

# Positionality practices and dimensions of impact on equity research: A collaborative inquiry and call to the community

Stephen Secules<sup>1</sup>  | Cassandra McCall<sup>2</sup>  | Joel Alejandro Mejia<sup>3</sup>  |  
 Chanel Beebe<sup>4</sup> | Adam S. Masters<sup>5</sup> | Matilde L. Sánchez-Peña<sup>6</sup> |  
 Martina Svyantek<sup>5</sup> 

<sup>1</sup>Florida International University, Miami, Florida, USA

<sup>2</sup>Utah State University, Logan, Utah, USA

<sup>3</sup>University of San Diego, San Diego, California, USA

<sup>4</sup>Purdue University, West Lafayette, Indiana, USA

<sup>5</sup>Virginia Polytechnic Institute and State University, Blacksburg, Virginia, USA

<sup>6</sup>University at Buffalo, Buffalo, New York, USA

## Correspondence

Stephen Secules, School of Universal Computing, Construction, and Engineering Education, Florida International University, 10555 West Flagler Street, EC 1274, Miami, FL 33174.  
 Email: ssecules@fiu.edu

## Funding information

Partially supported by National Science Foundation, Grant/Award Number: 1826354

## Abstract

**Background:** Many engineering education researchers acknowledge that their positionality impacts their research. Practices for reporting positionality vary widely and rarely incorporate a nuanced discussion of the impact of demographic identities on research. Researchers holding marginalized or relatively hidden identities must navigate additional layers regarding transparency of their positionality.

**Purpose:** We identify ways in which positionality impacts research, with a particular emphasis on demographic identity dimensions. We note that whether identities are relatively marginalized, privileged, hidden, or apparent in a research context creates complexities for conceptualizing, practicing, and disclosing one's positionality.

**Method:** In a collaborative inquiry informed by autoethnography, we assemble positionality reflections of current engineering education researchers to demonstrate the primary ways in which positionality impacts research.

**Results:** We find that positionality impacts six fundamental aspects of research: research topic, epistemology, ontology, methodology, relation to participants, and communication. These aspects of research delve deeper than conceptions of positionality as a methodological limitation, a measure to prevent bias, or a requirement for research quality.

**Conclusion:** The impact of positionality on research is complex, particularly when researchers occupy minoritized identities and for research topics that interrogate power relations between identity groups. By demonstrating the practices of interrogating and representing positionality, we hope to encourage more researchers to represent positionality transparently, thus making researchers' transparency safer for all. We argue that positionality is an important tool for reflecting on and dislocating privilege, particularly when working on equity research.

## KEY WORDS

epistemology, equity, identity, intersectionality, positionality, research methods

## 1 | INTRODUCTION

Many engineering educators were originally engineers, trained to think instrumentally about solving problems in the physical world. In education, they often encounter a more complex and unpredictable set of social interactions. Many important aspects of the education process are known unknowns (Secules & Groen-McCall, 2019; Secules & McCall, 2019): a student's thoughts and feelings, mental health and other aspects of the private self, and a range of past experiences that impact the current moment. Other challenging aspects include power relations and patterns of inequity among demographic groups in education and overlapping dimensions such as pedagogical goals, learning trajectories, and social relationships, which can create an increasingly complex interaction of human dynamics in engineering education settings. To address these complex interactions, the engineering education community has engaged in qualitative education research and has enhanced our understandings of complex human processes through conversations on research methodology and quality (Baillie & Douglas, 2014; Kellam & Cirell, 2018; Walther et al., 2013, 2017). These efforts have helped bring clarity beyond a colloquial discussion of engineering education.

Discussions of research quality have also identified further challenges for the community, such as complexities related to researcher positionality and reflexivity, which are often understood as transparency about the author's perspective regarding the research (Pillow, 2003). While this transparency is discussed as a generally important aspect of research quality, practices for representing positionality range from abstract discussions or delineations of the research team's specific identities to full accounts of the ways in which the researchers' identities may have impacted the research process and outcomes. Beyond a piece of writing, positionality also provides an opportunity for researchers to interrogate their own motivations, worldviews, beliefs, and embodied components of the research process. Positionality in engineering education is generally underdeveloped relative to its potential complexity and importance. As Riley et al. (2014) note, many research studies on diversity in engineering education are "well-intentioned, but ... somewhat lacking in reflexivity and self-limiting in their impacts" (p. 335). At a moment when many of us are reflecting on our role in the broader society and the ways we can counteract systems of oppression, the engineering education community has an opportunity to enhance its impact through deeper reflection on the positional aspects of its research.

This paper makes a contribution to scholarship on research methodology by discussing six orienting topics in which positionality impacts the research process: (1) research topic, (2) epistemology, (3) ontology, (4) methodology, (5) researcher-as-instrument, and (6) communication. The six topics emerged from an autoethnographic and collaborative inquiry (Secules & Groen-McCall, 2019) to provide a starting point for reflection and discussion among researchers beginning to address positionality in their work. This paper focuses on positionality through identity categories of privilege and marginalization, including how relatively hidden but important identities can impact a researcher's perspective. We present examples where positionality has become important, difficult, contested, or clarifying in our own work. Moving beyond simple statements of transparency, we make a case for positionality as a complex and contextual aspect of research and provide examples and tools for probing and representing its complexity.

## 2 | POSITIONALITY AND ENGINEERING EDUCATION

Positionality captures the dynamic ways an individual is defined by socially significant identity dimensions (Maher & Tetreault, 1994; St. Louis & Barton, 2002) and was initially introduced by Merton (1972) via a dichotomy of Outsider and Insider Doctrines of research. The Outsider Doctrine valued detached observations from neutral researchers not belonging to the group under study, whereas the Insider Doctrine valued researchers studying a group to which they belong and the ability to authentically engage members of that group (Corbin Dwyer & Buckle, 2009; Kerstetter, 2012; Merriam et al., 2001). Proponents of outsider research challenged the ability of insiders to clearly and critically conduct research on a group with shared experience (Greene, 2014; Kerstetter, 2012), while advocates for insider research argued that outsiders will never fully understand an experience they have not shared (Kerstetter, 2012). Recent scholars have challenged Merton's dichotomy altogether by acknowledging the fluidity of positionality throughout the research process (e.g., Greene, 2014; Merriam et al., 2001; Naples, 1996) and issues in delineating outsider/insider status when considering factors such as culture, power, and other societal structures and institutions (e.g., Chavez, 2008; Corbin Dwyer & Buckle, 2009; hooks, 1984; Sarrant-Green, 2002). This nuanced sense of positionality has since been applied to reveal and unpack inherent power dynamics in research processes (Bourke, 2014; hooks, 1984; Maher & Tetreault, 1994; Malterud, 2001; Pillow, 2003; St. Louis & Barton, 2002).

Positionality has been operationalized as reflexivity, an activity in which a researcher identifies, examines, and owns their backgrounds, perspectives, experiences, and biases in an effort to strengthen research quality (Berger, 2015; Charmaz, 2014; Creswell & Creswell, 2018; Patton, 2002; Sochacka et al., 2009). Reflexive practices such as “bracketing” help researchers acknowledge, track, and mitigate preconceived notions or assumptions that may “taint the research process” (Tufford & Newman, 2010, p. 1). Bracketing asks the researcher to identify biases to limit their influence on the study and findings. Another practice is “diffraction,” in which researchers proactively engage with the research context and their own differences from participants (Bozalek & Zembylas, 2017). This approach encourages researchers to interrogate aspects of their influence that are unpredictable or unknown, leading to more socially just and ethical research practices. Bracketing and diffraction are similar but perpendicular approaches to reflexivity: Bracketing identifies similarities between the researchers and participants to epistemologically distance the researchers from their assumptions; diffraction identifies material realities and differences between the researchers and participants to ontologically anticipate and rectify issues such as “othering” (Bozalek & Zembylas, 2017).

While practices of identifying positionality are becoming common in qualitative social science research and in some quantitative research traditions (Malterud, 2001), the processes for conducting these activities are often poorly understood (Tufford & Newman, 2010), ill-defined, and debated (Gough, 2003; Sochacka et al., 2009) and are left to the discretion of the researcher (Creswell & Creswell, 2018). Creswell and Creswell (2018) suggest that researchers include statements describing how past experiences with the research problem, participants, or setting may shape interpretations throughout the research process. Charmaz (2014) describes a stance in which the researcher “bring[s] [themselves] into the process” and informs “how the researcher conducts [their] research, relates to the research participants, and represents [participants] in written reports” (p. 344). To help scaffold this reflection, Sochacka et al. (2009) proposed a three-tiered model of reflexivity: (1) ontological and epistemological assumptions, (2) values, and (3) experiences. The aim is not “to reduce the ‘subjectivity’ of interpretive research” or “to give the impression that interpretivist research is ‘objective’” (Sochacka et al., 2009, p. 4) but to acknowledge and harness subjective understandings to increase quality (Banks, 1998; Sochacka et al., 2009). Yet, Creswell and Creswell warn that “researchers need to limit their discussion about personal experiences so that they do not override the importance of the content or methods in a study” (2018, p. 256).

Engineering education publications have begun to demonstrate and advocate for statements of positionality and intentional reflexivity (Mejia, Revelo, et al., 2018; Secules & Groen-McCall, 2019; Sochacka et al., 2009, 2018). To gain a greater understanding of this movement and the ways positionality is being communicated in engineering education research, we conducted a focused literature search in June 2019 using two representative online publication locations: (1) the American Society for Engineering Education (ASEE) Conference Papers on Engineering Education Repository (PEER) and (2) the *Journal of Engineering Education*. These two publications were chosen to establish a representative understanding of the use of positionality in the U.S. engineering education research community.

Within these publications, we searched empirical studies presented in conference papers and journal articles between 2000 and 2019 for instances of the following terms, with variations: “positionality,” “reflexivity,” “audit trail,” “bracketing,” “memo writing,” and “diffraction.” We excluded results related to wave diffraction and those in which positionality and reflexivity was the primary paper topic (e.g., Aleong et al., 2017; Anderson & Martin, 2017; Hampton & Reeping, 2019; Hira et al., 2018; Secules & Groen-McCall, 2019; Sochacka et al., 2018). Fifty-nine articles were identified that contained positionality statements which were clustered by the second author (McCall), with help from the first author (Secules), into three emergent categories: (1) Acknowledging Practice, (2) Establishing Transparency of Self Attributes, and (3) Contextualizing Methodology. Descriptions of each category, including example statements, are shown in Table 1. Counts of each positionality category are presented in Figure 1.

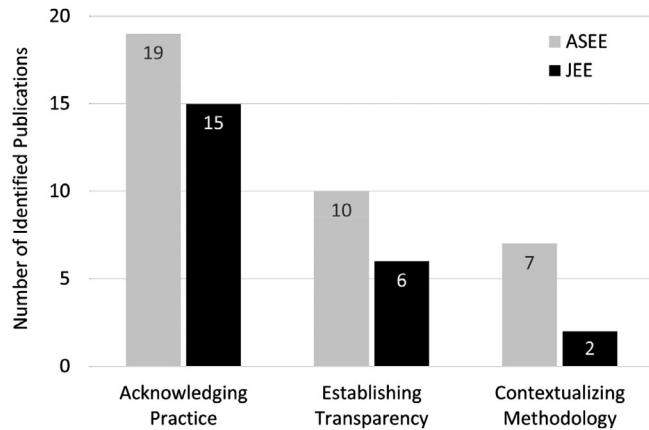
The positionality statements captured through this search varied in depth (i.e., the amount of information provided about the researcher) and complexity (i.e., the level of disclosed integration between the researcher and the research process). The most common statements were those categorized as Acknowledging Practice (57%), in which researchers positioned themselves as researcher-as-instrument and as abstractly influential to the study. These statements often appeared as a mention of the researcher’s participation in some form of reflexive practice (e.g., keeping an audit trail, memo writing, etc.) to establish research quality. In statements categorized as Establishing Transparency of Self Attributes (28%), researchers disclosed specific personal attributes (e.g., demographic information, professional roles, prior experience, etc.). These disclosures were used to enhance research quality by mitigating bias and establishing trustworthiness, yet they give us deeper insights into who these researchers are. The least common form of positionality statements was Contextualizing Methodology (15%), in which researchers framed positionality as necessary for understanding research context and complexity. Statements in this category went beyond mitigating bias and were used to contextualize the researcher, the topic under study, and the methodology selected by providing insight into ways these are interrelated.

**TABLE 1** Positionality categories utilized in engineering education research

<b>Category 1: Acknowledging practice</b>		
<b>Researcher role</b>	<b>Definition</b>	<b>Example studies</b>
The self is abstractly relevant to the research study.	The researcher acknowledges researcher-as-instrument or that they have participated in practices related to positionality and reflexivity often to establish trustworthiness and research quality (includes mention of unpublished audit trails and memos).	<ul style="list-style-type: none"> <li>• Brown et al. (2018)</li> <li>• Burt et al. (2016)</li> <li>• Dutta (2015)</li> <li>• Huff et al. (2016)</li> <li>• Kajfez and Matusovich (2017)</li> <li>• Lee et al. (2013)</li> <li>• Mosjowski et al. (2017)</li> <li>• Wendell et al. (2017)</li> </ul>
<i>Example statement:</i> “We committed to suspending, or bracketing, any connection of participant responses to our prior theoretical or personal knowledge.” (Huff et al., 2016, p. 51)		
<b>Category 2: Establishing transparency of self attributes</b>		
<b>Researcher role</b>	<b>Definition</b>	<b>Example studies</b>
Specific aspects of self are important but potentially biased.	The researcher includes information about oneself (e.g., demographics, professional roles, prior experiences, etc.) as a way to establish trustworthiness, limit bias, and address research quality.	<ul style="list-style-type: none"> <li>• Berdanier et al. (2018)</li> <li>• Blair et al. (2017)</li> <li>• Cruz and Kellam (2018)</li> <li>• Donohue et al. (2010)</li> <li>• Kirn and Benson (2018)</li> <li>• Tsugawa-Nieves et al. (2017)</li> <li>• Wilson-Lopez et al. (2018)</li> <li>• Groen et al. (2018)</li> </ul>
<i>Example statement:</i> “The authors of this work are underrepresented women within and outside of engineering who have experienced a wide range of mentoring styles in their time in higher education. As they have met and interacted with each other, they have acknowledged the importance of dual, equitable, and trustworthy research mentoring relationships. All three authors ... aim to elevate the voices of women mentors and mentees across science and engineering disciplines, both of which are traditionally male-dominated and technically- and scientifically- demanding.” (Gelles et al., 2018)		
<b>Category 3: Contextualizing methodology</b>		
<b>Researcher role</b>	<b>Definition</b>	<b>Example studies</b>
The self is specifically important and necessary for understanding research context and complexity.	The researcher includes information about oneself (e.g., demographics, prior experience, etc.) to provide a nuanced context for a research topic and the chosen methods.	<ul style="list-style-type: none"> <li>• Bruning (2002)</li> <li>• Martin et al. (2015)</li> <li>• Martin et al. (2016)</li> <li>• Mejia, Chen, et al. (2018)</li> <li>• Mejia and de Paula (2019)</li> <li>• Secules et al. (2018)</li> <li>• Svyantek (2016)</li> </ul>
<i>Example statement:</i> “The first author’s ‘sensibilities’ emerge from his own experiences as a first-generation Latinx engineer in the United States. Living between two worlds and in conflict with two separate cultures best describes this sensibility. Author 1 grew up in Mexico but completed his high school and postsecondary education in the United States. Similar to the adolescents in this study, his native language is Spanish and he learned English while enrolled in the English as a Second Language (ESL) program in high school. His experiences as an engineer are informed not only by the knowledge gained through postsecondary education, but also through his everyday life experiences growing up in a rural, low-income community in Mexico. As a member of that community, he has been interested in issues of social justice and equity for Latinx in STEM. Living in the borderlands of engineering motivated Author 1 to investigate the ways in which Latinx adolescents are ‘holders and creators of knowledge’. The goal was to create bridges between the adolescents’ everyday lives and formal instruction in the engineering classroom.” (Mejia et al., 2017)		

With this review, we establish a shared understanding of the variations in the use of positionality and the sociocultural factors that shape research practice. The two most common forms of positionality statements, Acknowledging Practice and Establishing Transparency of Self Attributes, originate from the paradigmatic roots of high-consensus disciplines such as science and mathematics (Biglan, 1973), where the researcher is acknowledged but nonintegral; bias must be identified, accounted for, and bracketed or suppressed. In contrast, Contextualizing

**FIGURE 1** Summary of identified positionality statements according to type



Methodology statements challenge this paradigm by positioning the researcher as an integral component of the research process, highlighting the importance of positionality within our work (Berger, 2015). In this tradition rooted in the social sciences, to understand our research is to understand one another, including the experiences and identities that shape why and how we approach our work.

### 3 | IDENTITY AS COMPLEX AND CONTEXTUAL

Identity has been a prominent theme of national discourse and is often discussed simply as “identity politics,” implying that minoritized populations in society are organizing on the basis of single identities (Riley et al., 2014). In contrast, the theory of intersectionality demonstrates how multiple dimensions of oppression intersect to create unique societal positions that cannot be characterized by the addition of each dimension (Crenshaw, 1989; in higher education, Robbins & Quaye, 2014a; Bruning et al., 2015). Although intersections of privilege and dominance are not as commonly thought about as orienting our actions, our choices are always informed by our discourse-mediated identity and our interactions with others (Foucault, 1972). In this paper, we discuss identity in light of the overlapping intersections of oppressed and privileged identities (Robbins & Quaye, 2014b) without reducing intersectionality to an individual’s multiple identities. We see the overlapping and contextualized experiences of privilege and marginality as importantly informing all research, practice, and reform efforts in engineering education.

The national discourse on identity also fails to consider its multifaceted nature: Identity is not only an individual’s personal choice for how to identify or something ingrained in their personhood. Identity is a combination of who one elects to be known as and what society views as that individual’s group memberships (Tajfel, 1974; Tajfel & Turner, 1979). Identity involves both the agency to decide and the structure to impose, and the two elements do not always align. In considering these dimensions, scholars often discuss identities as hidden or apparent. For example, within engineering education, LGBTQ individuals, first-generation students, disabled students, and veterans are all thought to have hidden identities, while gender, racial, or ethnic identities are considered to be apparent. Engineering education has long focused on underrepresented populations with apparent marginalized identities but is recently paying more attention to marginal identities that are considered hidden (e.g., Cech & Waidzunas, 2011; Haverkamp, 2018; Main et al., 2019; Martin et al., 2014; McCall et al., 2020; Mobley et al., 2019; Pearson-Weatherton et al., 2017; Smith & Lucena, 2016; Svyantek, 2016).

While the hidden-apparent dichotomy helps explain which aspects of identity are considered readable by appearance and which are not, it is also overly simplistic. A lesbian or gay identity may be hidden until the individual speaks about their partner. Some disabilities (e.g., limb differences) may be apparent, while others are not (e.g., Crohn’s disease). Although gender and race are considered to be apparent, people frequently make incorrect assumptions about these identities; some people “pass” as White or as a single race when they actually identify as mixed race. A woman or nonbinary person with a traditionally regarded masculine name may be assumed to be a man. Thus, aspects of identity typically considered to be apparent may actually be hidden, and aspects of identity typically considered to be hidden may be apparent in certain contexts. Identity is always a complex assemblage of what is apparent and assumed and what is private yet impactful. In this paper, we put forward a complex and contextual discussion of identity to model deeper ways of conceptualizing researcher positionality.

## 4 | RESEARCH PROCESS

### 4.1 | Origination of the study

This study emerged from informal discussions between the first and second authors (Secules and McCall), comparing their experiences as researchers with relatively hidden marginalized identities. For both, positionality was experienced as a series of dilemmas and complexities throughout the research process that transcended the simplistic descriptions often used in researcher training. In formulating a conference paper on the topic (Secules & Groen-McCall, 2019), they drew on traditions within their respective disciplinary trainings: ethnography for Secules and grounded theory for McCall. These methodological traditions both leverage positionality and researcher-as-instrument to understand the impact of one's self on the research (Creswell & Creswell, 2018), of "making the familiar strange" or identifying the aspects of everyday life that are noteworthy for scholarly attention (Secules, 2019), and of naming and organizing those findings into an organization of knowledge or guiding theory. This initial process could hence be thought of as an autoethnographic grounded theory exploration of Secules' and McCall's personal experiences of researcher positionality. Their initial reflections revealed six orienting topics that guided their discussions of positionality impact: research topics, epistemology, ontology, methods, research participants, and communication.

### 4.2 | Research purpose

In this study, we ask the following research question: How do researchers' positionality impact their work? The goals of this study were to:

- Collaborate with a group of researchers who have also encountered and examined positionality in their work
- Validate the salience of the orienting topics of reflection
- Expand our understandings of the orienting topics
- Highlight dimensions of positionality associated with researchers from minoritized identity groups and/or working with minoritized participant populations
- Assemble our collective reflections to identify meaningful experiences and ongoing challenges associated with positionality and representing the self
- Distill those reflections into a series of questions that may help guide deeper engagement with positionality for researchers.

### 4.3 | Reflective empirical methods

We used reflection-based autoethnography and collaborative inquiry to assemble and make meaning of ourselves as researchers and research participants. In autoethnography, a researcher reflects on their own perspective and experience to find patterns and principles related to the social systems and culture in question (Adams et al., 2014; Anderson, 2006). In collaborative inquiry, researchers reflect together on a specific topic to generate knowledge and insight (Walther et al., 2017). We also align with the view of researcher-as-instrument to question the influences of our own identities and positionality on our work.

### 4.4 | Recruitment

Secules and McCall recruited participant researchers through professional contacts; during an initial paper presentation session at the 2019 Collaborative Network for Engineering and Computing Diversity (CoNECD) Conference (Secules & Groen-McCall, 2019); and during the literature review process, identifying authors who included highly contextualized and nuanced positionality statements in their work. To ensure a level of qualitative saturation of the theoretical space of positionality across identity groups, we prioritized the recruitment of participants who (1) provided a diverse representation of minoritized researcher identities and (2) offered a range of perspectives and expertise on the topic of positionality in research. Moreover, Secules and McCall intentionally recruited a range of researcher experience,

**TABLE 2** Dimensions of positionality and reflection prompts

Dimension of positionality	Reflection prompts
Research questions	How does your positionality impact what research you choose to do?
Epistemology	How does your positionality impact how you know what you know?
Ontology	How does your positionality impact what you can observe as researchers?
Methodology	How does your positionality impact how you make methodological choices?
Researcher-as-instrument	How does your positionality impact how you relate to research participants?
Communication	How does your positionality impact how you represent yourself in writing and other communication?

<sup>a</sup>Source: Adapted from Secules and Groen-McCall (2019)

including graduate students, postdoctoral researchers, and faculty. Several of the coauthors come from qualitative, critical, and ethnographic scholarly backgrounds and likely drew on prior understandings of positionality in their reflections, while others were relatively new to reflective empirical methods and learned a great deal about their own positionality as a result of participating in this work.

#### 4.5 | Reflection tool and process

All participants were asked to reflect on and give a paragraph-length response to the six aspects of research that we identify as “dimensions of positionality” shown in Table 2. In each prompt, positionality was conceived of as intersectional experiences of privilege and marginalization with respect to systems of social oppression. Each respondent utilized the positionality prompts to query themselves about the complex power and privilege dynamics within their work.

While some of the question prompts were clarified or revised to elicit more productive responses, Secules and McCall intentionally left the prompts open-ended and encouraged respondents to skip a topic if it did not resonate with them, which served as a check for the validity and salience of topics across participants. Final responses were edited for conciseness and cohesion and are presented in the sections below.

#### 4.6 | Limitations

This autoethnographic and collaborative empirical approach is limited by our own reflective capacities and our willingness to be honest with ourselves and others. We may not know the true impacts of our positionality, or we may only identify the most obvious and available aspects. To ensure that responses were authentic, we did not insist that each respondent engage with each aspect of positionality or with each aspect of their identity. As salience correlates with significant experience, and personal significance can be tied to marginalization, we may have underdeveloped our examination of privileged identities in our collective responses. For example, respondents who are not disabled did not reflect on their positionality as not disabled in their responses. Perhaps it would be an interesting future study to ask each respondent to consider each intersection of privilege or marginality they experience regarding each element of positionality.

In addition, we note that our operationalization of positionality as identity categories and experiences is just one possibility among many. By emphasizing categories that are relatively stable aspects of identity, we are underemphasizing the fluid and interactional components of positionality that add additional complexity to its analysis.

### 5 | REFLECTIVE RESPONSES AND DISCUSSION

In the following sections, we present the responses to the guiding prompts on positionality. We note that the topics are not comprehensive of all positionality aspects in research, nor are they mutually exclusive. We hope they serve as starting points for researchers beginning to contextualize their positionality for themselves and others.

## 5.1 | Dimension 1: Selecting research topics and questions

When framing research topics, academic researchers tend to cite gaps in the literature to ground their selection as more than the individual whim or interest of the researcher. Yet, the choices we make to pursue specific research topics and the questions we ask are inherently related to our own experiences and positionalities. By acknowledging the role of positionality within these decisions, we gain perspective for ourselves and represent the motivations for our work more transparently.

We asked the orienting question: “How does your positionality impact what research you choose to do?” In their responses, Beebe, McCall, and Sanchez-Peña describe their drive to pursue research strongly related to their own identities.

**Beebe:** My research goals come from a place of concern that has been generated from my social background. As a Black woman from inner city Detroit who was good at math and science as a child, I grew up attending engineering summer and weekend programs that attempted to address social disparities in ways that were not always informed by the truth of my experience and what I knew to be true of my culture. As I grew as an engineering student, I watched and learned how the engineering industry and the educational system disenfranchised my peers, elders, and ancestors based on characteristics often outside of their control. This grew within me a need to design and implement spaces where engineering and design thinking could be used to address issues of social inequity in ways that not only included, but prioritized voices of those who are underrepresented and marginalized. Thus, my journey into higher education was driven by a desire to more deeply ground my own expertise in a wide variety of methodologies and historical context[s] so that knowledge could be directly translated to the programming I co-develop within communities I care about. Essentially, my identity is the reason I do my research and my communities are my ultimate measuring stick of my own success and impact.

**McCall:** My current research interest was inspired by my first year of my doctoral program when I was diagnosed with a degenerative, non-apparent, physical disability. From this experience, I further scoped my research to focus on the professional identity formation of undergraduate civil engineering students with disabilities. As someone transitioning with my own disability, I wanted to know more about how disabled students navigate the physical, academic, and bureaucratic structures of our university systems. As a disabled academic, I felt an obligation to the disability community to bring these students' voices to the forefront of my research, particularly to resist ableist norms and promote inclusion and equity in the engineering field and in engineering education.

**Sanchez-Peña:** Having experienced multiple episodes of depression during my adult life and having suffered their consequences and challenges while advancing my professional preparation have resulted in my interest to engage in inquiries related to mental health in academia. This is an understudied space that has not been granted its deserved relevance even though the numbers of college-aged students suffering from mental health issues is growing. My own experiences fuel my interest to understand how different elements of the engineering education system have been supporting or hindering the path of students with mental health issues. This has significant implications for me both as a researcher and as an engineering educator who is interested in seeing my students achieving their dreams despite the challenges of living with mental health issues or other invisible disabilities.

These responses show how the motivation, passion, and insight for the research stems from each researcher's experience and background.

Similarly, Svyantek's reflection focuses on her motivation as a disabled researcher studying disability while emphasizing her concern with mitigating her own bias in her research:

**Svyantek:** I am persistently aware of the privilege of performing research with and for the Disability community, as well as its potential impacts on both my project sites and my own professional trajectory. I am additionally aware of my own potential biases as a researcher and as a person who has been a student on two of the campuses where I will collect documents. I also recognize that researcher bias is not

bad, but it does need to be explicitly mentioned and taken into consideration throughout the course of a project. This is why it is critical that I constantly address my own relationship to the research topic, the research sites, and the motto of Disability rights: “Nothing about us, without us.” In other words, I am doing my current research *precisely because* I am Disabled. I am researching many of the same things that I have encountered in my own lived experience, because I know that my personal experience is valid.

Svyantek's reflection emphasizes the tension between an insider status in a community that drives and orients her while striving to mitigate bias to maintain research quality (often associated with Establishing Transparency of Self Attributes positionality statements). Secules experiences a similar tension between distance and proximity to his research topics. He not only notes how identity ties to his pursuit of education research generally but also how it intersects with his research topic choices in complex ways.

**Secules:** My exit from engineering industry and entry into education research was directly tied to coming out as gay or queer, and a sense that I needed to tackle unacknowledged injustices within STEM. This orientation towards social justice in education is tied to, but not solely because of, my queer identity. I have aimed myself towards asking questions that further our understanding of equity and culture in engineering, primarily focusing on intersectional race, gender, and other forms of inequity such as socially constructed meritocratic ability hierarchies. As a person who experiences relative gender, racial, and other forms of privilege, but who has been increasingly aware of the function of masculine and heteronormative norms since coming out, I have felt it necessary for personal and professional reasons to begin with unpacking educational culture in areas I experience privilege (Whiteness, masculinity, ability). It has felt urgent for me to center not only the problems that I experience, but also to work on uncovering the ways that I have been complicit or not resistant enough to marginalization that does not directly impact me. At the same time, I feel a sense of solidarity and importance to researchers tackling LGBTQ issues in engineering education, though I have not yet taken up LGBTQ issues as a central focus of my research. I think this choice partially stems from a fear of being perceived as only concerned with self-interested topics, a doubt that I have unique insight or experience that others do not, and a sense that I may not yet have the appropriate emotional distance to tackle LGBTQ marginalization issues which are still sensitive to me. Currently, I find I work on issues that matter deeply to me, that relate to experiences and problems I have had, but that are not always extremely personal to my actual lived experiences.

In the responses to this prompt, all of the participants said that their identity is strongly tied to their selection of research topics, although those ties are not predictable or linear. Several researchers (Beebe, Sanchez-Peña, McCall, and Svyantek) specifically research the communities in which they are a member, while Secules has not engaged in research related to his primary marginal identity (LGBTQ).

A common theme across reflections is the interplay between distance and proximity; we select projects where we feel close enough to feel invested in the research yet distant enough to mitigate bias or protect our emotional well-being. We find that our positionality have clearly shaped the topics we engage with as researchers in fundamental ways that preempt and supersede the rest of the research process.

## 5.2 | Dimension 2: Epistemology

The way we understand and generate knowledge is greatly influenced by our life experiences. Marginalized communities consistently describe experiencing *double consciousness* (Baldwin, 1955; Pease, 2000), the realization that more than one truth is possible at any given time depending on one's social position. Privileged experiences underpin claims of objectivity by establishing consensus via majority perspectives which render those that differ as subjective, false, and unreliable (Riley, 2017). Yet, this presumed “objectivity” is itself informed by experiential and positional aspects and by researchers' prior knowledge, backgrounds, and training. Regardless of the research one conducts, reflecting on the positional underpinnings of epistemology enables a greater understanding of the knowledge claims in one's own and others' research.

We asked participants: “How does your positionality impact how you know what you know?” In her response, Svyantek describes her research epistemology as acquiring and interpreting information from existing resources and professional networks:

**Svyantek:** In my current research, I know what I know because I am looking at the actual published words of specific institutions, their policies ... and I recognize people in my network to be those who help support me in this work, giving research advice and feedback and sharing resources.

For Beebe and McCall, epistemology hinges on making meaning of their own experiences while simultaneously interacting with and gaining feedback from the world around them:

**Beebe:** My identity has given me experiences in which I have observed that meaning is co-created within a context. This co-creation within a context creates ‘place’ and community.

I know what I know based on experiences of shared meaning and place making. My shared spaces and communities help create knowledge and capital that I then negotiate other spaces within and beyond my community. These interactions provide me with feedback and reflections that iteratively inform and grow my conceptions of what I know. In this sense, what I know is never static, but grows and evolves based on social affordances and interactions.

**McCall:** As someone who grew up in a White, small town in rural America, I genuinely believed in the meritocracies of our systems. However, as I grew older and moved away from home, I began to engage with diverse groups of people who have been subjected to the inequalities and inequities of these systems. ... As such, I position mine and others' experiences as simultaneously true, particularly in the event that they contradict. These contradictions help me gain a greater and deeper appreciation for the world and others.

Secules and Mejia also discuss the pluralistic nature of epistemology but further expand their descriptions by emphasizing the larger sociocultural systems that differ across majority and minority perspectives and inherently influence conceptions of reality and knowledge generation:

**Secules:** I tend to think marginalized identities have a double consciousness about a cultural space and understand both their own ways of acting (surviving) and those of the majority. ... Through coming out I accessed more understanding of cultural settings and therefore trust experiences at the margins. I still work to remain in dialogue with majority and privileged identities, but often in a way which assumes they may be missing some aspects of a cultural dynamic. I think this is opposite from the assumed epistemology of much of research, that marginalizes the perspectives of the small populations and individual perceptions.

**Mejia:** I believe we are all a product of colonial educational systems. We learn what others want us to learn and keep reproducing what has been taught. We have been taught what is “true” and there are no alternative ways of knowing. ... Recently, I have relied more on my own gut feeling and have tried to detach from traditional (or canonical) ways of knowing in engineering education, and opted for a personal epistemology that is rooted in my own cultural and social background. Working with Latinx and indigenous communities made me realize that they are the expert witnesses of their own knowledge. If I want to tell their stories, I need to break away from traditional ways of knowing and embrace their knowledge systems. ... Stories cannot continue to be told from the White perspective.

Overall, these excerpts illustrate complex interactions of individual experience, the experiences of others, and existing social systems that influence the ways researchers engage in and construct knowledge. Our reflections also varied in their alignment with Freire's concept of *critical consciousness*, which refers to recognizing and actively challenging the ways social systems foster people's situations of disadvantage (Campbell & MacPhail, 2002; Freire, 1968, 1993). Our reflections highlight key variations in critical consciousness, ranging from accumulating knowledge through interactions with others (i.e., Svyantek) to acknowledging and gaining feedback from others (i.e., Beebe and McCall) to critically examining the power relations that shape others' experiences of sociocultural systems (i.e., Secules and Mejia).

We can apply critical consciousness to reveal divergences in epistemology that stem from a shared challenge in engaging with positionality and personal experiences with power relations.

### 5.3 | Dimension 3: Ontology

As researchers, we continuously negotiate ontological dimensions of our research that influence the representation of the reality we observe. There are many possible frames of perceived reality within the complex social systems that we explore which are power- and privilege-laden. For example, identity groups can be framed monolithically or as comprised of diverse individuals. Like epistemology, here, our experiences shape the nature of the reality that can be explored, known, and observed. Discussions of research ontology underscore the inherent power dimensions of a researcher gaining access to studying and interpreting a particular reality.

Here, we share responses to the orienting question: “How does your positionality impact what you can observe as researchers?” Across researchers, reflections focused on the personal and cultural lenses and tensions that shape the experience and interpretation of reality. For example, Svyantek notes some practical limitations on what one can observe through a document investigation: “It’s really difficult to observe ‘hidden’ things, or ‘lost’ things – things that people either don’t want to share or can’t, for whatever reason.” Svyantek also implies that her positionality as researcher impacts what people will choose to remember and share with her. Secules’ reflection also highlights limitations based on access as well as multiple other ways his ontology is shaped by his positionality:

**Secules:** I think I can productively problematize some aspects of cultural settings through positionality as gay/queer/LGBTQ. I actively try to problematize further aspects of self and setting, thinking of intersectionality as a way of dislocating privileged and normative identities that I and others can take for granted. Access and solidarity also impact what I can see as a researcher. So if I have revealed an identity and can gain the trust of experiences of other marginalized groups, I may literally hear/see different aspects of reality than if I have come across as only privileged and not particularly invested, experiencing, or in solidarity with marginalization. Methodologically, this has led me to make more statements of solidarity than are necessarily recommended in classical interviewing advice. On the other hand, I think privilege also leads me to hear different pieces of reality as well (e.g., what White men will share with me about their perspectives). Neither positionality is a panacea to understanding social realities of marginalization, but both seem to be particularities of the realities I am able to see that shape my research.

Here, Secules notes that there are positional aspects of ontology that are both practical (one's access and trust with a participant) and figurative (what a researcher perceives as ordinary or noteworthy). Beebe also resonates with these points:

**Beebe:** Given the relational nature of my identity, I believe that what we can observe as researchers is dictated by what we have been socialized to value as noteworthy, special and valid. Additionally, our observations and value systems are dictated by the social power we possess and the relational functionality of those powers.

Beebe highlights the relational and socialized aspects of identity that impact the researcher's observational and analytical lens. In addition to interpersonal interactions, our observations as researchers are also related to our position within a community, broadly speaking, as an insider or as an outsider. Mejia underlines this relational aspect of positionality:

**Mejia:** Related to our identity, we choose, deliberately or unconsciously, to see what we want to see and to interpret it in any way that best fits our research goals. We construct reality based on our belief systems, personal experiences, cultural and social backgrounds. Both etic and emic views influence what we observe as researchers. An etic view looks at a community with a researcher's outsider gaze. In an etic view a person outside of the community being studied maps on concepts or understandings from their own culture and community. Thus, an etic view of research may lead to misrepresentation of the communities in

question. For example, without understanding the language, culture, practices, or belief systems of Latinx students, researchers in the past have created deficit views of Latinx and other underrepresented student groups' thinking and academic work. On the other hand, an *emic* view assumes that there is complete immersion in the culture, and that immersion helps the researcher understand the context of the belief systems, language use, practices, and other aspects that otherwise may be ignored. Nonetheless some researchers may embrace an *emic* lens without a true insider's understanding of the community, and sometimes insider views can require a critical distance (e.g., a White supremacist community may misrepresent the reality of racial oppression).

Here, Mejia elucidates how a researcher's relation to a community (e.g., as member, as outsider, as presumed insider) impacts the interpretive lens a researcher brings to bear on their observations and analysis.

These reflections demonstrate how a researcher's positionality impacts the world that they perceive and interpret, ranging from the practical (i.e., what a participant will or will not communicate to a researcher) to the interpretive and cultural (i.e., what frameworks we develop and choose for understanding what we see). Given the interlocking nature of identity and intersectionality, we can conceive of not only a positionality of dual consciousness but an overlapping set of partial perceptions and misperceptions of any social reality. By examining positionality in light of ontology, we shed more light on the sources and contours of the way our view of reality is shaped (Berger, 2015).

#### 5.4 | Dimension 4: Methodology

Traditional scientific research regards methodology as a formal set of procedures; however, we acknowledge that disciplinary traditions are also underpinned by a myriad of personal methodological choices. The intersection of identity and methodology has been previously documented, for example, in the infamous example of the injection of syphilis into Black men at the Tuskegee Institute (Brandt, 1978). This methodological choice was not dictated by scientific methodology; it was predicated on White researchers devaluing the bodies of Black men (Brandt, 1978). In engineering education research, decisions to conduct surveys, interviews, or observations; to write about a small number of individuals with nuance; or to collate experiences often unconsciously embody our perspectives, our bias, our sense of purpose, and our positionality.

The following are responses to the orienting question: "How does your positionality impact how you make methodological choices?" In his response, Secules discusses how his identity and a history of colonialism or activism in different research traditions impact his understanding of enacting his work:

**Secules:** I have realized the methodologies I draw on embody histories of gender, race, class, colonialism, and other aspects of identity and oppression. Traditional ethnography comes from a U.S. anthropological tradition that is steeped in views of a colonialist outsider examining exotic cultural settings (Secules, 2019). Critical pedagogy comes from activist and non-Western traditions to empower oppressed groups towards liberation (Secules et al., 2018; hooks, 1992). I have struggled with these histories when leveraging these methodologies towards equity. In anthropological traditions I find beneficial tools for investigating and commenting on culture, but there is a danger of subjecting insider informants to an exoticized outsider gaze. I find ethnography allows me more evocative forms of communication, and more inspired and insightful findings, but I wonder if it is a certain level of privilege (in my command of English language, an embodied positionality of voice and knowledge production as a White Western male academic) that allow me to position this work as valid research. Alternatively, many scholars of equity take up more pragmatic approaches grounded in institutional data or in activism. Yet, if I take up an activist approach, borrowing on political traditions developed by and for the liberation of people of color (hooks, 1992; Freire, 1968), I may also be, in some ways, an outsider to marginalized experiences and it may be challenging to embody shared liberatory work with the inherent power dynamics of that position. As identity is embedded in these methodological frameworks, it is also continually embedded in my work.

The tension that Secules expresses between the historical origin of methodological traditions and his own positionality resonates with Mejia's response to the Dimension 3: Ontology prompt; Mejia talks about *etic/emic* dangers for individual outsider researchers, whereas Secules notes that similar issues may be embodied in an entire methodological tradition.

Svyantek also describes the relationship between researcher identity and methodological choices. As a disabled researcher, Svyantek aligns her work with Disability Studies and enacts that work through associated methodological traditions:

**Svyantek:** My strategic methodological choices are indicative of bringing Disability Studies within my research methods (Svyantek, 2016). I am proposing methods that are not dependent on doing work to pass as nondisabled within a research setting. My data collection is based on using publicly available documents and websites, which are all being gathered digitally; this means I am not reliant on getting past gatekeepers or knowing how to connect with the right people at a site. So, for my dissertation work, I'm not conducting interviews, focus groups, or observations. I'm not treating people as subjects or participants, because I am going at a slant – I'm conducting document analysis as a direct means to conduct counter surveillance on institutions of higher education and how they recognize the presence of Disabled people as part of their campus community. Thus, my methods are attainable for other researchers (Disabled or not), as they do not require travel, carry undue financial burden, or rely on a particular set of bodymind characteristics. (Note: “bodymind” expresses interrelatedness to acknowledge how “mental and physical processes not only affect each other but also give rise to each other—that is, because they tend to act as one, even though they are conventionally understood as two” (Price, 2015, p. 269).

Based on her positionality, Svyantek challenges methodological norms to make pragmatic choices that support her own bodymind in a way that increases inclusivity in the research process while making significant contributions to disability-related policies in higher education.

Aligning with Berger (2015), these reflections highlight the ways individual researchers influence the methodological and procedural choices that occur throughout the research process. Methodology, as influenced by the researcher, disrupts traditional notions of what engineering education research is and how it is conducted, thus making space for our research methods and research community to evolve.

## 5.5 | Dimension 5: Researcher-as-instrument

In many qualitative research methodologies, the researcher is positioned as the primary methodological instrument. Yet, we may not acknowledge just how deeply we bring our own bodies and selves to our studies. As researchers, we bring embodied particularities regarding how we relate to participant communities. As an outsider, we may need to do additional work to gain rapport if we have identity differences from our participants. As an insider, we may need to do additional work to adjust expectations to maintain a researcher (partial outsider) position. Particularly for qualitative researchers conducting work on equity and inclusion, examining positionality is crucial for understanding how the research was carried out, how claims were developed, and how elements of identity influenced results.

To elicit reflections on the construct “researcher-as instrument,” we provided the guiding question: “How does your positionality impact how you relate to research participants?” Sanchez-Peña notes how her membership within the community she studies has shaped the way she relates to her participants during data collection:

**Sanchez-Peña:** In my research on mental health, I find myself relating to my participants as one of them. I often hear from our interviewees how appreciative they are of being part of the research and the change that it is expected to ignite. It helps that at this point, the only data collection we have conducted has been in partnership with a chapter of the National Alliance on Mental Illness (NAMI), a national organization focused on eradicating stigma on mental illness. Since our participants are NAMI members, they have already grown used to sharing their stories and fighting their oppression in certain ways. Still, identifying as having a mental health condition myself builds a stronger bridge of collaboration and empathy when they are sharing with us.

Sanchez-Peña describes a bridge of empathy and openness that her identification within the community creates. McCall also finds her identity to be a source of rapport and solidarity with participants but notes complexities with how that disclosure can be interpreted:

**McCall:** I am measured in the disclosure of my disability identity to participants. While disclosure may be used as a way to build rapport with participants, I recognize that it may also be interpreted as a way of minimizing the participant's experience. I became aware of the risks associated with disability disclosures in one particular personal experience when my own disability disclosure resulted in a dismissive comment from a more senior academic that minimized its implications in comparison to others' disabilities.

Masters describes a larger sense in which being transparent about a range of respective identities creates an authentic connection and leads to richer insights:

**Masters:** Prior to graduate school, my research experience was limited to quantitative materials science and engineering studies. I had never worked on human subjects research, but I had served as a participant in a biomedical engineering study. Perhaps because that study required me to walk on a treadmill, I realized how easy it is for research participants to feel like a lab rat or a hamster running on a wheel solely for the researcher's benefit. Thus, as I was learning how to conduct engineering education research, it was important to me that I connect with participants in an authentic way. I never wanted to be the researcher in the corner taking notes on a clipboard; I wanted to build rapport with participants and have genuine, meaningful engagements with them. So within a few weeks of starting to collect qualitative ethnographic data, I adopted the motto, "enter as a person first and as a researcher second." For me, this meant never taking observation notes in front of participants during my participant-observation visits. It also meant that when it felt natural, and was safe for me to do so, I would disclose personal details about my life (such as my trans identity, my queerness, my educational background, etc.). My first priority was to make an authentic connection with a participant; research insights would naturally follow from there.

Similarly, Secules' reflection focuses on the relevance and appropriateness of disclosing personal information during participant interactions, noting various complexities that can arise:

**Secules:** Of many facts research participants will read about me and make assumptions about, including skin tone, gender presentation, language/accent, and dress, sexual orientation is one that I know they may or may not assume. Yet I have rarely explicitly come out as gay during research interviews or other data collection. Sexual orientation or romantic choices have never been the primary topic of conversation and is often not even a secondary topic. But my own identity blurs this line; a question about work-life balance may simply involve making time for a girlfriend for a straight person, but for a queer person and for myself, it involves making strategic choices when and how to be proactively "out" professionally. I had one long term research participant who shared many personal things with me; she was a devout Catholic straight woman who was an undergraduate engineering student at the time. While pursuing our participatory research, I would share more of my own experience in solidarity with her to co-construct a critique of engineering culture (Secules et al., 2018). Over time, I was consciously skipping past experiences related to an LGBTQ perspective or coming out; given the Catholic church's official stance on LGBTQ people at the time, I did not want to create an uncomfortable circumstance for the participant. Eventually though, the inertia of the conversation seemed to outweigh the potential for negatively impacting the research relationship, and I did end up coming out to her. Although it seemed to deepen the conversation, I was conscious that, at the time, I was taking a risk with bending our topic of conversation towards my own identity and sexual orientation. This experience has made me think about the ways heteronormativity and other forms of privilege implicitly bend conversations away from queer identity. While not all participant conversations are or should be about being queer/gay, I am noticing how hard it is to draw the line and that the hard work of drawing the line is typically mental/emotional labor placed on the person with the salient hidden or marginalized identity.

Finally, Mejia discusses the qualities of trust and power dynamics that extend beyond identity disclosure into a deeper sense of *confianza*:

**Mejia:** Trust is very important to me when doing qualitative research. As a Latino scholar, I like to use the term *confianza* rather than trust. *Confianza* relies on mutual reciprocity and I believe that is the best way

to relate to participants. It is important to recognize that honoring relationships that go beyond the research context is significant not only for the researcher but also for the participating communities. *Confianza* means that someone is allowing the other person to take on a predetermined and mutually-agreed action. *Confianza* can be either strengthened or weakened, suspended or broken. Building *confianza* with the participants is very important if the research is to truly represent the community. At the same time, being aware of the power dynamics between the researcher and the participant is necessary. Engaging in constant self-reflexivity is necessary to help develop *confianza* and transparency in the research process. *Confianza* is not imposing your authority onto the participants, but to share that power equally and being willing to make the knowledge of the community visible without deconstructing, minimizing, or neglecting their reality.

All of our reflections focus on the importance of building rapport, trust, or *confianza* with participants. Disclosing personal identity serves as an indicator of both belonging and solidarity with the participant communities. Participating in community also means showing appreciation, surrendering power, operating flexibly, listening to others with an open mind, and engaging in continuous readjustment. By centering oneself as the instrument, the researcher and participant become “partners in creation of knowledge” (Xu & Storr, 2012, p. 14).

Denzin and Lincoln (2018) argue that the way a researcher is situated in the context being studied impacts their interpretive power, and therefore, questions of power, trust, disclosure, and identity must be critically analyzed as researchers seek to “make the world visible” (p. 10). Several reflections highlighted the ways in which one’s characteristics can benefit or detract from establishing rapport and influence data collection. Responses also reveal the importance of understanding—and challenging—power structures between researcher and participant. Power dynamics also play an important role in the researcher’s decision to become “the instrument,” to frame the conversational space, to determine the distance between researcher and respondent, and to select the level of self-disclosure. All of these factors can be interpreted by the participant in ways that contribute to or interfere with the narratives being told. Particularly in research focused on minoritized, marginalized, or vulnerable populations, the researcher’s goal should be to create unique conversational spaces for the participants’ voices to be heard (Pezalla et al., 2012).

## 5.6 | Dimension 6: Communication

Qualitative researchers often include narrow positionality statements in published work, only disclosing identities that are clearly relevant to the topic. As we have seen, however, identity informs our research in ways that are deeper and more complex than these simple disclosures imply. These truths about ourselves can be difficult to present to a reader audience. This communication is further convoluted by normative assumptions associating certain names with identities. In light of these assumptions, what counts as disclosure and positionality in a paper? If one’s identity is normative and privileged with respect to race, gender, gender presentation, sexual orientation, ability, and class, then briefly disclosing these identities can be both obvious and superficial; if one’s identity is marginalized, then disclosing these identities could be dangerous or disruptive. In recognizing the importance of the intentional acknowledgement of positionality, we all gain a richer understanding of published work while creating more space for scholars with minoritized identity dimensions.

The following are responses to the orienting question: “How does your positionality impact how you represent yourself in writing?” McCall and Sanchez-Peña detail situations and decision processes for the disclosure of a non-apparent identity and how this shapes the way their writing and scholarship are perceived:

**McCall:** Within writing, I will disclose my hidden or non-apparent identities that I perceive as relevant or important to the project on which I am currently working. For non-disability-related projects, I tend not to disclose my disability identity, particularly as I feel it is less salient to my research. However, for disability-related projects, I often feel compelled to disclose as a way to justify my interactions with participants and key themes that I pull from my data. While this decision to disclose a marginalized identity may sound fairly straightforward, it can be quite complex, confusing, and risky due to a required sense of vulnerability and the permanence of published works. I admit that this is something with which I continue to grapple, particularly as I assess how this disclosure will be received and interpreted by the broader research community.

**Sanchez-Peña:** In my writing, it does feel paralyzing to decide whether or not to make my identity explicit. I know it could provide a basis for invalidation for those that do not understand mental health conditions, but it could also provide a source of validity and understanding for those that do. In one of my publications, a reviewer self-identifying as having a mental health condition criticized the bold language used in the paper. Bold language was originally chosen by all coauthors, all with first-hand experience with mental health conditions, with the intention to create tensions to outsiders and evidence how labels were hurtful. However, we did not consider that for some insiders such language could be triggering, especially given our lack of transparency about our own experiences. It made us reflect on how language use and the presence or absence of a positionality statement could change the perceived intentionality of a written piece, especially for those groups whose voices we are trying to amplify. I have now made a priority to enhance validity and understanding through communicating who I am and how it relates to what I do despite the challenges that this might represent when presenting a highly stigmatized topic as it is mental health. It is intimidating, but we need to start changing the culture.

Other respondents discuss how they decide to disclose aspects of self and identity, noting several ways in which they may be perceived correctly or incorrectly. Masters proactively includes relevant but nonapparent identities in many areas:

**Masters:** My first name, Adam, is often perceived as a man's name; while I was aware this could happen when I chose this name for myself, it has never been my intention to be perceived as a man. I openly use they/them/theirs pronouns to refer to myself in author bios, add these pronouns to my conference name-badges, and include "(they/them/theirs)" under my name on title slides of conference presentations; these practices out me as trans even if I don't explicitly state anything more about my identity. Sometimes, I will be more explicit and state something like "Adam is White, queer, transmasculine non-binary, and disabled, and their lived experiences inform their work" in an author bio. Other times, I include a statement about my identities in written passages about positionality and epistemology. I make a point to note my critical worldview in articles as this provides context about how I designed and interpreted the study. When it makes sense to write a more thorough positionality statement, I explain how I came to develop a critical epistemology.

Secules has thought about the ways he is perceived or misperceived and how to be proactive about transparency in a wide variety of research contexts. In addition, he discusses situations that have created pressure and difficulty for him based on a nonnormative identity in research:

**Secules:** I have written positionality statements into my research to help situate the reader to who I am and how I communicate. Similar to the prior section on relating to participants, I am aware that many researchers' identities are masked in print – when reading the name 'Stephen' people, in all likelihood, may subconsciously assume that I am a man; the name 'Secules,' which is an Americanized German name, indicates no strong clues about ethnicity. My identity as gay is hidden by print unless it is specifically named in writing as I am doing here. This creates certain dilemmas, as the only choices are to unintentionally 'pass' as a straight White cisgender man or to 'out' myself in settings that may not be safe or may be perceived as oversharing or admitting to bias. In one research experience, a positionality statement in which I came out was seen by some participants as helpful context to understand research findings which had seemed to come solely from a place of privilege, and by others as inappropriate oversharing. This situation felt like an unfair double bind. The complexity of this choice is experienced particularly by individuals with hidden and marginalized identities, and is therefore important for majority groups and researcher practices to acknowledge.

Positionality impacts communication in ways that move beyond a simple disclosure. Svyantek notes how her choices to use direct and identity-first language stem from her positionality as disabled and serve as an act of solidarity with activist strains in the Disability Rights community.

**Svyantek:** I have a very direct message when I'm doing/presenting my work – I work on Disability issues, and I am Disabled. My work frames Disability that may be disquieting or uncomfortable for those solely

familiar with how educational specialists discuss Disability. I use identity-first (i.e., ‘Disabled people’) language throughout this piece, as opposed to person-first (i.e., ‘people with disabilities’) when discussing Disability within higher educational contexts. This choice is reflective of the position of activists and advocates for Disability Rights as well as my own researcher positionality as Disabled. I will occasionally use person-first language or euphemisms when quoting others (directly or with ‘scare’ quotes). Additionally, I will use disability (with a lowercase ‘d’) when discussing specific conditions, limitations, or reasons why someone might identify or be identified (or push back against such identification) with the Disability community; this is similar to the difference between Deaf/deaf.

Mejia similarly connects his positionality to intentional language usage within and surrounding the Latinx community:

**Mejia:** I try to indicate where I come from, my background, how I see the participants I work with (e.g., how I prevent “othering”), and why I believe what I believe (personal epistemology). As mentioned before, I believe that language constructs reality and, for the most part, reality is being constructed by the White perspective—particularly in engineering. For instance, take a Wikipedia article that talks about an indigenous community. Most of the writing is done in the past tense as if those communities, their knowledge, and their contributions are things of the past. It neglects the fact that these communities still exist and keep thriving. When it comes to writing, I believe that knowledge is not missing, it is misrepresented and it is due to how researchers communicate with the broader audience. I try to write in present tense when it comes to underrepresented communities and share the results with my participants to make sure that I am not misrepresenting them. I also try to include direct Spanish quotes when my participants are Spanish speakers, or phonetically-similar words when the participants have other native languages. Unfortunately, most of the stories that need to be told are typically written by White individuals and narrated by the Global North. Technology and research may be new, but everything else is old. That is one of the reasons why it is important to detach from the uncritical-mimetic of research in engineering education and “unlearn” the common methodologies and approaches, and how these are communicated.

These reflections underscore how communication is fundamentally tied to our positionality. Many aspects of self will be functionally concealed without disclosure, and thus, communicating our identities coconstructs our position with respect to a scholarly community. Indeed, identity is often conceptualized as enacted only through communication with another and through narratives that provide meaning (Sfard & Prusak, 2005). The choices around disclosure in communication are never straightforward, requiring one to know what that communication is likely to mean to oneself and to others and to plan for consequences of disclosure. Communication also shapes who we are in relation to the world by the language, style, and terminology we use to describe research participants and the world around us, which carry power and invoke political and theoretical alignments (Berger, 2015). We find that, although communication and positionality are often perceived as linked, the relation between the two is deeper, more complex, and more nonlinear than methodological guidance often suggests.

## 6 | SYNTHESIS AND IMPLICATIONS

In this section, we synthesize the discussion of positionality and offer implications and concrete advice for other researchers looking to integrate positionality in their work.

### 6.1 | Calling for and modeling a contextualized positionality

We began this paper by noting the disparate and sometimes simplistic ways positionality is communicated in engineering education research literature (shown in Table 1). In the conference papers and journal manuscripts reviewed, we differentiated between statements describing a process of maintaining trustworthiness and mitigating bias (Acknowledging Practice) and statements that identified authors’ key demographics in the spirit of transparency (Establishing Transparency of Self Attributes). In general, these types of statements provide incomplete depictions of the ways that positionality impacts the research process. Contextualizing Methodology, the least common

positionality category identified in our review, was the form of positionality we attempted to model in this paper. We reiterate the importance of establishing who we are as researchers and naming how our identity is consequential to our research.

The reflection topics discussed here pushed the thinking of our contributing researchers in ways that some had not fully anticipated. By asking ourselves the six orienting questions, we found new and unacknowledged ways that positionality had impacted our work. Thus, we suggest these questions and example topics (Table 3) as a guide for researchers interested in reflecting on their own positionnalities.

By reflecting on these questions, researchers can begin to think about their own roles and perspectives throughout the research process. While we do not presume that researchers can share comprehensive stories for every positional aspect of their research, we encourage the engineering education community to think intentionally about ways in which their own identities are integrated with all aspects of the research process and to communicate those connections to others. This disclosure will provide others with appropriate information that will enhance the understanding of one's research and bolster, rather than detract from, research findings.

## 6.2 | Nuances for marginalized, privileged, hidden, and apparent researcher positionnalities

Oriented by experience and by intersectionality and identity theories, the first and second authors recruited the coauthor researcher-participants whose statements were focused on identity experiences of marginalization or privilege and identity categories that are largely hidden or apparent. This choice was made on the conjectures that (1) standard research guidance regarding positionality may be more complicated for people of marginalized and hidden identity categories and (2) awareness of this complication would be important for people of privileged and apparent identity categories. Next, across our small sample of responses, we explicate how experiences of marginality, privilege, hidden, and apparent identities have contributed to our positionnalities.

Many of the respondents noted how marginality is relative or intersectional, such that a researcher who has experience and empathy with marginalization also has the resources and privilege to be in the position of the researcher. For some, personal experiences of marginalization directly motivate their research, while others try to maintain some emotional distance from personally charged research topics. Experiences of marginality were also salient to epistemology and ontology and can impact a greater critical consciousness or recognition of insider/outsider positionality. Regarding methodology and participant interaction, marginalization impacted the process of gaining trust of participants in a shared marginalized community. In communication, respondents emphasized the importance of

TABLE 3 Orienting reflection questions and example topics for each dimension of positionality

Dimension of positionality	Orienting question	Example topics
Research topic	How does your positionality impact what research you choose to do?	<ul style="list-style-type: none"> <li>• Motivation or interest</li> <li>• Access to topic</li> <li>• Emotional proximity to topic</li> </ul>
Epistemology	How does your positionality impact how you know what you know?	<ul style="list-style-type: none"> <li>• Critical lens versus objectivity</li> </ul>
Ontology	How does your positionality impact what you observe as a researcher?	<ul style="list-style-type: none"> <li>• Insider/outsider status; etic/emic views</li> <li>• Dual consciousness versus single reality</li> </ul>
Methodology	How does your positionality impact how you make methodological choices?	<ul style="list-style-type: none"> <li>• Historical traditions</li> <li>• Research alignment with methods (e.g., bodily particularities)</li> </ul>
Researcher-as-instrument	How does your positionality impact how you relate to participants?	<ul style="list-style-type: none"> <li>• Power and privilege</li> <li>• Access to participants</li> </ul>
Communication	How does your positionality impact how you represent yourself in writing and other communication?	<ul style="list-style-type: none"> <li>• Perceptions of name</li> <li>• Disclosures of identity</li> <li>• Language choices</li> </ul>

justice-oriented language and nonhegemonic ways of creating meaning. As researchers, we may not frequently be asked or expected to represent these dimensions within our work; indeed, respondents found that many of these aspects of their experience as marginalized researchers became apparent only when prompted. Belonging to a marginalized identity group was a key component of each researcher's perspective, style, or effectiveness.

As researchers—and as people in society—we may have even less intuition about how our experiences of privileged identities influence our work; nevertheless, these identities powerfully shape our perspectives and are important to consider, particularly when working with marginalized populations. While most of the responses in this paper centered on marginal positionalities, some of them provided a roadmap for how to consider one's privileged identities. A sense of privilege may inform a sense of duty to conduct research that dismantles a system that privileges the researcher. It may allow greater access to certain research participants (e.g., from privileged demographic groups) while creating greater challenges to gain the trust of and insight from participants who do not share major demographic identities with the researcher. Some researchers worried about the implications of a relatively privileged person selecting a methodology that has been employed as a tool of either knowledge generation for those in elite society or as a form of revolution by and for oppressed people. Positionality can be a tool for reflecting on and dislocating privilege by recognizing the ways that we share or do not share life experience with other researchers and participants. If reflecting on privileged positionality proves difficult for our readers, we recommend they think further about the contrasting experiences of marginalized researchers to gain an understanding of how privilege subtly impacts their own work. The practice of diffraction may also be valuable as it helps us understand differences between researchers and participant populations and imagine correctives to those differences (Bozalek & Zembylas, 2017).

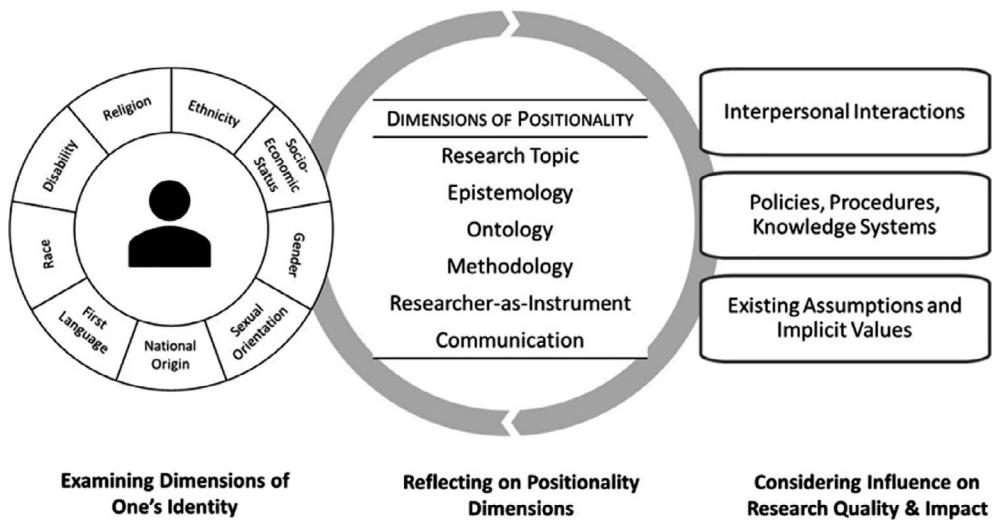
Hidden identities are those that may not be visible or accurately assessed by society but are salient to the researcher or to the research. Several respondents noted complexities regarding the communication of hidden identity categories, including in written communication and interaction with participants. Any disclosure of a researcher's hidden identity may help elicit more trust from a reading audience or research participant, but it may also inject complications or tension. The standard research guidance to disclose identities when they are salient to the topic becomes more complex when there are personal dimensions of a researcher's relation to the research.

Finally, apparent identities are those that are relatively simple to perceive about the researcher. Our respondents noted that certain aspects of their identities are readily perceived or assumed. For example, readers make conscious and unconscious assumptions about gender and ethnicity based on an author's name. Research participants also notice aspects of gender presentation, skin color, dress, voice, and physical movement or ability in their interactions with researchers. These observations are largely out of our control, but a researcher can become more aware of how their apparent identity is perceived and how it may impact the research process. The communicative aspect of research often involves clarifying or correcting the assumptions others have made regarding our assumed apparent identities. We call for scholars with relatively simple apparent identities to make more space for the positionality disclosures of others as an act of solidarity. This would mean not only making positionality statements as an author but also supporting them as editors and reviewers and valuing them as a reader.

### 6.3 | Process for examining identity, positionality, and impact

Finally, researchers can leverage these reflection prompts to intentionally examine their impacts on existing infrastructure and communities in which their work is situated. Participant coauthors reported being more readily able to explain their values and decisions upon completing their reflections. Thus, we posit that additional value for such a reflection lies in deeper engagement with the quality and impact of one's research and work as shown in the conceptual framework presented in Figure 2.

In this framework, a researcher transitions from understanding self (i.e., identities related to categories of privilege and oppression), to applying that understanding to dimensions of positionality, to then examining their outward impact. This transition mirrors a move from reflection about what is known about oneself to diffraction about what is not known or understood about a specific research context. The figure's circularity emphasizes how understandings of self and research reflexively inform one another. The framework prompts researchers to examine aspects of their interactions with participants and stakeholders as well as relationships to relevant policies, procedures, and knowledge systems. During this iterative process, researchers may also surface clearer conceptions of the implicit purpose, function, and ideal end goals of their work. We hope that researchers' deepening engagement with positionality will catalyze reflection across the field and spark conversations that lead to more authentic and impactful research.



**FIGURE 2** Process for using prompts to deepen understanding of research quality and impact

## 7 | CONCLUSION

We find that examinations of marginal, privileged, hidden, and apparent identities help reveal inherent complexities of positionality in research. Positionality is particularly complex because of the multifaceted ways in which identity impacts research, the limited space we typically have for representing it, and the risks that can come from disclosures and transparency. By creating additional tools like those in Table 3 and Figure 2, we hope to make the practice of deeply examining and openly representing positionality the norm within our research community, making it safer for all scholars. For many engineering education researchers who work from privileged identities, the practice of representing positionality can become a form of solidarity with marginalized researchers and an important form of disrupting privilege within their own work. We invite all researchers to engage in this work by critically examining and representing their identities in relation to existing power dynamics in their research contexts.

In our call to the research community to examine positionality, we problematize our own distinction that positionality particularly impacts topics of equity and inclusion and researchers utilizing qualitative methodologies. Although this remains our particular standpoint as authors, positionality matters for the entire research community. We call on researchers who do not focus on equity and inclusion to consider how their research plays a passive role in upholding inequitable social systems. We call on researchers who see themselves as objective and removed from the interpersonal contexts of education to consider how their personal perspective shapes their choices in research topic, methodology, and communication. An examination of positionality can and should disrupt the notion that any of us can remove ourselves entirely from the personal and interpersonal nature of research, education, or equity.

If understanding our research requires understanding one another, we must become a community that continually and bravely tells one another who we are.

## ACKNOWLEDGMENTS

We want to thank other researchers who engaged with this conversation but whose contributions did not make it into the published version, including attendees of the CoNECD Conference session, Samantha Brunhaver, Enrique Rodriguez, and Cynthia Hampton. Stephanie Masta and Darryl Dickerson each provided anecdotal observations about positionality that were incorporated into the way the findings were discussed. We also want to acknowledge individuals with whom we had helpful conversations that guided our thinking, including Alice Pawley. Finally, we sincerely thank the reviewers and editors for their thoughtful engagement with our work and their feedback, which substantially improved the manuscript. Some content of this article is based on work supported by the National Science Foundation under Grant 1826354. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

## AUTHOR CONTRIBUTIONS

Stephen Secules and Cassandra McCall conceived of the study and drafted each major section of the paper. Stephen Secules managed the overall empirical process, and Cassandra McCall conducted the literature review. Joel Alejandro Mejia joined early conversations with Stephen Secules and Cassandra McCall to discuss the paper approach. Chanel Beebe, Adam S. Masters L., Matilde Sanchez-Peña, and Martina Svyantek contributed approximately equally and have been listed in alphabetical order. Each author contributed their reflections, reviewed and edited the entire document, and engaged in multiple collaborative conversations through which validation and inspiration often emerged as a collective result.

## ORCID

Stephen Secules  <https://orcid.org/0000-0002-3149-2306>

Cassandra McCall  <https://orcid.org/0000-0002-0240-432X>

Joel Alejandro Mejia  <https://orcid.org/0000-0003-3908-9930>

Martina Svyantek  <https://orcid.org/0000-0001-8938-5231>

## REFERENCES

Adams, T., Jones, S., & Ellis, C. (2014). *Autoethnography: Understanding qualitative research*. Oxford University Press.

Aleong, R. J., Goldstein, M. H., Ortega-Alvarez, J. D., & Rodriguez-Simmonds, H. E. (2017). Knowing our story: Framing a cooperative inquiry project to explore the personal growth of graduate students in engineering education. *Proceedings of the American Society for Engineering Education Annual Conference and Exposition*. Retrieved from <https://peer.asee.org/28601>

Anderson, L. (2006). Analytic autoethnography. *Journal of Contemporary Ethnography*, 35(4), 373–395. <https://doi.org/10.1177/0891241605280449>

Anderson, R. K., & Martin, J. P. (2017). A real report from the trenches of a PhD dissertation: Exploring the inherent “messiness” of engineering education research through an audit trail. *Proceedings of the American Society for Engineering Education Annual Conference and Exposition*. Retrieved from <https://peer.asee.org/27504>

Baillie, C., & Douglas, E. P. (2014). Confusions and conventions: Qualitative research in engineering education. *Journal of Engineering Education*, 103(1), 1–7. <https://doi.org/10.1002/jee.20031>

Baldwin, J. (1955). *Notes of a native son*. Beacon Press.

Banks, J. A. (1998). The lives and values of researchers: Implications for educating citizens in a multicultural society. *Educational Researcher*, 27(7), 4–17. <https://doi.org/10.3102/0013189X027007004>

Berdanier, C. G. P., Tang, X., & Cox, M. F. (2018). Ethics and sustainability in global contexts: Studying engineering student perspectives through photoelicitation. *Journal of Engineering Education*, 107(2), 238–262. <https://doi.org/10.1002/jee.20198>

Berger, R. (2015). Now I see it, now I don't: Researcher's position and reflexivity in qualitative research. *Qualitative Research*, 15(2), 219–234. <https://doi.org/10.1177/1468794112468475>

Biglan, A. (1973). The characteristics of subject matter in different academic areas. *Journal of Applied Psychology*, 57(3), 195–203. <https://doi.org/10.1037/h0034701>

Blair, E. E., Miller, R. B., Ong, M., & Zastavker, Y. V. (2017). Undergraduate STEM instructors' teacher identities and discourses on student gender expression and equity. *Journal of Engineering Education*, 106(1), 14–43. <https://doi.org/10.1002/jee.20157>

Bourke, B. (2014). Positionality: Reflecting on the research process. *The Qualitative Report*, 19(33), 1–9. Retrieved from <https://nsuworks.nova.edu/tqr/vol19/iss33/3>

Bozalek, A., & Zembylas, M. (2017). Diffraction or reflection? Sketching the contours of two methodologies in educational research. *International Journal of Qualitative Studies in Education*, 30(2), 111–127. <https://doi.org/10.1080/09518398.2016.1201166>

Brandt, A. (1978). Racism and research: The case of the Tuskegee syphilis study. *The Hastings Center Report*, 8(6), 21–29. <https://doi.org/10.2307/3561468>

Brown, S., Montfort, D., Perova-Mello, N., Lutz, B., Berger, A., & Streveler, R. (2018). Framework theory of conceptual change to interpret undergraduate engineering students' explanations about mechanics of materials concepts. *Journal of Engineering Education*, 107(1), 113–139. <https://doi.org/10.1002/jee.20186>

Bruning, M. J. (2002). Why NOT engineering—Perspectives of young women and the influence of the media. *Proceedings of the American Society for Engineering Education Annual Conference*. Retrieved from <https://peer.asee.org/10283>

Bruning, M. J., Bystydzienski, J., & Eisenhart, M. (2015). Intersectionality as a framework for understanding diverse young women's commitment to engineering. *Journal of Women and Minorities in Science and Engineering*, 21(1), 1–26. <https://doi.org/10.1615/JWomnMinorSciEng.2014007345>

Burt, B. A., McKen, A. S., Burkhart, J. A., Hormell, J., & Knight, A. J. (2016). Racial microaggressions within the advisor-advisee relationship: Implications for engineering research, policy, and practice. *Proceedings of the American Society for Engineering Education Annual Conference and Exposition*. <https://doi.org/10.18260/p.26029>

Campbell, C., & MacPhail, C. (2002). Peer education, gender and the development of critical consciousness: Participatory HIV prevention by South African youth. *Social Science and Medicine*, 55(2), 331–345. [https://doi.org/10.1016/s0277-9536\(01\)00289-1](https://doi.org/10.1016/s0277-9536(01)00289-1)

Cech, E. A., & Waidzunas, T. J. (2011). Navigating the heteronormativity of engineering: The experiences of lesbian, gay, and bisexual students. *Engineering Studies*, 3(1), 1–24. <https://doi.org/10.1080/19378629.2010.545065>

Charmaz, K. (2014). *Constructing grounded theory*. Sage.

Chavez, C. (2008). Conceptualizing from the inside: Advantages, complications, and demands on insider positionality. *The Qualitative Report*, 13(3), 474–494. Retrieved from <https://nsuworks.nova.edu/tqr/vol13/iss3/9>

Corbin Dwyer, S., & Buckle, J. L. (2009). Reflection/commentary on a past article: “The space between: On being an insider-outsider in qualitative research.” *International Journal of Qualitative Methods*, 8(1), 54–63. <https://doi.org/10.1177/1609406918788176>

Crenshaw, K. (1989). *Demarginalizing the intersection of race and sex: A Black feminist critique of antidiscrimination doctrine, feminist theory, and antiracist politics [1989]* (pp. 139–167). University of Chicago Legal Forum. <https://doi.org/10.4324/9780429500480>

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage Publications.

Cruz, J., & Kellam, N. (2018). Beginning an engineer's journey: A narrative examination of how, when, and why students choose the engineering major. *Journal of Engineering Education*, 107(4), 556–582. <https://doi.org/10.1002/jee.20234>

Denzin, N., & Lincoln, Y. (2018). The discipline and practice of qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE Handbook of Qualitative Research* (5th ed., pp. 1–32).

Donohue, S., Schnittka, C., & Richards, L. (2010). The constructivist-based workshop: An effective model for professional development training activities. *Proceedings of the American Society for Engineering Education Annual Conference*. Retrieved from <https://peer.asee.org/16270>

Dutta, D. (2015). Sustaining the pipeline: Experiences of international female engineers in U.S. graduate programs. *Journal of Engineering Education*, 104(3), 326–344. <https://doi.org/10.1002/jee.20077>

Foucault, M. (1972). *The archaeology of knowledge*. Pantheon Books.

Freire, P. (1968). *Pedagogy of the oppressed*. Continuum International Publishing Group.

Freire, P. (1993). *Education for critical consciousness*. Continuum.

Gelles, L. A., Villanueva, I., & Di Stefano, M. (2018). Perceptions of ethical behavior in ethical mentoring relationships between women graduate students and faculty in science and engineering. *Proceedings of the ASEE Annual Conference and Exposition*. Retrieved from <https://peer.asee.org/30870>

Gough, B. (2003). Deconstructing reflexivity. In L. Finlay & B. Gough (Eds.), *Reflexivity: A practical guide for researchers in health and social sciences* (pp. 21–35). Blackwell Science. <https://doi.org/10.1002/9780470776094>

Greene, M. J. (2014). On the inside looking in: Methodological insights and challenges in conducting qualitative insider research. *The Qualitative Report*, 19(29), 1–13. Retrieved from <https://nsuworks.nova.edu/tqr/vol19/iss29/3>

Groen, C., Paretti, M. C., McNair, L. D., Simmons, D. R., & Shew, A. (2018). *Experiencing disability in undergraduate civil engineering education: An initial examination of the intersection of disability and professional identities*. Paper presented at the CoNECD—The Collaborative Network for Engineering and Computing Diversity Conference, Crystal City, VA. Retrieved from <https://peer.asee.org/29536>

Hampton, C., & Reeping, D. (2019). Positionality: The stories of self that impact others. *Proceedings of the American Society for Engineering Education Annual Conference and Exposition*. Retrieved from <https://peer.asee.org/33177>

Haverkamp, A. (2018). The complexity of nonbinary gender inclusion in engineering culture. *Proceedings of the 125th ASEE Annual Conference and Exposition*. 14. Retrieved from <https://peer.asee.org/31084>

Hira, A., Beebe, C., Maxey, K. R., & Hynes, M. M. (2018). “But, what do you want me to teach?”: Best practices for teaching in educational makerspaces (RTP). *Proceedings of the American Society for Engineering Education Annual Conference and Exposition*. Retrieved from <https://peer.asee.org/29648>

hooks, b. (1984). *Feminist theory: From margin to center*. South End Press.

hooks, b. (1992). Theory as liberatory practice. *Yale Journal of Law and Feminism*, 34(1990), 1–12.

Huff, J. L., Zoltowski, C. B., & Oakes, W. C. (2016). Preparing engineers for the workplace through service learning: Perceptions of EPICS alumni. *Journal of Engineering Education*, 105(1), 43–69. <https://doi.org/10.1002/jee.20107>

Kajfez, R. L., & Matusovich, H. M. (2017). Competence, autonomy, and relatedness as motivators of graduate teaching assistants. *Journal of Engineering Education*, 106(2), 245–272. <https://doi.org/10.1002/jee.20167>

Kellam, N., & Cirell, A. M. (2018). Quality considerations in qualitative inquiry: Expanding our understandings for the broader dissemination of qualitative research. *Journal of Engineering Education*, 107(3), 355–361. <https://doi.org/10.1002/jee.20227>

Kerstetter, K. (2012). Insider, outsider, or somewhere in between: The impact of researchers' identities on the community-based research process. *Journal of Rural Social Sciences*, 27(2), 99–117. Retrieved from <https://egrove.olemiss.edu/jrss/vol27/iss2/7>

Kirn, A., & Benson, L. (2018). Engineering students' perceptions of problem solving and their future. *Journal of Engineering Education*, 107 (1), 87–112. <https://doi.org/10.1002/jee.20190>

Lee, C. S., McNeill, N. J., Douglas, E. P., Koro-Ljungberg, M. E., & Therriault, D. J. (2013). Indispensable resource? A phenomenological study of textbook use in engineering problem solving. *Journal of Engineering Education*, 102(2), 269–288. <https://doi.org/10.1002/jee.20011>

Maher, F. A., & Tetreault, M. K. T. (1994). *The feminist classroom*. Basic Books.

Main, J. B., Camacho, M. M., Mobley, C., Brawner, C. E., Lord, S. M., & Kesim, H. (2019). Technically and tactically proficient: How military leadership training and experiences are enacted in engineering education. *International Journal of Engineering Education*, 35(2), 446–457. Retrieved from <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85070617792&partnerID=40&md5=bcef7f7261ca68d4b6f85e307c9011d1>

Malterud, K. (2001). Qualitative research: Standards, challenges, and guidelines. *Lancet*, 358(9280), 483–488. [https://doi.org/10.1016/S0140-6736\(01\)05627-6](https://doi.org/10.1016/S0140-6736(01)05627-6)

Martin, J. P., Garrett, S. D., Adams, S. G., & Hamilton, J. (2015). A qualitative look at African American students' perceptions of developing engineer of 2020 traits through non-curricular activities. *Proceedings of the American Society for Engineering Education Annual Conference and Exposition*. <https://doi.org/10.18260/p.23434>

Martin, J. P., Miller, M. K., & Simmons, D. R. (2014). Exploring the theoretical social capital "deficit" of first generation college students: Implications for engineering education. *International Journal of Engineering Education*, 30(4), 822–836.

Martin, J. P., Revelo, R. A., Stefl, S. K., Garrett, S. D., & Adams, S. G. (2016). *Ethnic student organizations in engineering: Implications for practice from two studies*. Proceedings of the 2016 American Society for Engineering Education Annual Conference and Exposition. <https://doi.org/10.18260/p.26744>

McCall, C., Shew, A., Simmons, D. R., Paretti, M. C., & McNair, L. D. (2020). Exploring student disability and professional identity: Navigating sociocultural expectations in U.S. undergraduate civil engineering programs. *Australasian Journal of Engineering Education*, 25(1), 79–89. <https://doi.org/10.1080/22054952.2020.1720434>

Mejia, J. A., Chen, D. A., Dalrymple, O. O., & Lord, S. M. (2018). Revealing the invisible: Conversations about-isms and power relations in engineering courses. *Proceedings of the ASEE Annual Conference and Exposition*. Retrieved from <https://peer.asee.org/30937>

Mejia, J. A., & de Paula, M. N. (2019). "Ingeniero como vos": An analysis of the Mbyá-Guaraní practices associated with engineering design. *Proceedings of the ASEE Annual Conference & Exposition*. Retrieved from <https://peer.asee.org/31921>

Mejia, J. A., Revelo, R. A., Villanueva, I., & Mejia, J. (2018). Critical theoretical frameworks in engineering education: An anti-deficit and liberative approach. *Education Sciences*, 8(158), 1–13. <https://doi.org/10.3390/educsci8040158>

Mejia, J. A., Wilson-Lopez, A., Robledo, A. L., & Revelo, R. A. (2017). Nepantleros and Nepantleras: How Latinx adolescents participate in social change in engineering. *Proceedings of the ASEE Annual Conference & Exposition*. Retrieved from <https://peer.asee.org/28701>

Merriam, S. B., Johnson-Bailey, J., Lee, M.-Y., Kee, Y., Ntseane, G., & Muhamad, M. (2001). Power and positionality: Negotiating insider/outsider status within and across cultures. *International Journal of Lifelong Education*, 20(5), 405–416. <https://doi.org/10.1080/02601370110059537>

Merton, R. K. (1972). Insiders and outsiders: A chapter in the sociology of knowledge. *American Journal of Sociology*, 78(1), 9–47. Retrieved from <https://www.jstor.org/stable/2776569>

Mobley, C., Brawner, C. E., Lord, S. M., Main, J. B., & Camacho, M. M. (2019). Digging deeper: Qualitative research methods for eliciting narratives and counter-narratives from student veterans. *International Journal of Qualitative Studies in Education*, 32(10), 1210–1228. <https://doi.org/10.1080/09518398.2019.1659440>

Mosjowski, E. A., Daly, S. R., Peters, D. L., Skerlos, S. J., & Baker, A. B. (2017). Engineering PhD returners and direct-pathway students: Comparing expectancy, value, and cost. *Journal of Engineering Education*, 106(4), 639–676. <https://doi.org/10.1002/jee.20182>

Naples, N. A. (1996). A feminist revisiting of the insider/outsider debate: The "outsider phenomenon" in rural Iowa. *Qualitative Sociology*, 19(1), 83–106. <https://doi.org/10.1007/BF02393249>

Patton, M. Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). Sage Publications.

Pearson-Weatherton, Y., Mayes, R. D., & Villanueva-Perez, C. (2017). Barriers to persistence of engineering students with disabilities: A review of literature. *Proceedings of the 124th Annual American Society for Engineering Education Conference*. Retrieved from <https://peer.asee.org/27650>

Pease, B. (2000). Researching profeminist men's narratives: Participatory methodologies in a postmodern frame. In B. Fawcett, B. Featherstone, J. Fook, & A. Rossiter (Eds.), *Practice and research in social work: Postmodern feminist perspectives* (pp. 138–161). Routledge.

Pezalla, A. E., Pettigrew, J., & Miller-Day, M. (2012). Researching the researcher-as-instrument: An exercise in interviewer self-reflexivity. *Qualitative Research*, 12(2), 165–185. <https://doi.org/10.1177/1468794111422107>

Pillow, W. (2003). Confession, catharsis, or cure? Rethinking the uses of reflexivity as methodological power in qualitative research. *International Journal of Qualitative Studies in Education*, 16(2), 175–196. <https://doi.org/10.1080/0951839032000060635>

Price, M. (2015). The bodymind problem and the possibilities of pain. *Hypatia*, 30(1), 268–284. <https://doi.org/10.1111/hypa.12127>

Riley, D. (2017). Rigor/Us: Building boundaries and disciplining diversity with standards of merit. *Synthesis Lectures on Engineers, Technology and Society*, 9(3), 249–265. <https://doi.org/10.1080/19378629.2017.1408631>

Riley, D., Slaton, A. E., & Pawley, A. L. (2014). Social justice and inclusion. In A. Johri & B. M. Olds (Eds.), *Cambridge handbook of engineering education research* (pp. 335–356). Cambridge University Press.

Robbins, S., & Quaye, C. (2014a). Intersectionality: A legacy from critical legal studies. In D. Mitchell, Jr., C. Simmons & L. Geyerbiehl (Eds.), *Intersectionality & higher education* (pp. 31–44). Peter Lang.

Robbins, S., & Quaye, C. (2014b). Racial privilege, gender oppression, and intersectionality. In D. Mitchell, Jr., C. Simmons, & L. Geyerbiehl (Eds.), *Intersectionality & higher education: Theory, research, and praxis* (pp. 20–30). Peter Lang.

St. Louis, K., & Barton, A. C. (2002). Tales from the science education crypt: A critical reflection of positionality, subjectivity, and reflexivity in research. *Forum: Qualitative Social Research*, 3(3), 249–262. <https://doi.org/10.17169/fqs-3.3.832>

Secules, S. (2019). Making the familiar strange: An ethnographic scholarship of integration contextualizing engineering educational culture as masculine and competitive. *Engineering Studies*, 11(3), 196–216. <https://doi.org/10.1080/19378629.2019.1663200>

Secules, S., & Groen-McCall, C. (2019). *To be or not to be: A dialogic discussion of two researchers' hidden and transitioning identities*. Paper presented at the CoNECD—The Collaborative Network for Engineering and Computing Diversity, Crystal City, VA. Retrieved from <https://peer.asee.org/31799>

Secules, S., & McCall, C. (2019). *The known unknowns of diversity & inclusion: Supporting individuals with hidden & transitioning identities*. Pennsylvania State University. <https://doi.org/10.25148/succeed.FIDC008801>

Secules, S., Gupta, A., Elby, A., & Tanu, E. (2018). Supporting the narrative agency of a marginalized engineering student. *Journal of Engineering Education*, 107(2), 186–218. <https://doi.org/10.1002/jee.20201>

Sarrant-Green, L. (2002). Black on Black: Methodological issues for black researchers working in minority ethnic communities. *Nurse Researcher*, 9(4), 30–44. <https://doi.org/10.7748/nr2002.07.9.4.30.c6196>

Sfard, A., & Prusak, A. (2005). Telling identities: In search of an analytic tool for investigating learning as a culturally shaped activity. *Educational Researcher*, 34(4), 14–22. <https://doi.org/10.3102/0013189X034004014>

Smith, J. M., & Lucena, J. C. (2016). Invisible innovators: How low-income, first-generation students use their funds of knowledge to belong in engineering. *Engineering Studies*, 8(1), 1–26. <https://doi.org/10.1080/19378629.2016.1155593>

Sochacka, N., Walther, J., Jolly, L., & Kavanagh, L. (2009). Confronting the methodological challenges of engineering practice research: A three-tiered model of reflexivity. *Proceedings of the Research in Engineering Education Symposium*.

Sochacka, N., Walther, J., & Pawley, A. L. (2018). Ethical validation: Reframing research ethics in engineering education research to improve research quality. *Journal of Engineering Education*, 107(3), 362–379. <https://doi.org/10.1002/jee.20222>

Svyantek, M. V. (2016, June). Missing from the classroom: Current representations of disability in engineering education. *Proceedings of the ASEE Annual Conference & Exposition*. <https://doi.org/10.18260/p.25728>

Tajfel, H. (1974). Social identity and intergroup behaviour. *Social Science Information*, 13(2), 65–93. <https://doi.org/10.1177/053901847401300204>

Tajfel, H., & Turner, J. (1979). An integrative theory of intergroup conflict. In W. G. Austin & S. Worchel (Eds.), *The social psychology of intergroup relations* (pp. 33–47). Brooks/Cole.

Tsugawa-Nieves, M. A., Perkins, H., Miller, B., Chestnut, J. N., Cass, C., & Kirn, A. (2017). The role of engineering doctoral students' future goals on perceived task usefulness. *Proceedings of the American Society for Engineering Education Annual Conference and Exposition*. Retrieved from <https://peer.asee.org/29005>

Tufford, L., & Newman, P. (2010). Bracketing in qualitative research. *Qualitative Social Work*, 11(1), 80–96. <https://doi.org/10.1177/1473325010368316>

Walther, J., Sochacka, N. W., Benson, L. C., Bumbaco, A. E., Kellam, N., Pawley, A. L., & Phillips, C. M. L. (2017). Qualitative research quality: A collaborative inquiry across multiple methodological perspectives. *Journal of Engineering Education*, 106(3), 398–430. <https://doi.org/10.1002/jee.20170>

Walther, J., Sochacka, N. W., & Kellam, N. N. (2013). Quality in interpretive engineering education research: Reflections on an example study. *Journal of Engineering Education*, 102(4), 626–659. <https://doi.org/10.1002/jee.20029>

Wendell, K. B., Wright, C. G., & Paugh, P. (2017). Reflective decision-making in elementary students' engineering design. *Journal of Engineering Education*, 106(3), 356–397. <https://doi.org/10.1002/jee.20173>

Wilson-Lopez, A., Washburn, K. H., & Hasbún, I. M. (2018). Establishing quality in qualitative research with linguistically and culturally diverse research participants. *Proceedings of the American Society for Engineering Education Annual Conference and Exposition*. Retrieved from <https://peer.asee.org/30440>

Xu, M. A., & Storr, G. B. (2012). Learning the concept of researcher as instrument in qualitative research. *Qualitative Report*, 17(21), 1–18. Retrieved from <http://nsuworks.nova.edu/tqr/vol17/iss21/2>

## AUTHOR BIOGRAPHIES

**Stephen Secules** (he/him) is an Assistant Professor in the School of Universal Computing, Construction, and Engineering Education at Florida International University, 10555 West Flagler Street, EC 1274, Miami, FL 33174; [ssecules@fiu.edu](mailto:ssecules@fiu.edu).

**Cassandra McCall** (she/her) is an Assistant Professor in the Department of Engineering Education at Utah State University, 4160 Old Main Hill, Logan, UT 84322-4160; [cassandra.mccall@usu.edu](mailto:cassandra.mccall@usu.edu).

**Joel Alejandro Mejia** (he/him) is an Assistant Professor in the Department of Integrated Engineering at the University of San Diego, 5998 Alcalá Park, San Diego, CA 92110; [jmejia@sandiego.edu](mailto:jmejia@sandiego.edu).

**Chanel Beebe** (she/her) is a PhD Candidate and Ford Foundation Fellow in the Department of Engineering Education at Purdue University, 610 Purdue Mall, West Lafayette, IN 47907; [beebe@purdue.edu](mailto:beebe@purdue.edu).

**Adam S. Masters** (they/them) is a graduate student pursuing a PhD in the Department of Engineering Education and an MS in the Department of Mechanical Engineering at Virginia Tech, Goodwin Hall, 635 Prices Fork Road, Blacksburg, VA 24061; [masters1@vt.edu](mailto:masters1@vt.edu).

**Matilde L. Sanchez-Peña** (she/her) is an Assistant Professor in the Department of Engineering Education at University at Buffalo—SUNY, 140 Capen Hall, Buffalo, NY 14260-5030; [matildes@buffalo.edu](mailto:matildes@buffalo.edu).

**Martina Svyantek** (she/her) is a Doctoral Candidate in an individualized, interdisciplinary Disability Studies program at Virginia Tech, 2020 Torgersen Hall (0292), 620 Drillfield Drive, Blacksburg, VA 24061; svyantek@vt.edu.

**How to cite this article:** Secules S, McCall C, Mejia JA, et al. Positionality practices and dimensions of impact on equity research: A collaborative inquiry and call to the community. *J Eng Educ.* 2021;110:19–43. <https://doi.org/10.1002/jee.20377>