Positionality: The Stories of Self that Impact Others

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Introduction

This initial work in progress paper explores a discussion of positionality from two doctoral candidate researchers in engineering education. Initiated and guided by Culture, and Researcher Positionality: Working Through Dangers Seen, Unseen, and Unforeseen [1], this paper will present a starting point of dialogue and self-exploration from both qualitative and quantitative research perspectives. Engineering education researchers task themselves with being innovators in the production of knowledge. This knowledge is intended to improve and serve current practices and other ways of thinking, knowing, and doing in engineering. However, what can be said of the internal conversation that researchers experience in relation to their work? And does this conversation occur as part of reflexivity in research? This work in progress paper will provide: (1) an initial and non-exhaustive presentation of literature and thoughts related to qualitative and quantitative considerations in positionality; (2) describe the initial process and thoughts of two researcher's conversation of key incidents related to positionality over time; (3) barriers and supports to exploring positionality; and (4) how this exploration influences their respective research. The personal exploration presented here is intended to serve as a starting point to ongoing reflexive work for each graduate researcher as a means of continuous development in their research practice.

Background: The Self and System

Each individual possesses intentions and perspectives that are unique to their personal paradigm or worldview. This basic set of beliefs guide ontological, epistemological, and methodological choices and action [2]. These paradigms that an individual possesses can be a complex makeup of life experiences; exposure to people, places, and things; and a rich entanglement of individual, societal, and organizational influences [3] that interact with self and environment. This realization of the self in relation to what is outside and connected to the self, or the system [4], comprises the unique lived reality of individuals.

Positionality in the context of this paper refers to the "stance or positioning of the researcher in relation to the social and political context of the study - the community, the organization or the participant group" [5]. This designation has roots in the traditions of action-based and critical research in the sense of a researcher's view and interaction with the study participants. Specifically, in the instances of the researcher and researched the question of whether white researchers can and should conduct research on communities of color [4]. The role of the researcher as a conduit and interpreter for data of various components of a participant's life is one that has been historically entrenched in power dynamics. These dynamics have propagated and reinforced inequity and exploitation of communities of color in the United States. A researcher's positionality, including the personal and philosophical perspectives (e.g. worldview), influences the assumptions, research design, and methods [6] for a study. The components of research design, methods, and worldview are interconnected and are therefore influenced by the positionality of the researcher. The acknowledgment and exploration of a researcher's positionality is critical due to the researcher being the primary data collector, analyzer, and interpretation tool in qualitative studies and as the interpreter of quantitative data. For instance, the beliefs and experiences of male whiteness are perceived as the "norm" [1] to which everyone and everything else is compared in educational research. The actual context of a

data interpretation cannot truly be recognized without the acknowledgment and exploration of these tensions. The research choices are impacted as well as whose voice is or is not represented [5].

The initial concepts of positionality have been introduced into the curriculum of methodological coursework at the graduate level in engineering education. Discussions on reflexivity [5], worldview, ethical considerations, researcher bias [6], validity threats [6], and research quality [7] all broach on the complex underpinnings of positionality for engineering education research. However, the primary difference that appears is the consideration of the actual personal roots that a researcher has for the type of research conducted and its "quality", and the peoples researched. Beyond initial considerations, this rooting of thought in relation to another's life experience surpasses reflexivity, which can be confused as being bound to the beginning and end of a study. The consideration of the rooting and internal exploration that exists in positionality is a continual consideration that spans beyond the work of research studies to explore a grappling of personal identity and existence in society.

The acknowledgment and processing of these perspectives will be explored below using a framework of researcher racial and cultural positionality [4]. This framework will assist in presenting the "seen, unseen, and unforeseen" [4] by beginning to (1) research the self, (2) research the self in relation to others, (3) engage in reflection and representation, and (4) shift from self to system. By exploring these facets of our own personal perspective or positionality, we can begin to more adequately investigate the phenomenon of interest involving individuals with different life experiences than our own.

Thoughts of Positionality from a Qualitative Researcher

A key practice that was established early in my graduate career was the concept of reflexivity. This reflexivity was represented in my methodological coursework as a tool to be used while conducting qualitative research. As a means of checks and balances, this tool's purported use became a way to navigate through qualitative research in a manner that acknowledged the relationship between the researcher as an instrument and the processing of information over the course of research projects [8]. This navigation can be conceptualized in practices such as field texts and reflections before, after, and during interaction with research participants as a means to show proof of consideration of positionality, specifically for communities of color [9]. This tool, however, seemed to be accepted as a one size fits all in terms of obtaining research quality for studies, without limited attention paid to the nuances and complexity of what positionality entails. Required readings for my courses encompassing motivation studies, identity development, disparities of underrepresented groups and so forth but neglected the conversation of who was conducting the research. Expertise instead filled the bylines of author biographies and only included professional credentials.

My first realization of the impact of not stating the multifaceted positionality of a research author occurred upon reading an article related to low-socioeconomic African-American student's motivation in a study. I found myself not understanding why many of the details of the study as well as the conclusions made did not resonate, and to a certain extent did not fully realize the experiences that I had witnessed, lived, and studied. Without the conversation of how the researchers viewed their own internal conversation with their identity and the identity of those

being studied, I had limited insight into the perceived worldview and lens of the researchers and therefore limited insight into how the researchers were actually conceptualizing their results for the study. This became a trend for much of the education-related research I encountered through my graduate studies.

With this realization came the absolute need for myself as an individual and researcher, too many times be the lone voice in a discussion of an alternate lens of interpretation for studies dealing with topics explored by white researchers on groups different from themselves. This consideration of the researcher's actions and perspectives of roles, motivation, identity, power, and voice [8], became a clear need in understanding our relationship with the research that we conduct. I realized that I had begun to develop an awareness of the identity of the researcher and what impact that had on the research being presented. More specifically, the researcher's own perspectives on the persons they were studying and the contextual factors that existed in the issues that they researched.

Positionality is formed by both personal and philosophical perspectives. These perspectives are important to acknowledge and unpack for example, in the case of narrative inquiry and methods of narrative analysis. My use of narrative techniques as a qualitative researcher requires that I acknowledge my personal perspectives because the individuals being studied share a different "social reality" [10] than myself. Additionally, the question of who is telling a story is the first consideration in the construction of narrative. As a narrative study, my story as the observer or researcher is as much intertwined in the overall study as the participants themselves [11]. I will present the exploration of my personal perspective using the framework of researcher racial and cultural positionality [4]. Research of myself, myself in relation to others, engaging in reflection and representation, and shifting from myself to the system will be explored to present my personal perspective in my research study.

Lived Experience and Positionality

I have matriculated through the public-school system and subsequent public higher education institutions as a racially ambiguous (i.e., "light-skinned") Black woman, and each of these phases of education was in predominantly white environments. The perception of my racial ambiguity by others contributed to my interactions with students of various cultures due to misidentification by Asian and Latinx cultural groups who shared similar physical features; access to advanced coursework due to the location of my high school; and being categorized by teachers as "non-dangerous," which kept me from being overpoliced [12], due to the long-standing U.S. history of colorism, or "the allocation of privilege and disadvantage according to the lightness or darkness of one's skin" [13]. Though these experiences may seem trivial to some, they inform my presence as a researcher in the current study and have guided my activities as a broadening participation practitioner. My experiences as a minoritized engineering student, practitioner, and researcher have led me to acknowledge, respect, and pursue exploration for the experiences of individuals who are "othered".

During my undergraduate career, exposure and interaction with various groups, especially white men, was frequent and required due to the Midwestern rural composition of my engineering degree program. These interactions were welcoming, unwelcoming, supportive, and at times bigoted. Some interactions involved me overhearing or being in the environment of

conversations that were racist in nature against Black people, while other interactions were inquisitive and inclusive conversations about race. These experiences have caused emotional reactions linked to not feeling a sense of belonging in my undergraduate career and in my first full-time engineering position. However, I was able to navigate these experiences when I was able to find shared goals or interests with white men. Reflecting on these experiences is a necessity in the qualitative research that I conduct due to the shared and unshared positions that I have with the participants. However, without the acknowledgment of these experiences, I cannot fully engage in the research processes needed to capture the stories of those with a different lived experience.

From my own experience, I could easily hold emotional or biased notions related to the identities of participants, that could influence how I present the narratives of others, or even how that narrative is co-constructed with the participant. Similarly, having a shared experience with participants could contribute to a predilection that could prevent the nuanced exploration of a participant's experience. Narrative methods express the importance of knowing that the role and influence of the researcher are critical and intertwined with the story of the participant [14]. These acknowledgments and explorations of positionality could be deemed necessary for all studies regardless of power differential or cultural dissimilarity. However, the historical context of research, as it pertains to sociological and anthropological studies has been viewed through the lens of the white experience and therefore placed at the forefront the normalization of whiteness. This status quo is only reinforced through the methodological decisions we as researchers make, thereby producing results and analysis that combines our perspectives with the experiences of our participants.

The previous experiences that are expressed influence key components of my research. Reflexivity or the influence that my personal connections, background, and culture have on my interpretations of the participant and their story [6] is shaped by positionality and the ability of the researcher to use introspection when interacting with the study. As a member of a marginalized group studying the lived experiences of white men, I will need to consult with researchers in engineering education who are members of the group in question. Acknowledging how I as a researcher have interacted with a majority racial group is a way to acknowledge and dissect my personal experiences in order to be reflexive. This reflexivity is important in order to not unconsciously influence the stories of participants through only my personal experiences. Although unconscious perspectives surely influence the research, a researcher exploring their own positionality deeply can verify to an audience that these considerations have been explored. Therefore, my role as a researcher is a balancing of the exchange of the participant being capable of telling me their story, and me being able to communicate with them in a way that will allow me to capture and interpret their individual stories.

Thoughts of Positionality from a Quantitative Researcher

Using quantitative methods is where I feel at home, but it is a troubled home nonetheless. Quantitative inquiry can often be seen as a neutered perspective of reality, a supposedly objective way to determine causality or "impact," however defined. The post-positivist underpinnings of a "capital" T truth is a comfortable reality of the undergraduate-me. Textbook engineering analysis problems had one unique answer, or if it was open-ended, expected a regurgitation of the pre-approved opinion. The differential equation does not bring any inherent

cultural identity impacting the problem. My journey regarding positionality to this point, while short compared to countless other senior faculty and researchers in the field, has been winding and uncomfortable as the assumptions I had held gradually slipped through my grasp.

Objectivity was the first fantasy to fall to the wayside for me; numbers could betray us at any moment. The use of faulty statistics to deceive and sway favor in the public and private sectors. From reporting inflated sales figures to drawing from biased samples to assert a supposed norm, the number is only as good as its generator. Quantitative inquiry can be accompanied by a statement of positionality or reflexivity to outline how the researcher's biases and background influenced design choices and interpretations, perhaps by engaging with Milner's [1] prompts or through a different dialectic process.

Numbers, on the other hand, can be politicized and measures of constructs can be perverted, but quantitative inquiry is not necessarily required to include such discussions. Definitions of constructs, choices of variables, how categories are aggregated – all have implications. Simpson's paradox [15] is one classic example of the need for domain knowledge to know where to and how to disaggregate. The premise of the paradox is that groups will exhibit a certain trend on their own, but when the groups are gradually aggregated the trend can reverse or disappear entirely. Figure 1 displays a simplified visualization of the paradox. The classic example in education concerns the assertion of sex bias in Berkeley's graduate admissions from 1973 where, in aggregate, men were admitted in numbers disproportionately higher than women [16]. However, when the data is pooled by the department, the male advantage disappears and swings in a slight favor of women - but not nearly as severe an advantage to males in aggregate. If results are not interrogated beyond one's own biases, there is a chance Simpson's paradox can lead one astray and settle for incomplete inferences.

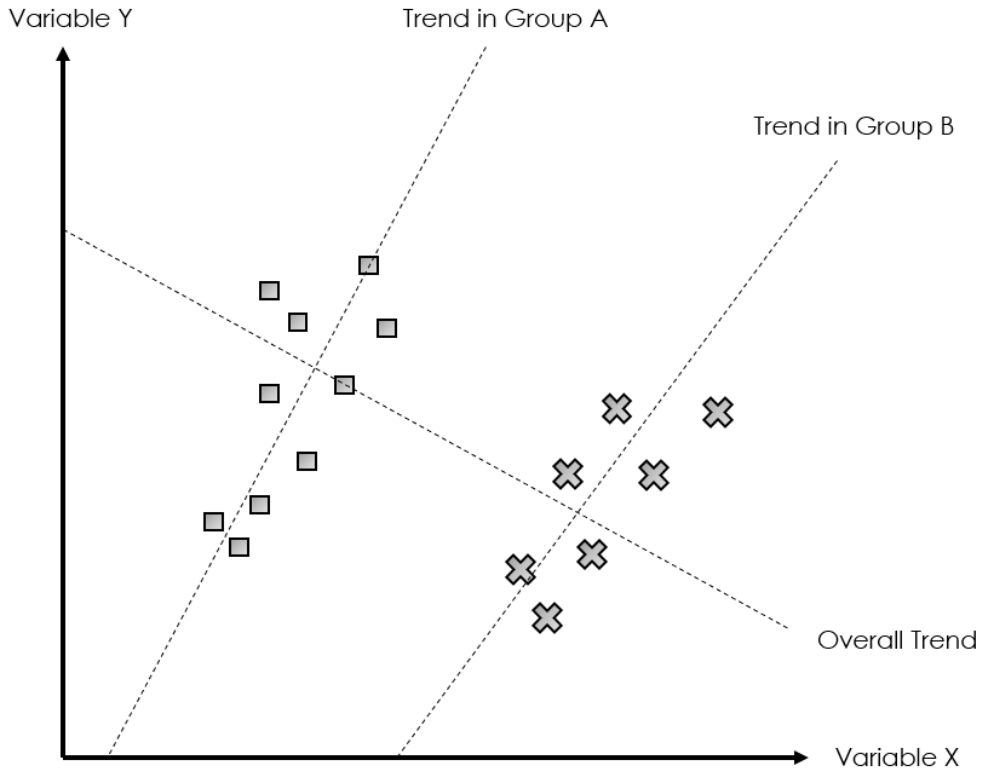

Figure 1. Visualization of Simpson's Paradox, trends can change or disappear in aggregation

Indices can also mislead or be arbitrary depending on the context, such as in cluster analysis. Consider the classic question in such analyses [see 17], how many clusters do you expect in the upper left box of Figure 2? Perhaps three if the separation between the masses of points is considered with respect to some imaginary centroid. However, four could also be defensible if we look at the density of points rather than their proximity to a centroid/center. On the other hand, what if we stepped back and rethink what constitutes a cluster? The cluster does not need to be a spheroid. In fact, the cluster could be an arbitrary shape - often resulting from density-based algorithms. We could just as easily claim two clusters as a result. After running the algorithms, deciding which solution is most appropriate without context can reduce the process of picking the solution with the best indices, even if its practical explanatory power is suboptimal. Those with a more positivist value system could likely cringe at such a statement, and I have come to feel incomplete at performing purely quantitative cluster analysis - believing it to be a mixed technique at heart.

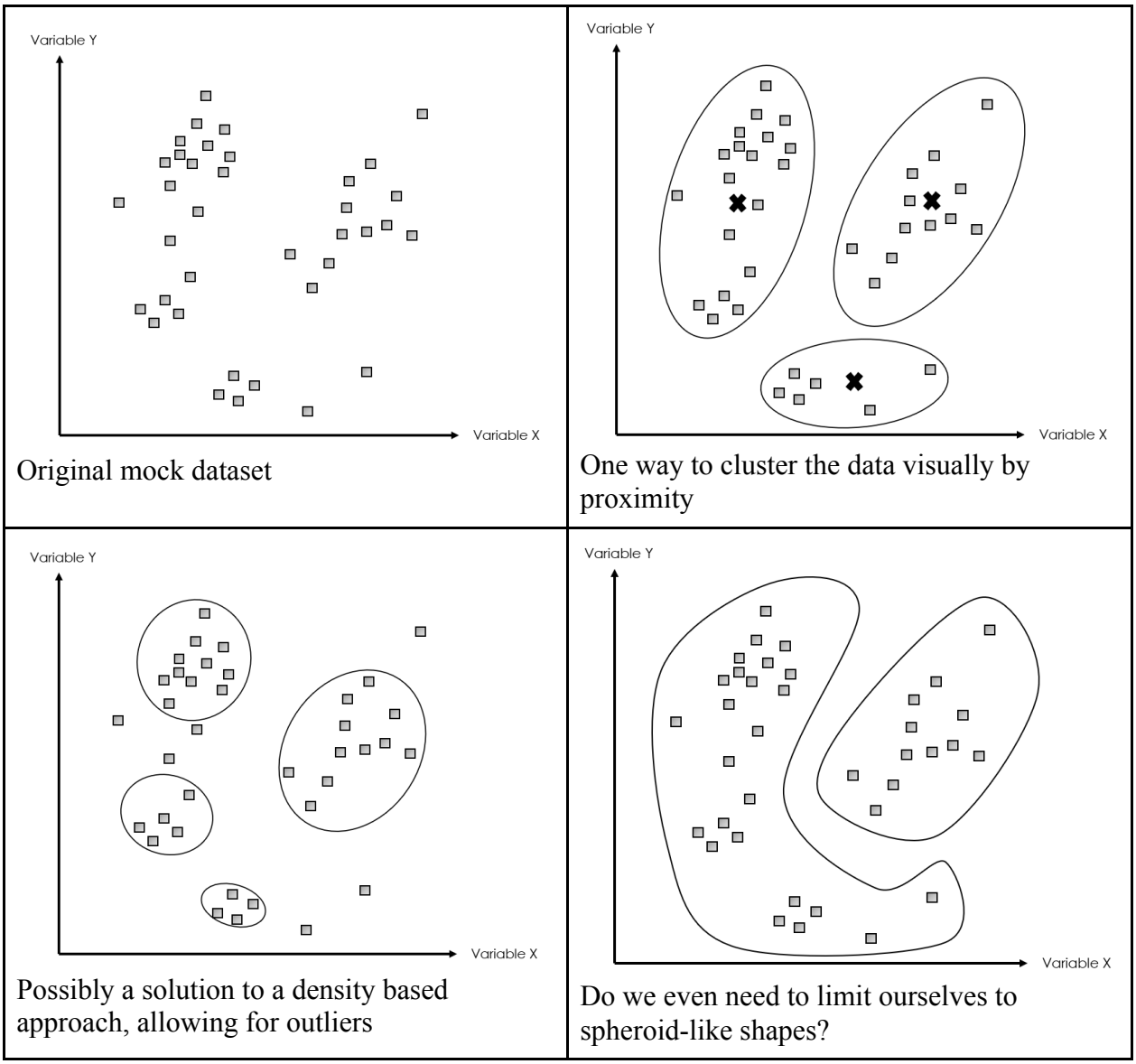

Figure 2. Demonstrating the ambiguities in cluster analysis without qualitative context

The perplexing question of the number of clusters or what "good" happens to mean is where qualitative evidence is needed - hence, the "mixed" reference. The most reasonable solution should go beyond optimizing a set of context-neutered measures [18]. Both Simpson's Paradox and clustering demonstrate the demand for a careful examination of domain knowledge to make sound decisions.

Procedures in quantitative inquiry are no less prone to biases than qualitative inquiry. For example, Garvey [19] discussed his emotions in studying queer and trans collegians, including design decisions that have stuck with him to this day. Quantitative, qualitative, mixed – regardless of the approach, I have come to think more critically about what I bring to the design in the form of motivations, biases, and relevant background. Much of my work does not directly deal with students. Perhaps linking to my passion for studying methods and connecting them

with issues in the field in addition to my affinity for using existing data whenever possible. Often times I can feel insincere in my research interests because of my background considering I feel that I cannot relate in studies dealing with a disadvantage. Without having the common background, I can only assume what it would be like based on the stories of those who had the experience of being in a disadvantaged position.

No better example than my dissertation work highlights the disconnect with respect to experience. My dissertation concerns how information is communicated to transfer students, which stemmed from my bewilderment from stories of those I knew, students and close friends, who were short-changed with their credit hours. I had never been a transfer student from another university or community college, nor had I ever attempted to transfer credit of any kind. My educational trajectory was largely as smooth as one could imagine, placing me in an uncomfortable position. My discomfort largely stems from my role as a researcher. I do not want people to feel "studied" in a clinical sense or part of some white savior narrative in a selfish quest for my own self-discovery [see 20]. Much of what I currently do concerns using existing data, which has in some ways been useful in demonstrating cost-cutting, pragmatic ways to conduct research – gaining new insights by simply looking at what already exists. Yet it simultaneously ignores the fact that characterizing a sociotechnical system requires working with the actors within the system [21]. Of course, it can be asserted no system can be captured fully in a model through the quantitative and qualitative methods anyone employs. I have come to understand the need for balance in my work and finding the right people - other researchers, students, administrators, teachers – to collaborate within a participatory manner.

More generally, the more papers I read and the presentations I saw, the more I had a nagging feeling quantitative methods were being used in situations as a tool to suppress questions and critiques. For those not comfortable with quantitative inquiry, the presentation of quantitative methods and results can become an exercise similar to what mathematicians joke as "proof by intimidation" or "proof by verbosity." The general idea of "proof by verbosity" is to overwhelm the audience with material and jargon such that the argument becomes so incomprehensible the audience has no way to refute it without admitting their lack of understanding [22]. What I have seen along the lines of "proof by verbosity" in practice is the acceptance of face validity based solely on the impressive analyses. Face validity can be described as the "mere appearance the measure has validity" [23]. Coupled with the technical jargon seen in nearly every field and symbolic representation of information, face validity can be easily given to an unsatisfactory piece of work.

Because mathematics is often associated with objectivity and rigor, rigging up a formula seems to provide a sense of legitimacy. One work comes to mind that contained an equation connecting four constructs together with several undefined symbols that did nothing more than likely intimidate the reader – little value added where a figure would have been enough. Recognizing that not everyone is as thrilled about quantitative work as I am was difficult to accept, but I contend I have grown to put the needs of others in reading what is produced versus the enjoyment I receive from running the analyses.

Implications for Engineering Education

The lines of quality become blurred when engineering education-based researchers do not acknowledge their positionality as to what experiences they place at the forefront in studies involving women and African-Americans, Latinx, Native Americans, first-generation students, persons with disabilities, or any other peoples marginalized in engineering education. This type of discussion in practice looks like a conversation on women broadly throughout a journal article and then concludes with a short discussion on the experiences of racially minoritized groups as an add on at the end of a study. The discussion of positionality adds context for study design, results, and implications drawn from analyses. As a visualization, a study without positionality is like a map without a due north. All the components and features are present, but where the study was conceived and where it is going has no grounding. When a researcher has not acknowledged their power or privilege, or perhaps their whiteness, or more broadly their experiences with these components, the reader and the populations studied have no grounding for why conclusions were made or policy implementations requested.

For engineering education as a field, researchers must communicate who they are in relation to their research and practice. This is a clear departure from what is conceived as engineering work in a classical (yet challenged) sense of removing self and only applying theory and calculation. Researchers often prioritize the experiences of majority groups in discussion of the results, with the added caveat of only a small number of racially minoritized groups available for participation, with this being the accepted validation for a lack of focus on the experiences of these "othered" groups. This discussion is expounded upon by various researchers such as Amy Slaton and Alice Pawley, with work done that supports self-critique and disciplinary reflection about our "research preferences" in response to the "small N" [24]. This is further discussed when considering the majority of research done that pertains to engineering education, in which majority status (upper middle class, white, cis, male, able-bodied) students and practitioners are the majority from which research has been conducted. In essence, the lack of reflective work that utilizes critical and intersectional theories that integrate needed positionality self-work only furthers the potential of quantitative research to exploit power differentials. This additionally works to prevent the unpacking of educational conclusions made that quite honestly only apply to majority and privileged groups. Making explicit the ways in which research does and does not consider groups that are unlike the individuals conducting the research serves to only minimize the extreme limitation of findings, and that these studies are rooted in the white male experience [25]. We must remember that research can disenfranchise as much as it can empower, using common methods guided by a researcher's position, i.e. narrative smoothing [26] and data cleaning of outliers. Our research intended and unintended consequences.

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