, Heathcliff, who was a physician. Chavone's childhood in Kansas City, Missouri, in the 1980s is set against the backdrop of "hyper segregation," during what has now been called the Kansas City Missouri School District's magnet school "experiment" (Ciotti, 1998). She attended six different schools during her elementary and secondary education.

Chavone's Positionality Statement

My story is one positioned at an intersection of multiple marginalized positions—a Black, poor girl growing up in a low-income, public housing neighborhood. It was dangerous; there was drug dealing, fights, shootouts with the police, riots, and everything. My mother was addicted to drugs. She was not employed, and we received welfare and food stamps. Even with this government assistance, my siblings and I would sometimes go without food and other necessities because my mother spent the money on drugs. We had a family friend that paid us for our grades; I had straight As, so I made a lot of money. I am a saver, but my mother would steal this money for drugs. I started saving it in coins instead of dollars to detract her from taking it. I always wanted to go to college; I love to learn, and I desperately wanted to get out of my neighborhood. I equated college with job opportunities—something I did not see in my neighborhood. I wanted to be the opposite of my mother and other adults in my neighborhood.

The only thing I knew about science or engineering or math as a kid was that I loved them; I knew nothing about the careers in these areas. I knew about scientists because I had seen them in movies. I was so enthralled by science that whenever the big, thick, Sear's Christmas catalogs came around, I skipped all the toys and went straight to the chemistry sets. Every year I circled the chemistry sets, but I never got one.

I wanted to work with Julie on this project because she cared. This project is important to me because many people do not believe that the kinds of things that happened to me are still happening to other kids. There are a lot of people who think that if you work hard, anything can come for you. When you're in a situation like that, you have to climb out of it, scratch and dig yourself out of it, and yet a lot of the time, that is not enough. If it were that simple, I don't think I would know what to do with myself! I would be on Easy Street. In reality, working hard is not enough. I have worked hard throughout my life, and every time I achieve something, I still get pushback. Working with Julie has helped me realize how much someone's lived experience affects the way they see things. I am able to understand that sometimes when I get pushback, it is because of the other person's lived experience, not because of me.

Julie's Profile

Julie grew up as a White, middle-class cisgender girl in Charlotte, NC in a family where attending college was an absolute expectation. Her family possessed the resources to contribute to her college fund from the time she was born. In fact, she remembers her grandparents giving her a college savings bond on her third birthday. Julie was encouraged to major in a STEM discipline from her pre-teen years because adults in her life recognized her ability in math and science. Teachers and family friends suggested potential STEM college majors. She was placed in accelerated "gifted and talented" classes from elementary school onwards and attended well-resourced schools that offered Advanced Placement courses to prepare her for college. She attended school in the Charlotte-Mecklenburg District and lived in a house with her younger sister, father who was employed as an insurance adjuster, and mother who was a homemaker and part-time community college instructor.

Julie's Positionality Statement

I am an engineering educator and throughout my career, I have observed students dealing with systemic factors that influenced their daily lives, particularly with respect to pursuing an education in engineering. I have worked part of my career at an institution with an ethnically and socioeconomically diverse student body. My education and the majority of my career, however, have been at predominantly White institutions, where the vast majority of students enter college directly from high school (and a small fraction from two-year colleges), come from middle-class backgrounds, live on campus, and have few, if any, family responsibilities. I have observed how easy it is for educators to assume the "traditional" stereotypes that accepts that college students move directly from high school, their parents help with college costs, they live on or near campus, and they attend full time (AACU, 2018).

My career goal is to make education, in particular engineering education, more accessible to and inclusive of all students. My motivation in collaborating with Chavone on this paper is two-fold. First, I wanted to share space with Chavone where we could enter into discussion together; that is, I want myself and others to treat her as an expert in her own experience. In doing so, I want to instigate a dialogue with my fellow engineering education researchers about how we can do better— better at conducting research to give to our field, and better at centering the voices or creating space for others to speak on their own behalf. Secondly, I want my fellow engineering educators to be more aware that the archetype of the "traditional" college student as middle-class, eighteen years old, and mostly White really does not exist anymore (AACU, 2018). The students in our college classrooms possess varying hidden and visible identities, experiences, and perspectives they bring with

them to campus. I want to spark discussion among engineering educators about how to better serve *all* students, not just the ones who fit the traditional model.

I come to this work aware of the privilege I experience and of the of the gaps in knowledge and perception created by my privilege with respect to racism and class. I was educated and socialized with meritocracy as the dominant narrative; I believed that hard work was all that was necessary to get ahead in life, and that education was the key to social mobility. I never could have understood Chavone's struggle to be recognized, acknowledged, and gain access to college-preparatory courses without fully partnering with her on this project. Through our collaboration, I have a deeper understanding of the operation of privilege in K–12 and higher education than I could have ever reached on my own.

Data Collection and Analysis
Process
Julie
Our work did not begin as an autoethnography project. It began with me in the role of sole researcher and Chavone in the role of research participant. I was interviewing Chavone as a participant in another research project. After I asked only one question, "how did you get here?" Chavone talked and talked, unfolding many aspects of her life story. As Chavone spoke, I realized that my role as the interviewer was to sit back and let Chavone tell her story with minimal interference. After the interview, I felt overwhelmed by the many ways the educational system had failed Chavone. For example, I was struck by her ability to navigate educational spaces by herself at a young age. Over the next few days, the interview raised several questions in my mind, and so I invited Chavone back for another interview. In the second interview, I asked a few more questions based on Chavone's prior responses. Following the two interviews, I considered how to tell Chavone's story in a way that would help engineering educators understand the diverse backgrounds of their students, and how educators could learn from Chavone's experiences. I realized that Chavone's story would be reflective of many students' stories, and that other educators may recognize some of their students in Chavone's story. While not familiar with the history of the Kansas City, Missouri School District (KCMSD), I felt that Chavone's story was relevant to the racism that influences policies and practice in American education today.

After outlining a potential narrative case study paper on the topic, I felt an ethical uneasiness about "taking" Chavone's story and retelling it for potential professional benefit or gain (e.g., a publication credit). As I wrestled with this, I began to seek out a non-exploitive way to share Chavone's story that did not presume to speak for her, misrepresent her, or erase her voice (Lapadat, 2017). In the words of Cannella and Lincoln (2011, p. 82), I was searching for a way to "join with" Chavone rather than to "know and save" her. Sochacka et al. (2018, p. 365) use Guillemin & Gillam's (2004, p. 261) phrase "ethically important moment" to describe my dilemma. After reading Brewer, Sochacka and Walther's paper (2015) and after conversing with Walther about my ethically important moment, I approached Chavone about collaborating with me on an auto-ethnographic project. This is when Chavone moved from participant to collaborator, coresearcher, and coauthor. Chavone enthusiastically responded to my proposal, and we started meeting weekly to plan the paper.

Chavone
When Julie asked me to collaborate, I was excited because I had never heard of anything like this. It was something totally new to me—to actually learn how to do research in an academic setting sounded awesome. I was nervous, but I was excited. The fact that we were going to be talking about my life felt awkward because I don't talk about myself unless somebody probes me to do it. For me to just come out and say something about myself is not something I do—not something I've ever done, really. I think it may be because I don't value myself as much as I should. At first, I thought, "why would we talk about me when we've got other interesting things to talk about?" But working on the project has helped me to validate my self-worth. It's still hard for me to talk to people about *myself*, but working on the project has gotten me to talk to others about *the paper*, which is really talking about myself but in a different way. So even though I still don't like to talk about myself, the paper has given me a way to talk to people about my experiences because I'm talking about the *research* we're doing.

When Julie first invited me to her research group meeting, I was anxious. I was so nervous. At the time I was the only undergraduate working in the group, and I was intimidated because the rest of the group were PhD students or already had their PhD. So, I'm thinking, "Oh my God, these people really know what they're doing. Here I am, this little sophomore. I don't belong here." I felt out of place. I felt like I hadn't earned my spot there. As far as I was concerned, the rest of the group had all gone through all the years of schooling, and they had all done so much research. I hadn't done any research. I thought they may have felt like, why is she even here? She's not supposed to be here. At the meetings, Julie would have us go around the table and talk about our "wins for the week." I didn't want to say anything—not even my name. I hadn't even started writing the paper, so my wins had nothing to do with research. They just had to do with my life outside of school. But after a couple meetings, I realized that other people talked about wins and difficulties that related to their life, too. That's when I realized, I'm okay. I'm way overthinking this situation here. That was an "aha moment" for me.

Over time as I got to know everybody, I started to feel more at home. Everyone was so nice and gave me tips about how to do research. And they talked with me. That helped a lot because when you're doing research regarding your own life, it gets pretty heavy, so I needed an outlet. Bouncing ideas around with them helped a lot. Then another undergraduate joined the research group, and I wasn't the newbie anymore. Honestly, that helped a lot, too!

Julie and Chavone

This study turned into a journey for both of us. It grew into to a symbiotic collaboration, in which neither of us could have achieved our outcomes without the other. Given the structures and processes of the academy that control the production of knowledge in academia, Chavone would not have been able to publish without the entrée that Julie could provide with her role as a faculty member. While she was a talented writer, Chavone did not possess knowledge about framing a research study, choosing a theoretical framework, or selecting an appropriate journal. The collaboration with Chavone plunged Julie into a deep reexamination of how she represents participant voices in her research. The collaboration forced her to grow epistemologically, theoretically, and methodologically as a researcher.

Data and Analysis

The layered accounts presented next use multiple data sources: Chavone's personal narratives from memory, interview transcripts, maps, and historical law and educational analyses (Hughes & Pennington, 2016). Chavone wrote detailed, chronological accounts of her life, over 40 pages. Chavone found this writing to be therapeutic (Ellis et al., 2011). During weekly meetings, we discussed many other areas of her life and agreed that the details included in this paper would focus on her educational experiences and the parts of her life that influenced it. We discussed what to leave out, which was not easy; for instance, Chavone experienced a series of deaths of people close to her in her life. We agreed that while these experiences are an integral part of who she is, they are not directly tied to this manuscript. After Chavone initially wrote from memory, Julie mentored Chavone in the methodology of autoethnography and theoretical framework of CRT, which Chavone enjoyed learning about. After reading Chavone's autobiographical writing and having weekly discussions, Julie initially proposed to organize the paper around four scenes (we later added another scene). With Chavone's direction, Julie re-organized parts of the text from Chavone's writing into the scenes. We debriefed to ensure that nothing that was left out was salient to Chavone.

We ultimately chose the following scenes because these were the most compelling epiphanies related to Chavone's interest in college and STEM; Chavone identifies each scene as a key point on her journey to studying engineering. These scenes illustrate how Chavone navigated educational institutions as she struggled to establish an identity as an undergraduate and how educators consistently ascribed "unwanted identities" to her (Johnson et al., 2011, p. 344) and also denied her aspirations through a series of interactions, policies, and practices. The scenes convey key aspects of our epistemological stance by demonstrating how Chavone continually renounced these unwanted ascribed identities despite her location in the matrix of oppression. We used Chavone's point of view to present the following scenes because we wanted to restrain—as much as we could—Julie's point of view, background, experiences, and assumptions from controlling the narrative. First, however, we begin with a short overview of the KCMSD, where Chavone spent the first 12 years of her formal education.

Background: Kansas City, Missouri School District

Following the 1954 *Brown v. Board of Education* ruling, *Newsome v. Kansas City, Missouri School District* found that the school district had taken steps to circumvent desegregating their schools. From the time of the KCMSD ruling and through Chavone's childhood, the racial conversation in KCMSD was discussed as a Black/White binary. By the 1980s, "massive" White flight had occurred (Moran, 2005, p. 1933), and most of the White student population previously enrolled in KCMSD schools were attending separate school districts in the suburbs. This left KCMSD with a smaller tax base, leaving the Black children in the city to attend dilapidated schools (Moran, 2005; Ciotti, 1998). A 1984 district court ruling determined that segregation in schools still existed and in 1986 the district started $250 million magnet school program to entice suburban (White) students into the urban schools (Ciotti, 1998; Gotham, 2002). The district built 15 new schools and renovated 54 others (Ciotti, 1998). To attract White students into the new magnet schools, the court mandated that KCMSD establish a quota that no school could be more than 60% African American (Ciotti, 1998). The district allotted a $900,000 advertising budget to entice White students to come to the magnet schools and spent $6.4M to bus White students in (Ciotti, 1998). If a White student did not live on bus route, the district would send a taxi for door-to-door service (Ciotti, 1998). One of the magnet schools was the 1,200-student Central High School, which adopted a "classical Greek" theme, which meant it was focused on athletics. The building cost $33 million, had a six-lane indoor track "better than those found in many colleges" and an Olympic-sized swimming pool with an underwater viewing room (Ciotti, 1998, p. 5). The cost of just heating the pool was reported to be several hundred thousand dollars per year (Ciotti, 1998). Another school, Lincoln High School and its feeder school Lincoln Middle School—which until 1954 were the only Black schools in KCMSD—became the college preparatory magnet schools (Gotham, 2002). This historical context and, indeed, both of these schools, are important to Chavone's story.

Chavone's Story in Five Scenes
Scene 1: Trapped in a Dome
Chavone grew up in the Holy Temple Homes, a low-income housing complex in Kansas City. She describes the complex as a "dome." The neighborhood was situated so that its residents could see both the Kansas City Royals and Chiefs stadiums. While she knew there was something else—some other worlds not like this one—outside her complex, she described feeling "trapped" in a dome that was her neighborhood, where a sense of complacency, drug use, crime, and an antagonist relationship with police led her to seek sanctuary in school.

Chavone

One of the things I remember as a kid was that everywhere, everybody where I lived, no one was ever happy, and life seemed so limited. And when I say limited, I remember as a kid imagining the apartment complex having a dome over it that we couldn't get out of because that's what it felt like. I pictured it having a dome. Everything you stereotypically think happens within a low-income, urban environment, happened where I lived. Inside the dome there were a lot of drug dealers, lots of teenage pregnancies, lots of just every negative stereotype you can think of, but outside if you can get outside the dome it was different.

I didn't want to be in the dome. I never wanted to be there. I did not understand how so many people—all of my neighbors, it seemed—could be so proud of being from there. They were proud, too. They bragged about being from Holy Temple Homes or "The Temp" as they would call it for short, as though it was the best place a person could ever live. That baffled me as a child. I recognized the fact that none of the people around me had much of anything – not really at least. Moreover, none of the people around me appeared to be working toward attaining anything more. It always felt as though the prevailing thought was "this is our life, we may struggle at times, but we love it", so I used to wonder, why? I remember thinking, "I don't understand why you can be so complacent with where you are? These people have either given up or they like it. Which one I don't know but I don't like it nor will I ever give up." Because that's what it seems like, it seems like complacency but now when I reflect back I don't think it's complacency with people who are in that environment. It's more hopelessness than complacency.

Like so many people in my neighborhood, my mother was a drug addict, on welfare and food stamps. However, with those substance abuse issues and no other income, she spent that money on the drugs. That's why we would go without a lot of times. We had food to eat sometimes, but we went without a lot of stuff. I was told so many times as a kid because I was from a single parent home where the mom was on welfare and was a high school dropout, that I was going to be the same: have kids out of wedlock as a teenager, be a drug addict. I was told that I was never going to be anything because I was a young Black girl from the ghetto.

Scene 2: Discovering the Black Quota System
KCMSD had implemented a system for school selection and students were constantly being told that we were "piloting" these new experiments. What that really meant was that we were guinea pigs, and that's how it made me feel, like they were experimenting on me. Since my school, West Rock Creek, only went up to third grade, I knew that we needed to choose a new school for me to attend for fourth grade. The selection process involved us filling out forms. I brought home the forms for my mom to fill out and sign. She never did. Therefore, I ended up in Ashland Elementary School. Ashland was only open for one year, 1989–1990, and the school district opened it for all of us kids who didn't have a place to go. We were the leftovers. That year, I never had a teacher. Rather, our classroom was taught by a series of substitutes. All of the students were "bad." I hate using the word bad because I don't think of kids as bad, but they fought, cursed, and everything you can imagine. I had never been in a school that had those kinds of children. It felt like I was in an alternative school. Though our substitute teachers usually lasted a month or so, each and every one made a point to tell us how "we were the worst generation ever—and that we weren't ever going to be anything because we were animals." Animals—we heard that daily. We were constantly berated and told we were stupid. My sanctuary, my escape, my favorite place in the world had been taken from me because I was just stuck in Ashland since KCMSD needed to stick us somewhere. So, after that, I was wary of any other school that the district would decide to "stick" me in because to me it was obvious that I didn't matter. And not only did I not matter, but I also didn't belong anywhere at all. The next year, they just stuck us all somewhere else – I got lucky. The school I got stuck into was Askew, and I got placed into the class of a teacher who actually cared, Mr. D.

In 5th grade, at yet another school, Chavone was surprised to have a teacher who recognized her as an advanced student. Again, KCMSD sent home forms to be filled out for placement in middle school. There was one school that tracked students into the only college prep high school, both named Lincoln College Prep. Chavone gave up on her mother filling out the form and forged her mother's name so that she could get into the school of her choice.

Chavone

Again, the parents were supposed to fill out the form and mail it into the district office—my mom didn't do this the prior two years, which is how I got put into Ashland and Askew. So, it was no surprise that even though I bugged her daily about it, she didn't do it that year either. Mr. D. asked me one day before winter break if my mom had turned my forms in, I told him no. I

think I gave him the excuse of "she can't afford the postage" or something because it's embarrassing when you have a parent who doesn't do what they are supposed to do. After I told him that, he told me that I could bring the form back to school, as along as my mom had filled it out, and they could turn it in for me. So, that night, I went home and filled the form out myself. I already knew what school I wanted to go to because I wanted to go to college and the way a child in KC went to college was by going to Lincoln College Preparatory Middle and High School—it even had College in the title. When you fill the forms out, you have to mark your first choice, then two backups. Naturally I picked Lincoln College Prep Middle School as my first choice. I filled out the form and forged my mother's name, and I took it back to Mr. D.

Mr. D. was different than anyone else in my life—different because within the first week of class, his actions in some way showed that he actually cared about his students. He wanted us to be great people. He cared about who we were and what we did—on an individual basis, as much as he could. Within the first few months of school, Mr. D. seemed to know that I was an advanced student and treated me as such. He challenged me, not really just going through the motions like I'd grown accustomed to. When juxtaposing my fifth grade year to my fourth grade year, it didn't take too long for me to feel as though I'd found the first place in which I simultaneously fit in and belonged, as well as it being my safe place. I'd always considered school to be my safe place. Ever since I was in the first or second grade, the classroom had been the place that I used as an escape for the troubles that I faced at home.

At the end of the school year when everyone received their sixth-grade school assignment, I was on pins and needles. When I got my assignment, to my disappointment, not only did I not get into Lincoln College Prep Middle School, but I didn't get into either of my back-up schools. The school district literally "stuck" me in a school of their choosing again. It was fourth grade all over again and I knew it. My assignment was Paul Robeson School, a school that was in its first year. It didn't have its own space yet because it was a new school to the district. The magnet school theme was classical Greek, which in Kansas City meant sports. I cried. All the hard work I'd been doing was for naught. But I didn't tell anyone.

Mr. D. noticed that I wasn't talking to anyone about where I was going to school, so he asked me "so, where are you going to school? I assume you got into Lincoln Prep, right?" and that's when I cried for the first time in front of him. He stopped for a moment like he couldn't believe what I had just said and asked what school I got in to. When I told him Paul Robeson, he shook his head because he'd never heard of that school—no one had. I was ready to give up on school because every time I felt like I was doing what I was supposed to do, somehow, I was pushed back. However, Mr. D. had other ideas and told me to come with him. He was livid. I didn't know how mad he was until after he made the call. That's when he called the district in front of me. That conversation was when I knew that I couldn't give up. He gave the person on the line his credentials, my information, and explained the situation. I'm not sure what they said, but you could see his patience slip as they spoke. And finally, he said something like, "I don't understand because out of all of the kids in this district who needs and deserves to go to Lincoln Prep, Chavone is that student. She's testing post high-school on the standardized test, and has worked her tail off and you're telling me that there is no space for her?" At the end of that phone call, he was visibly upset, though he held his temper when talking to me. He explained KCMSD's quota system and my schooling up to that point started to make sense. At least, the fact that I hadn't attended any magnet schools started to make sense. Under the quota system, none of the KCMSD magnet schools could have more than 60% Black students in attendance, and since Lincoln Prep had hit their mark, I didn't get in. That's when it became clear to me that the quota system was the experiment we poor Black kids were "piloting."

The school year ended and on my last report card Mr. D. wrote a comment that stuck with me most of my life. He wrote "never give up on yourself, your dreams. Lawyer in 2012?" I kept that report card for at least 20 years because even though he never explicitly told me to go to college on it, the implication was there. I knew what he meant. Mr. D. was the only teacher I had in KCMSD who cared about my future and whether I pursued a college education.

For high school, Chavone was placed into Central High School, a magnet school that claimed to have a classical Greek education base. It gained notoriety for its multimillion-dollar athletic facilities, including an indoor Olympic pool with an underwater viewing room.

Chavone

I wasn't athletic—I'd never participated in any team-oriented sports. I was actually hopeful about selecting my classes at Central because there seemed to be more flexibility. In terms of math, algebra was the default class where they placed incoming freshman. I met with my adviser and told him that I'd taken algebra both my seventh and eighth grade year, and I didn't feel as though I needed to take algebra for a third year in a row. He told me that my middle school academics and standardized testing didn't matter. Unless I had come from Lincoln College Prep, I had to take algebra. That was the first direct slap in the face I received from the rules that had been put in place at Central. It never occurred to any of those adults that I held dreams and ambitions. It never occurred to those adults that I wanted to go to college. None of the adults ever mentioned college to me again after Mr. D. That hurt a lot. I remember thinking, "I don't like this. I'm not a violent person. I don't do drugs. I absolutely have to get out of here."

The administration also used us students at Central as "guinea pigs" for block scheduling. However, every school year they implemented a new kind of block scheduling. By the end of junior year, I needed two of what they called "half credits" and there

was no way to earn them because Central now counted each class a "full credit." Even though I had followed all the rules and taken a full course load, I was told in my senior year that I would have to attend summer school to graduate. That was another way Central's rules slapped me in my face.

Going to summer school was not an option for Chavone because she had to work. She was living on her own by then and had to pay her own bills. A friend suggested that she consider getting a GED. Chavone learned that in order to get your GED in Missouri, you had to be over 16, a resident of the state, and could not be enrolled in school for 6 months prior to taking the test. Chavone dropped out to "hit the six months as soon as possible." She earned her GED at the same time she would have graduated from Central High School.

Scene 3: Interpreting an Aptitude Test and a Movie
GED in hand, Chavone tried to decide what to pursue for college and thought back to her high school aptitude test.

Chavone
My aptitude results came back as: (1) engineer, (2) scientist, and (3) psychiatrist. That was the first time I'd ever been told offi-cially that engineering was a career I should pursue. Unfortunately, I didn't know what an engineer was. I honestly had no idea. At that time, I associated being an engineer with working on a train. Therefore, my first reaction was, "this is not right, I don't even like trains." The scientist result made sense, however; I loved science. I didn't know any scientists though, so I didn't think science would be a "smart" career path because I associated college with getting a career, thereby gaining stability. As far as I knew, scientists were either bad—using their science for evil like The Fly *—or they were unemployable. These stereotypes were thanks to Hollywood, with movies such as* Honey I Shrunk the Kids, Back to the Future, *etc. Basically, the only careers that I thought required a college degree was lawyers and doctors, literally. I understood those results as telling me that I wasn't sup-posed to go to college since engineering was the top recommendation.*

Regardless of what the aptitude test told me, I still loved math. Math and science were my two favorite subjects. Accounting was the only career I associated with math, so I enrolled in Brown Mackie College for accounting. Unfortunately, this college was in Lenexa, Kansas, a suburb, which meant that you had to have reliable transportation to get there. During my second semester, my boyfriend burned out my clutch on my car and I lost my transportation. I had to drop out temporarily in order to get the money to fix my car. Luckily, I'd gotten a new job as an order processor where I did some bookkeeping, which told me that I did not like accounting after all. After getting my car fixed, I decided to try DeVry [a for-profit university] *because of its commercials. I found out that DeVry had a degree program for business with an emphasis on information technology and that intrigued me.*

Chavone married, had two children, and put her dreams of college on hold to provide for and raise her family, but then a movie led her to the discovery of engineering.

Chavone
It wasn't until I was in my mid-twenties that I actually figured out what engineering was. I saw a movie called Proof, *which was a defining moment for me in my pathway to being in an engineering program because it reminded me how much I loved math. After watching* Proof, *I did an internet search on math and mathematician to learn more about the subject and available careers. (The internet was not available as a resource for me in the '90s when I was in high school). Interestingly, everything came together for me. Lo and behold I came across engineering! There I was, 10 or more years after the results to my college aptitude test and I'd finally found out what an engineer was—and it had nothing to do with trains. But, in that moment, I decided I was going to go back to school—I was going to be an engineer!*

Scene 4: The Journey to Getting In
Chavone started working at a convenience store chain while she nurtured her dream of eventually going back to school. She took the job because the company had a tuition reimbursement policy. A few years into her role as assistant manager, the company announced plans to expand to another part of the country. Newly separated from her husband, Chavone agreed to move.

Chavone
When the company flew me to [name of city] for my "house-hunting" trips, I had done my research beforehand. I had two chil-dren—one of whom decided to stay in Kansas City with their father—so I knew that I needed a home in a good school district. I knew Clemson University was nearby, so I started scouting the area for a place to live. I took that chance in 2012—moving across the country away from everyone I knew—thinking that I would be okay because my company paid for everything and I was working for a stable company with competitive wages. Then I got hurt on the job. I went through the worker's comp system, but I found out that my injury was permanent and my company did not have any "light duty" jobs to accommodate me. I wanted to continue working because I wanted to go back to school under the company's tuition reimbursement. My

supervisor said to me, "Well, you just need to find a new line of work," and I remember thinking, "But I just moved across the country for this job!"

Now I really needed to get a degree. I hadn't been in a collegiate setting in over a decade and I was planning on attending a major university for engineering. I researched the engineering programs at Clemson University and Chemical Engineering stood out. I loved chemistry, so that was my plan. I would attend the local community college (Tri-County Technical College, TCT) for two years, get my associates degree, and apply to the university.

When I enrolled in TCT, I hadn't spoken to anyone at Clemson University, not even in the engineering department, because I knew that I would have a lot of work to do in order to get accepted into Clemson University's engineering program. Then during my second semester at TCT, I found out that the university had advisers that come over to the community campus once a week, so I finally got up the courage to seek one out and find out what I needed to do in order to have a good chance of being accepted. Up to that point, I was just going off of what the website said the engineering curriculum was. When I met with the adviser, she looked over my schedule, then at my placement scores and told me that I wasn't a good candidate for the engineering program because of how low I was currently in math. That didn't surprise me because I knew that where I was math-wise was pretty low. However, I still had another year left at TCT, and I had a plan to catch up. I told her that, and that I was older, 33 or 34 at the time, so I knew whenever I enrolled in college that I was going to have to start at the bottom with math, but I was going to work my way up in order to get to the level I needed to get to for math.

That was the first time—but not the last—a Clemson University staff member told me engineering was out of my reach. She wasn't mean, but she wasn't nice either, just very curt. Later, I decided to reach out directly to the adviser who was in charge of Chemical Engineering transfer students. During our meeting, she also noticed my level with math, but she listened to my plan. She understood that I didn't have any plans to transfer to the university for at least a year. Knowing this, and my current academic situation, she advised me the way they advised students in the university's Bridge Program [a program for students transferring in from TCT]. It was the first time I'd been told what classes, humanities and social sciences included, I should be taking for the university's general engineering program. Though I'd already taken philosophy and sociology since I was curious about both, neither were classes that were typically advised. Therefore, my second year at LCC I took the same classes advised for Bridge students, including my electives. She also gave me the worksheet that was given to Bridge students that gave me an outline and/or a plan to transfer to the university and be in the best place I could be academically.

The beginning of my last semester at TCT, I applied to the university and got in. I GOT INTO A MAJOR UNIVERSITY! That was how I felt. The poor girl from the ghetto, whose mom smoked crack and didn't graduate from high school, who had to fight to get to college, was accepted into a university's engineering program.

Scene 5: The University Wasn't Made for Me

Chavone was diagnosed with Attention-Deficit/Hyperactivity Disorder (ADHD) as an adult. When she attended LCC, she brought in her doctor's note and was able to receive the extra time on tests that she needed. When she got to the university, however, the system was another story. She went to the student accessibility office to inquire about getting accommodations.

Chavone

The first time I went in, they gave me a purple sheet of paper from a rack of pamphlets in the office. I got the purple sheet and walked out. I didn't look at it. I just walked out and thought, okay, cool. At least they have a sheet that tells you what to do, which is convenient. Later that night, at home, I read over that sheet and I'm like, whoa—I can't do this! They required you to get a doctor's note from a psychiatrist certified in ADHD and your diagnosis had to be shown to be back from high school and prior. I was in my mid-30s. And I had not been diagnosed until a few years prior. I was on Medicaid and it wouldn't pay for this sort of appointment because I was older. Medicaid says that evaluations for ADHD for adults are not needed. But isn't it needed if you work or go to school? So, I'm thinking, "this just can't be right." I eventually went back to the accessibility office on campus to see if they had another route I could take. I asked, "What do I do? I can't do what's on this piece of paper." I told them that Medicaid wouldn't pay for what they required. The lady I spoke to said that the only other thing they advised students to do was to go to a particular doctor, and he would charge, I think it was $350, or maybe $250, for the diagnosis. It was money that I did not have, whatever it was. I left the office and I did not know what to do. I couldn't get my accommodations. I did not have this extra money. My doctor had diagnosed me, but she was not a board-certified ADHD specialist.

I just didn't know what to do, so I just struggled through the first few semesters really badly. I remember being in the tests for calculus and feeling really pressured on time. I normally feel pressured even when I have extra time, but this was so much worse. Especially when other students would start leaving the room as they finished the exam, I felt even more pressure and then I'd start panicking. I wasn't able to concentrate so I'd make stupid careless mistakes.

I felt defeated. I felt like the university did not care about people like me. I felt like the university wasn't made for me. It was specifically made and tailored for people fresh out of high school. The university hadn't given a single thought to people like me. It just felt like we didn't exist and we were not meant to go to school. We were not meant to go to school at our age. That's how the whole situation made me feel.

Chavone suffered through several semesters with high homework grades but disappointing test scores. She found out quite by accident that there was a counselor at the student health center who could attest to her diagnosis for free. Eventually, she was able get the accommodations she needed, and her grades started going up. But she had other struggles unrelated to her coursework going on during the same time.

Just as I was finishing my coursework at TCT, my savings ran out completely. Less than a month before fall classes started at Clemson University, I found myself in a precarious situation. My daughter and I ended up having to move into a friend's basement apartment. I was dead broke, and I couldn't come up with a viable solution to get out of the situation that didn't take at least a year. I almost decided not to attend because of my money situation. But I felt like I couldn't stop my schooling now because I'm 36 years old and it's my dream to get a bachelor's degree. Moreover, I knew that if I were to take a break because of my personal struggles, I may not ever be able to come back. My struggles aren't going to go away just because I "drop-out" or take some time off from school. The problems I have, I've always had. They're not new.

We lived in the basement until the summer after my first year, but when the friend's living situation changed, I was under pressure to move out—like yesterday. I found a place that was fairly cheap. I had a way to pay the next month's rent. I just needed just a little bit of help to pay a few hundred dollars for the utility deposit. So, I went to go see the lady at the Dean of Students office. First of all, she told me she couldn't help me because it was summer, and I wasn't enrolled in summer classes, so she told me I wasn't technically a student. Even though I had been enrolled in the spring and was enrolled for the upcoming fall, she couldn't do anything for me. She said if it had been the fall, or if I had come a few weeks earlier when we were still in class for the spring, she might have been able to help. But since I wasn't taking summer classes, I didn't count basically. She told me that if I enrolled in a summer course then I'd be a student again and she might be able to help me out. But then I would have to make myself actually homeless (literally) because they can only help you if you're actually homeless. I couldn't be living in the friend's basement, so I would have to be actually sleeping in my car for it to count as proven emergency. I remember saying to her, "How am I going pay for a summer class? I can't even get a place to live!" She told me to go to Financial Aid. But I couldn't get a loan in the summer because I had maxed out the loans I qualified for during the academic year. There's no summer loan program. My federal loans were maxed out for the academic year, so I would have had to go a private loan company, which I absolutely did not want to do.

Then the woman in the Dean of Students office suggested that I just go back "home" to Kansas City for the summer and then come back to school in the fall. She gave me the advice you'd give an 18-year-old whose parents lived in Kansas City! I told her that wasn't an option because I didn't live in Kansas City anymore. So, she told me that maybe I should just go back to Kansas City and stay there. I remember saying, "No, I can't do that because Clemson University is here. I'm a student at Clemson University." If I went back, I would have to wait a year again to enroll in a whole new university. I was worried that if I did that, I might not even be able to enroll. I worried that I may never go back to school again. I absolutely didn't want to do that. I told her that moving back to Kansas City just wasn't an option. Besides, I explained that even if I did move to Kansas City, I wouldn't have anywhere to go. She assumed that moving to Kansas City was going to solve my problems. It's not like I'd magically have a house if I moved back. I'd still be in the same situation. I still have the same amount of money. I would just be in a different city that cost more money to live. But I'd be out of her hair. I don't know why she couldn't understand why that just wasn't an option. Then I told her that I might send my daughter back to Kansas City and stay here and live out of my car. That's what I was willing to do because I did not want to lose Clemson University. She didn't even flinch when I said that. Even though she didn't say it out loud, the message I got was: "Okay, yeah. That sounds fine with me." She also told me to go to the food bank. Food was the one thing I didn't need. I told her that I received food stamps and I had plenty of food. I needed a roof over my head for me and my daughter! She was no help, and she said she was sorry, but I don't think she really was.

That's when I knew the university did not—does not—have my back. I needed to figure it out on my own. Do not count on them for anything—for anything. I will never go to them for anything ever again. There were two people that I would go to for help: Julie (who I was working with by this time) and my academic adviser.

When Chavone told Julie what happened, Julie reached out to several adviser on campus, contacting the engineering dean and several department chairs to ask about emergency funds for Chavone. Julie was told that no such funds existed. The engineering dean forwarded Julie's message to the Minority in Engineering Program (MEP) director.

Chavone

The MEP director was really nice. She went through so much to help me out. She really, really, really tried. She had to go through her own personal means to help me because everything she tried through Clemson University didn't work, so her church ended up helping me out. That was awesome. I was so thankful for the church helping me. That gave me just enough to pay the utility deposit, which meant we would have a roof over our heads.

With the basic need of housing met, Chavone could focus more fully on her studies. But juggling family responsibilities with school still weighs heavily on her mind. She wishes that faculty would be more responsive to students like herself.

Chavone

Professors don't understand that I come with baggage. They don't stop to think that the lives of students like me are not the same as the lives 18- to 22-year-olds live. For instance, it's not even an option for those of us who have families to live on campus. We are responsible for our families, but the younger students have families they can count on for help. Most of the time, that's why we're in school. We're trying to better ourselves for our families. I'm not necessarily asking for special treatment, but just some understanding. The university seems to understand and gives special circumstances to the band and to the football team. They get to make up assignments or reschedule exams when they travel. Perhaps professors could think about those of with us having families in a comparable way because we're going to miss class sometimes or have harder days because we have families. But I don't get the option to make up an assignment when my daughter is sick. I'm breaking my neck to get the grades I earn because I'm juggling so many responsibilities. I'm not missing class because I'm out partying. I'm not doing keg stands on the weekend!

I wish I could tell professors: If you have someone who is older in your class, or who is a first-generation student, or some other type of different background, please reach out to us! Don't just assume that we know what to do when we need help, or when we need advice, or just how to navigate the whole college thing. A lot of times we're intimidated to ask for help, and we don't know what to do. Coming from my background, I feel so far out of my element. I feel so far out of my element that it gets overwhelming.

Discussion

Chavone's story—what is termed the "product" of this research—invites us to think about implications of the public K–12 education and higher education systems in the United States that are overwhelming for so many students. Chavone concludes Scene 5 with the emphatic statement of feeling overwhelmed. Likewise, the process of writing this ethnography was overwhelming at times for both of us because we attempted to share authorship and power. However, our discussions of power, voice, and authorship—via emails and text messages and in the comment bubbles of drafts—shaped the process and the product of this autoethnography. We were and we continue to be compelled to find a way to re-center Chavone's knowledge and experiences as the focus of this work.

Discussion of the Product

As Chavone's autoethnography reveals, systemic racism continues to shape the experiences of K–12 students as well as college students in the United States. In writing this autoethnography, the lens of CRT helped us to unveil the intersectionality of racism with other forms of subordination, specifically class. For example, on top of being forced to navigate the effects of her school district's efforts at desegregation, Chavone's socio-economic status also made it difficult for her to pursue her community college education, get into Clemson University, and remain enrolled. Her attempts to assert herself as a student interested in STEM were thwarted by dominant ideologies that defined who she was and what she was capable of. Johnson et al. (2011) discuss "how identities are intentionally asserted" by labeling these assertions as "bids for recognition … Bids can fail; individuals can simply be ignored. Worse, insiders [educators] in the setting may not only reject an individual's bid but can … ascribe another, unwanted identity onto the hapless bidder, based on elements that are outside her control—indicators of her particular intersection of race, class, gender, sexuality, religion, nationality, age" (p. 344). Chavone's story is a series of "failed bids" and unwanted ascribed identity(ies) (Johnson et al., 2011, p. 344).

Systemic racism functioned to create unwanted identities such as a student lacking educational potential, and to suppress and thwart identities related to STEM by denying resources, coursework, and basic career information before she even had a fighting chance to pursue a college degree. Teachers dehumanized her and her peers by saying they were "animals." She was denied admission to college preparatory schools. She was not an athlete, but the system forced her into a school that invested its resources into athletics. She fought to be placed in math classes that were appropriate for her skill level yet was forced to re-take math courses that were unnecessary. Chavone was told that she was not college material. And while her high school aptitude test told her that the careers for which she was best suited were engineer, scientist, and psychiatrist, she did not possess accurate information about these fields, and no one helped her. No one helped her in high school, and no one helped her at the for-profit college she attended. Many years later while enrolled in community college with the stated intention to transfer into engineering at the four-year university, the academic advisor for the university again stated the message she had received many times before: she was not "engineering material." Because of the structural factors impeding her entry, Chavone has barely begun developing a STEM identity. These factors include the school assignment policies in KCMSD, inadequate career guidance by pre-college educators, and less than helpful university policies regarding disability accommodations and emergency services for students in severe financial need.

Although Chavone did not have a STEM identity prior to discovering engineering, she did possess aspirational capital, resistant capital, and navigational capital in droves. These forms of capital should not be underestimated, even though they do not compensate for the lack of resources and lack of support everywhere else in Chavone's life. In other words, we are not arguing that these forms of capital can make up for everything else marginalized students are not allowed to access, but we

are saying that these forms of capital are beneficial. Aspirational capital, resistant capital, and navigational capital partially comprise Yosso's (2005) characterization of Community Cultural Wealth. In Locks' (n.d.) summary of Yosso's framework, she defines aspirational capital as the "hopes and dreams" students have. From a young age, Chavone was focused on getting out from under "the dome." Even though the school system did not support her in achieving this dream, a combination of her love of science and resistant capital propelled her to keep looking and fighting for ways to realize her goals. Resistant capital is understood as "those knowledges and skills fostered through oppositional behavior that challenges inequality" (Yosso, 2005, p. 80). Further interpreting Yosso's framework, Locks defines navigational capital as "students' skills and abilities to navigate 'social institutions,' including educational spaces" (p. 2). Locks explains that Yosso's concept of navigational capital "empowers [students] to maneuver within unsupportive or hostile environments" (n.d., p. 2). Chavone used education as a way to get out of her neighborhood and away from the limited future she possessed there, illustrating navigational capital. She understood and attempted to navigate the KCMSD school assignment system as early as fifth grade to get into a college preparatory school to meet her aspirations. When the school system changed their rules regarding number of credits to graduate, she timed dropping out of high school in order to get a GED at the same time her classmates would be graduating.

Locks suggests that not only do we need to work to help students navigate institutions, we also should ask, "How willing are we to acknowledge that our institutions, both their structures and cultures, have a history of, and may still in many ways be unsupportive and/or hostile to our students and their communities?" (n.d., p. 2). Acknowledging the ways in which the institutions are unsupportive of, or hostile to, students with diverse lived experiences is the first step—and one we must take if we are to address how our institutions of higher education contribute to systemic class and race subordination that begins much earlier in many students' educational trajectories.

Discussion of the Process

Our collaboration was overwhelming and messy at times. There were power differences at play throughout this project, and even though we worked hard to keep them in check, they still exist. In line with the tenets of CRT, these power differences compelled us to find a way to center Chavone's experiential knowledge and her writing. Doing so meant that we both had to cross disciplinary boundaries. Chavone stepped into the world of qualitative, educational research; Julie found herself questioning how she collects and interprets qualitative data, as well as exploring how alternative methods, like (collaborative) autoethnography, might offer other ways of examining and addressing inequity in engineering education.

Chavone

Our project has given me assurance—for the first time—that my lived experiences matter, and that it is the *system* that needs to be fixed, not me. As a kid I knew that the system was imbalanced. I looked at my school and the schools on the TV and just knew that something was not right. I always thought, "What did I do to cause this?" I really felt like something was wrong with me. I internalized the failure. I have not talked about these things ever—EVER. I am noticing that after working on this project, it is getting easier to talk about it with other people.

Being part of this research collaboration and being in Julie's research group has also made me think about different options for my future that I had never considered before. I have always had high aspirations for myself, and lately I have been thinking about the good I could do if I went into academia. I am thinking of it for two reasons. First, I love the research. I didn't know you could do this kind of research. But the other thing that never occurred to me until we worked on this project is how much people who are similar to you in academia affect how you look at yourself in the classroom. I'm a woman. Seeing what Julie does has had a huge effect on me. If I went into academia, I wonder how many Black students, how many women students would see me and feel like they belong? I want everyone to feel like they belong. I still go back and forth about whether I feel like I belong. I know I can do engineering. I just need to finish. But being different than everyone else in my classes is hard and being different makes me doubt whether I belong sometimes.

Julie

Listening to Chavone's story and figuring out how to amplify her voice has been an eye-opening process that has taken several years. It has upended me in ways I could not have predicted. For one thing, it made me "viscerally aware" (Sochacka et al., 2018, p. 371) of my own privilege in ways that all my prior personal and professional experiences had not. While I had worked closely with students from underrepresented racial/ethnic backgrounds at a previous institution and learned about their varied lived experiences, I was not as familiar with the lived experience of Black urban students. I was not aware of KCMSD's history. I was struck by how Chavone's lived experiences could help others understand the human cost of so-called "race neutral" policies.

Most importantly, our project has challenged me to fundamentally alter the way I do research. As a qualitative researcher, I have always taken pride in giving careful attention to ethical considerations with my participants; however, using

autoethnographic methods and CRT demanded additional ethical considerations and additional time to negotiate those considerations. I began to realize that even with my best intentions, I had still been complicit in "taking" the stories of my participants and telling them from my perspective. My (re)new(ed) commitment to engage with participants more accurately, authentically, and ethically will shift in my research timelines in the near future. When we started our collaboration, I was already working on another project that used CRT, but our project plunged me into a position that made me personally accountable to Chavone. This project took much longer than it would have if Chavone was merely a participant, rather than a coresearcher and coauthor. I wondered at times how this would affect my publication productivity that is so important for promotion and recognition in academia. Even with my "old" way of doing research, I struggled to make others (e.g., my tenure committee) understand that the methodologies I use in my work require lengthy incubation periods. This criticism about the pace of my publications has persisted because my publications were years in the making even though I have a robust federally funded research program. Furthermore, I realize that the page or word limits imposed by most journals serve to discourage or abbreviate submissions of this type. It makes me wonder how academia and funding systems function to marginalize academics who do this type of coauthoring work with participants like Chavone. I wonder how they function to further marginalize individuals who are already underrepresented and underserved in engineering education. These concerns make me even more convinced that it has to be done.

Implications

Chavone's counterstory is unique to her particular lived experiences, however, amplifying it has implications for *practice* and *policies* in engineering education. Chavone has not yet made it through to the "other side" of an engineering degree. That fact brings even more immediacy to the question of how institutions of higher education (and engineering degree programs in particular) can work to not merely accommodate students with varied lived experiences, but to revolutionize themselves to be structurally inclusive of all students. For example, one practice or policy that Chavone's story suggests is needed is university-administered emergency funds. Since university-based emergency funds did not exist at her institution, Chavone had to be connected to a church to receive the emergency financial assistance she needed when she was on the verge of being homeless. Some institutions, including The Ohio State University (where Julie is now employed), have such emergency funds. At Ohio State, the Student Advocacy Office administers the student emergency fund that provides up to $1,000 in emergency assistance for students who are "at risk of dropping out of college out due to financial emergencies" ("Student emergency fund," 2019). The university will directly pay a third-party such as a utility company or medical provider to relieve students' debt. This practice and accompanying policies for its use (including an application process, the amount available, and frequency of access) could easily be adopted at the engineering college- or department-level specifically to support engineering students.

With respect to the rest of these implications, we want to break with convention here and talk directly to you, our readers, to challenge and encourage you as engineering education practitioners and researchers to use our research to make the system of engineering education more inclusive. As a practitioner, you can take an asset-based perspective as a lens through which to view your students' life experiences. Students who are parents, who are working while going to school, or who are juggling other time-consuming outside commitments are likely to be adept at managing multiple competing priorities. As a faculty member, if you view their ability to juggle important priorities as an asset rather than a hindrance to their educational pursuits, you might institute inclusive course policies for absences due to childcare, allow students to bring their child to class if they have a childcare emergency, host virtual office hours in the evenings, or offer extra credit opportunities that are not tied to typical business hours.

We believe that engineering education research also has a role to play in helping educators and institutions gain this asset-based understanding and to use it to change practices. We invite you as engineering education practitioners to use our process and product to partner with students to restructure programs and policies for them. Current programs and policies were generally created with a particular kind of student in mind—a white, middle-class male who is 18–22 years old (Pawley, 2019). Engineering education practitioners—that is, faculty, administrators, and staff—need to recognize that students at their institutions do not possess uniform experiences prior to college, and that all students are not experiencing the curriculum, hidden curriculum, rules, and policies in the same way.

We also invite you as engineering education researchers to use our process and product to think more deeply about how each of you can more fully recognize their participants as holders and creators of knowledge. How might you deepen their consideration of ethical validation in order to move from "capturing" the voices of participants to "representing them and their experiences in as true of a form as possible" (Aluwihare-Samaranayake, 2012, p. 65) in research? How might the process and product from this study change the way you think about your own research? How might you use this autoethnographic counterstory example to shift the culture of research in engineering education?

We hope that our work will inspire you to intentionally select methods that make room for your research to enact social change. We hope that our process and product will inspire you to pay attention to the questions you ask (Harper, 2010),

acknowledge your own positionality and its influences on the epistemological assumptions you make in designing studies, and select or develop theoretical frameworks appropriate to the full range of lived experiences of our diverse participants. For example, our study models the use of using *critical race methodologies* when studying the experiences of people of color (Solórzano & Yosso, 2002). Critical race methodologies compel us to explicitly recognize how the history of the US continues to reify marginalization of people of color in education. These methodologies center the lived experience of the participant and address issues of power. They include *testimonios*, counterstorytelling, narrative, participatory action research, Quantitative Critical Race Theory methodologies (also called QuantCrit), and mixed methodologies (DeCuir-Gunby & Schutz, 2019; Huber, 2009; Solórzano & Yosso, 2002). Even when participants are not active researchers like Chavone, these methodologies necessitate a deep commitment to participants. We understand that this will be difficult and messy. You will make mistakes. We urge you to do it anyway.

Ong uses the term *methodological activism* to describe using methods in a politically purposeful way (2005). She argues that by employing methodological activism, "reform can happen not only in the latter stages of theory-building and or analysis or enactment of a policy recommendations, but also in the earlier stages of designing and implementing a long-term study" (2005, p. 6). Our study models two types of methodological activism described by Ong: long-term relationship and "care" as a mode of intervention in retaining marginalized students (2005). Similarly, Huber calls for "blurring traditional academic research boundaries" between researcher and participant (2009, p. 648) and it is our claim with this article's process and product that these research boundaries should be blurred.

Conclusions

The process and product of this autoethnography provide the engineering education community with a counterstory that challenges the majoritarian narrative of low African American student achievement and common deficit theorizing that blames the individual student, their family, or culture for educational underperformance. Chavone's reflections illustrate how a marginalized student aspired to go to college and actively resisted and navigated multiple systemic oppressions to become an engineering undergraduate at a major university. Her counterstory also provides examples of changes that are needed for the educational system to become inclusive to all students.

The process and product of this autoethnography provide engineering education researchers with an alternative way to approach qualitative studies of marginalized participants by demonstrating one way to center the voices of participants rather than unintentionally exploiting them. It serves an example of what Sochacka and colleagues so aptly call a "less-explored, messier, and much harder-to-control collaborative approach" (2018, p. 373). By collaborating with participants as coresearchers and coauthors, participants share authority in how their stories are told. Researchers recognize participants as holders and creators of knowledge and acknowledge those participants as experts in their own experience. In these ways, participants and their lived experiences become central because, in process and product, their voice matters.

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Competing Interests

The authors have no competing interests to declare.

Authors Contributions

Julie conducted the initial interviews with Chavone, conceptualized the paper, chose the theoretical framework and methodology, and organized initial drafts. Chavone and Julie met weekly for an academic year to explore Critical Race Theory and autoethnography methodology together. Chavone wrote her autoethnographic account, participant profile, and positionality statement. Julie proposed initial scenes based on the interview data and Chavone's writing. They jointly made decisions regarding the organization of the paper, including which parts of Chavone's accounts to include and which to omit. Julie wrote the rest of the paper and led the publication process (including manuscript revisions) with Chavone's input.

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