

Proto-Narrative: A Critical Exploration of the Cultural Identities Held by Black Women in STEM

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Abstract: Systemic structures have historically marginalized Black women, especially those with disabilities, from pursuing careers in STEM fields, perpetuating exclusionary practices within higher education institutions. The need for increased representation of Black women, including those with disabilities, in STEM has prompted institutions to prioritize graduation within this demographic. To meet the demand for more Black women entering the STEM field, higher education institutions encourage the integration of culturally relevant STEM curricula. Using culturally relevant models, such as Flake's Four Dimensions of Cultural Identity, based on Paulo Freire's Critical Reflection from the lens of Henri Tajfel's Social Identity, humanizes the educational journey of Black women in STEM, fortifying the Black women in STEM industry. Building on Flake's Cultural Identity framework, this paper uses Freire's Critical Pedagogy to underscore the transformative potential of culturally aligned curricula, fostering a learning environment conducive to the empowerment of aspiring Black women in STEM while anchoring them to their cultural roots. Therefore, this paper explores reflective narratives of Black women in STEM during their higher education experiences, illuminating the significance of their cultural identity in shaping their agency in STEM. Their narratives seek to inform the development of STEM curricula that empower Black women with the introduction of the authors' conceptual framework centered on cultural identity, learning communities, and agency. Within this framework, the proto-narratives of the study's participants, Black women in STEM with a disability, reveal how a sense of belonging within the learning community mediates the cultivation of agency within STEM. As such, this study elevates the experiences of Black women in STEM as proto-narratives, emphasizing these narratives as the genesis, in contrast to often labeled counter-narratives. It underscores the critical importance of recognizing and nurturing cultural identities to empower and advance the next generation of Black women in STEM.

Keywords: Black women, STEM, cultural identity, higher education, cultural pedagogy

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Maybe Black women just know what little Black girls need to hear. Maybe she was telling me what she wished someone had told her.

—Renée Watson

In the quiet spaces of introspection, where the echoes of our own stories resonate, questions arise that demand answers. Questions like, “Who has the right to write the story of a little Black girl? Of a young Black woman? Who has written the stories of our Black foremothers?” In the evocative words of Renée Watson, perhaps it is the Black women themselves who know what these little Black girls need to hear, for they understand the yearning for guidance and affirmation.

Within this realm of contemplation, we embark on a journey—an exploration into the lives and narratives of Black women of the Diaspora with a disability in STEM (Science, Technology, Engineering, and Mathematics). This narrative case study analysis delves into the complexities of cultural identity and the intertwined experiences in developmental, educational, and professional contexts that have shaped the experiences of Black women with disabilities in the STEM fields. The intersection of race, gender, and disability forms a unique landscape in the professional journeys of Black women in STEM. This confluence often leads to compounded challenges, echoing the multidimensional nature of oppression faced by this group.

Our inquiry transcends the dominant distortion of conventional narratives and goes beyond the limitation of terms like “counter narrative,” seeking the profound truths that reside within the hearts and minds of those who have gracefully navigated this intricate terrain, the proto narrative (Biti & Žigo, 2021). We do this in recognition of Black women, who are the sole witnesses to the intricacies of their intersecting identities firsthand. Through their gaze, we aspire to unearth the authentic stories—narratives that not only reveal the remarkable resilience, aspirations, and contributions of Black women with disabilities in STEM but also challenge the notion that such narratives can be confined within a single, reductive label.

As we embark on this journey, we are guided by the understanding that, in the landscape of contemporary lived experiences, none other than the Black woman herself has truly encompassed the narratives that need to be told. Their voices are central, their perspectives are paramount, and their stories are the ones we must listen to and honor.

In this narrative case study analysis, we confront the responsibility of documenting these narratives, amplifying their voices, and engaging with the profound question: Who holds the responsibility of writing the truest narrative of our origins? Together, we embark on a critical exploration—a journey into the cultural identities of Black women of the Diaspora with a disability in STEM, seeking to unravel the stories that have long been waiting to be told and uncover the treasures of their truths.

Participants Profiles

There were four research participants who participated in this study. Research Participant A is the first Black female PhD Physics student at her university, holding a Bachelor of Science in Physics. Of Nigerian heritage, she has experience in both government and private research labs and has self-reported attention deficit hyperactivity disorder, with a predominately inattentive presentation, or ADD. Research Participant B, a Black female of Jamaican heritage, is a middle school mathematics teacher with a Master of Arts in Teaching in Education. She has self-reported a physical disability. Research Participant C, a Black female adopted from foster care with an undefined heritage, has pursued a career in information technology. Her educational background includes an Associate of Science in Computer Information Systems, a Bachelor of Science in Health Informatics, and a Master of Science in Computer Science with

a focus on Cyber Security, and she is currently pursuing an EdD in Information Technology. Lastly, Research Participant D, a Black female with Nigerian heritage, has served as both a high school and university professor in mathematics and science. She holds a Bachelor of Art in Education, a Master of Education in Curriculum and Instruction, and an EdD in Educational Leadership. Research Participant D has self-reported attention deficit hyperactivity disorder and Post-Traumatic Stress Disorder.

The Experiential Knowing

Never limit yourself because of others' limited
imagination"

—Mae Jemison

In the rich tapestry of Africana and Black Feminist studies, the concept of "Experiential Knowing" emerges as a dynamic thread interwoven with cultural resilience, heritage, and the collective wisdom of Black women. Grounded in the profound ideologies of villagehood and mothership (Collins, 1990; hooks, 1994; Lorde, 1984; Moraga & Anzaldúa, 1983), this review of existing literature details our shared journey of exploring the transformative potential embedded in the lived experiences of Black women of the Diaspora, from their culturally nuanced girlhood to their navigation of the education system and their subsequent professional experiences in the STEM fields.

Africana and Black Feminist studies have long recognized the significance of centering experiential knowing—the deep, intuitive understanding that arises from the intersection of personal, cultural, and historical contexts (Collins, 1986; Collins, 2000; Crenshaw, 1989; hooks, 1984). The villagehood metaphor emphasizes the interconnectedness of Black communities, underscoring the communal responsibility for nurturing and uplifting the next generation. Mothership, as an extension of this metaphorical village, symbolizes the nurturing and guiding force that mothers and mother figures embody. In exploring experiential knowing, this review amplifies the voices of oftentimes economically disadvantaged Black girls through the perspectives of Black women of the Diaspora, acknowledging the pivotal role played by mothers, caregivers, and the broader community in shaping their educational narratives.

As we delve into the exploration of experiential knowing, our focus centers on the lived experiences of Black girls within the K-12 public education system as an enabling or disabling condition for their future professional navigation in their respective STEM fields. The review of literature is further enriched by perspectives of Critical Disability Studies. This literature review seeks to unravel the layers of their experiences through the lenses of decoloniality, critical pedagogy, and the unveiling of origin perspectives. DisCrit, as explored by Connor, Ferri, and Annamma (2015), offers a lens through which these experiences can be critically explored, revealed the entrenched biases in STEM fields. Guided by the understanding that experiential knowing is not solely an individual journey, but a collective endeavor deeply rooted in cultural nuance and community support, we aim to contribute to the authentic narrative; one that values and empowers Black girls. Through an interdisciplinary lens, we traverse landscapes and climates that recognize the transformative potential within the collective wisdom of the village and the guiding force of the mothership, fostering an educational environment that embraces their unique experiences and cultivates their holistic growth.

Stream 1: Decoloniality and the Impact on Black Women's Lived Experiences

The concept of decoloniality, emerging as a counterforce to the lingering impacts of colonialism, is pivotal in understanding the lived experiences of Black women. This research

stream explores how decoloniality intersects with the cultural, social, and academic experiences of Black women, particularly those in the STEM fields.

In *Local Histories/Global Designs*, Mignolo (2000) explores decoloniality as a concept challenging the Eurocentric worldview, laying a foundation for understanding and its application in various disciplines. Contemporary scholarly works following Mignolo's illustrate decolonial thought in action, especially as it relates to Black women's experiences and knowledge systems in STEM education and practice. Similarly, Quijano (2007) critically analyzes the underlying colonial structures that continue to affect societal experiences, such as institutional racism and lack of representation in academic and professional spheres, which are demonstrable barriers to the inclusion of those from non-Western social contexts.

In her work on intersectionality, Collins (2015) offers insights into how multiple identities intersect, a key consideration in the study of Black women with disabilities' experiences. This builds upon the examination of *Coloniality and Gender* by Lugones (2008). These works detail the multiple layers of discrimination Black women navigate. Davis (2003) also explores the societal structures affecting Black women, specifically detailing how the intersection of gender and race in the framework of coloniality manifests in both professional and personal spheres. Decoloniality can challenge and dismantle the intertwining of ableism and gender biases within STEM education and careers through its emphasis on the need for a radical shift in perspective—one that fully acknowledges and values the diverse experiences of Black women with disabilities.

Through decolonial approaches in education, several methods and strategies have demonstrated enabling conditions for Black women with disabilities in academic spaces. The decolonized approach goes beyond surface-level inclusion, advocating for deep, structural changes that recognize and celebrate diversity in all its forms. For example, in *Teaching Africa*, Dei's (2010) introduces decolonial perspectives in education, particularly relevant for Black women in academic spaces. Dei's research recognizes and emphasizes the value of cultural relevance and integration of indigenous knowledge systems into academic curriculums. Similarly, in *Decolonizing Methodologies*, Smith (2012) discusses research methods that challenge colonial biases, which is vital for students of Black women in STEM. Additionally, Bang and Medin's (2010) *Culturally Responsive Science Education* highlights the importance of embedding these decolonial approaches in STEM, namely for the enabling conditions it manifests for women of color. The use of participatory learning and teaching methods challenges traditional hierarchies in the classrooms of young Black girls, subsequently empowering Black women to think critically about colonial histories and their present-day impacts. These methodologies frame the experiences in which Black girls and Black women's knowledgeability is concentrated fuel to propel their communities forward. Furthermore, the decolonization of science and technology studies ultimately dismantles the colonial legacies of the STEM fields, specifically, offering practical pathways for empowering Black women in these areas (Eglash, 2016).

Thus, given the foundations of conceptualizing decoloniality paired with the exploration of its impact on Black women, the nuanced, intersectional experiences in varied social contexts encountered throughout their lives. The continued groundbreaking works of Collins (2000, 2015), among other scholars provides discussion regarding the empowerment and agency of Black women. In Dr. Bettina Love's (2019) *We Want to Do More Than Survive*, the shared narratives echo the decolonial struggles and triumphs of Black women. This research will build upon this scholarly body of knowledge to provide poignant, real-life examples of how these experiences are lived and felt by Black women with disabilities every day.

Stream 2: The Transformative Potential of Unearthing a Critical Lens

A critical lens in education is essential for recognizing, challenging, and transforming the systemic inequities that pervade society and academia. The direct experiences of the Black women with disabilities as professionals in STEM fields and participants in this study constructs a story of Black women of the diaspora in which they are charged to “articulate the complications, struggles, contradictions, and overall beauty of Black girlhood and womanhood” (Brown et al., 2015, p.137); through this unearthing process, this study provides both reader and participant the opportunity to “name her truth, locate herself as a legitimate source of knowledge, and call for societal change” (Toliver, 2020, p. 517). This stream integrates insights from critical pedagogy, reflective practice, and narrative analysis, focusing on their implications for social transformation.

The writings of Paulo Freire and Henry A. Giroux provide the related foundational theory for discourse on naming truths and advocating for social change. Freire (2000), in *Pedagogy of Freedom*, posits that education must move beyond mere transmission of knowledge to foster critical consciousness—an awakening that equips learners to understand and transform their world. Similarly, Giroux (2011), through *On Critical Pedagogy*, champions education as inherently political, urging a pedagogy that emboldens students to recognize and resist social injustices. These words underscore the imperative of a critical lens in education that not only critiques the dominant distortions of society but also empowers individuals, including Black women and girls from economically disadvantaged backgrounds, to enact transformative change.

Building upon the transformative educational paradigms, Schön's (1983, 2017) concept of the reflective practitioner delves into the cyclical process of reflection-in-action within professional contexts, which, when applied to education, underscores the necessity for teachers and learners to continuously adapt and reflect on their practices. This practice is pivotal in fostering an environment where educators are not just imparters of knowledge but lifelong learners themselves, embodying the ethos of transformational education. This reflective cycle, as Mezirow (2000) posits, is not just a tool for individual improvement but a catalyst for collective advancement. Mezirow's extension of this reflective imperative suggests that genuine learning embodies a transformation, a profound shift in perspective that emerges through critical reflection and discourse, a mechanism for personal growth and societal change. Moreover, such an approach encourages learners to become active participants in their learning journey, where education is not a passive experience but an active exploration of self and society. These practices can act as powerful levers for equity in STEM by drawing on the principles of DisCrit.

Narratives are critical in shaping our worldview and in the reclamation of marginalized identities, including Black women of the diaspora. Narratives, as Bruner (2002) suggests, are not mere stories; they are the very means by which individuals and groups articulate their identities. They act as vehicles for sharing lived experiences and as powerful instruments for cultural assertion and resistance. In *Storytelling for Social Justice*, Bell (2010) amplifies this notion, contending that narratives, especially those woven into the fabric of social justice education, are powerful tools for challenging systemic inequities. These personal and communal stories provide context to abstract theories and bring to life the statistics that often overshadow individual humanity. These stories serve as both mirrors and windows: mirrors in which learners see their experiences reflected and windows through which they can view and better understand the lives of others.

The intersection of critical narrative approaches and intersectional analysis offers a profound lens for addressing the intricacies of identity and oppression through the lived experiences of Black girls and women (Collins, 2015; Crenshaw, 2005). Crenshaw maps the

intricate landscapes of oppression where multiple identities intersect, offering a lens through which educational experiences can be understood and transformed. Collins probes the definitional complexities of intersectionality, pointing out the unique experiences at these intersections and the need for an educational praxis that recognizes and honors these nuances. Crenshaw's and Collins's work on intersectionality illuminates the multifaceted experiences of individuals at the confluence of various social categorizations, advocating for educational practices that are acutely aware of these complexities. Likewise, Lubin's (2022) *Gifted State of Mind* extends this dialogue by exploring leadership's cognitive and emotional landscapes contributing to the enabling or disabling conditions of Black girls and women in educational settings, emphasizing the unique challenges and strengths they bring to these environments. Lubin's work underscores the importance of recognizing and nurturing the intellectual and emotional gifts of Black girls, advocating for a more nuanced and supportive approach in both educational theory and practice. This perspective aligns with and enriches the broader discourse on intersectionality and educational empowerment, offering a critical lens on the experiences of Black girls in academic and professional spheres. The integration of disability awareness into the narratives is not only essential but transformative in centering Black women as more than their aggregate experience that has been presented and explored to counter dominant culture. Furthermore, this understanding is crucial for creating empowering learning environments, as hooks (2003) envisions education as a collective journey toward enlightenment and liberation. In *The Dreamkeepers*, Ladson-Billings (2009) promotes this vision by showcasing how culturally relevant pedagogy not only acknowledges but celebrates the diverse cultural backgrounds of students, as can be related to the diversity of the diaspora that is often presented in a monolithic deindividuated format. The vision thereby fosters academic success and enables societal change in an effort to enhance the quality of lived experiences for these communities throughout the phases of their developmental, educational, and professional growth. This cohesive framework suggests a pedagogical shift towards a more inclusive, reflective, and socially responsive educational model to harness the power of experiential knowledge and transform both the individual and the collective.

Finally, addressing the specific concerns of marginalized voices in STEM, Ong et al. (2018) advocate for the creation of counter spaces that provide nurturing environments for women of color, which are essential for their persistence and success in these fields. This call is a profound recognition of the barriers faced by Black women of the Diaspora with a disability in STEM and the need for dedicated environments that foster growth and resilience. Yosso's (2005) *Whose Culture has Capital?* challenges the traditional academic capital narrative, arguing for the recognition of the multifaceted cultural wealth that students of color bring to the educational landscape. This proposition of cultural wealth, often undervalued in mainstream education, pushes this dialogue further, urging educational systems to value the rich, diverse cultural contributions that Black girls of the diaspora offer. Such recognition is not just a matter of equity; it is a means to enrich the STEM fields with a broader range of perspectives and ways of knowing. By valuing the cultural assets that all students bring to the table, the STEM community can drive innovation and discovery that is truly representative of our diverse society.

The convergence of critical pedagogy, reflective practice, and narrative as transformative tools in education is not merely academic; it is a robust blueprint for action, a manifesto for transformative change in the collective consciousness. This narrative is about empowerment, giving voice to the voiceless, and reclaiming spaces where the presence of marginalized groups has historically been ephemeral. This research will not only offer a deep understanding of the layered complexities of identity and the revolutionary power of education but will also offer a prismatic lens to re-story the dominant distortions embedded in the narratives of STEM. This proto-narrative arc promises not only to reconstruct the stories within STEM but to reconfigure the very essence of who tells them and how they are told.

Stream 3: Unveiling Conscious Perspectives through Prototypical Narration

Narratives of Black women with disabilities in STEM are more than stories; they offer insights into the lived realities of navigating STEM fields at the intersection of race, gender, and disability. In this research stream, we delve into the potent interplay between narrative and consciousness. Drawing from Jerome Bruner's (2002) seminal work, *Making Stories: Law, Literature, Life*, we examine the argument that narrative is not merely a method of communication. Contemporary scholars such as Bruner (2002) have posited that narrative is a primary mode of thought, a way in which individuals make sense of experiences and construct reality. This centers the narrative as a fundamental framework through which humans perceive and construct their lived experiences. This perspective is crucial in understanding how storytelling shapes individual and collective consciousness.

Notable scholars like Chimamanda Ngozi Adichie (2009) have discussed the “danger of a single story,” highlighting the need for a multiplicity of narratives to combat stereotypical archotyping of a population and the dominant distortions that perpetuate those stereotypes. This resonates deeply with the focus of this research; Adichie's caution against a singular narrative exposes the reductionist dangers in understanding complex identities, such as those of Black women from the diaspora with a disability. Her advocacy for the acknowledgment of Black women's multiplicity is an effort that aims to foster a more nuanced understanding of diverse experiences. Adichie's eloquent argument for these corroborated narratives underscores the importance of individuation of the experiences of Black women of the diaspora as a framework for shaping a more holistic and inclusive consciousness. Jack Mezirow's (2000) *Learning as Transformation* extends this narrative understanding into the realm of education. His transformative learning theory posits that true learning is a metamorphic process, echoing the belief in the power of narrative to not only inform but transform. This learning theory highlights the process of sense-making through critical reflection, aligning with the narrative's capacity to underscore the evolution of our shared conscious understandings.

Ricoeur's (2004) *Memory, History, Forgetting* reflects the complex relationship between narrative, memory, and identity. Ricoeur's philosophical approach provides a deeper understanding of how narratives influence our perception of history and personal identity, a key aspect of this research as it aligns with the conceptualization of decoloniality. It underscores the significance of storytelling in reclaiming histories and identities. Similarly, Linda Tuhiwai Smith's (2012) *Decolonizing Methodologies* offers a critical perspective on the role of narrative in research, particularly in Indigenous and marginalized communities. Her insights are instrumental in understanding how narrative methods can serve as tools for decolonization and empowerment. It emphasizes the use of narrative as a decolonizing force. Additionally, in *The Performative Sustainability of Race*, Alexander (2015) delves into the narrative and performance as tools for understanding race and identity. His work aligns with how narratives can illuminate and challenge societal constructs of race and identity through animating these constructs in presented cases. This is integral to reshaping perceptions of race and identity.

Nussbaum (2010) expands this conversation to the societal level, arguing for the humanities' role in developing empathy and critical thinking—skills crucial for engaged citizenship. Her views reflect the belief in the transformative power of narrative in shaping consciously civic scholars and professionals. This complements Tuck and Wang's (2014) work, particularly their chapter “R-Words: Refusing Research” in *Humanizing Research* which discusses the ethical implications of narrative in research with marginalized groups. These scholarly perspectives are crucial to the ethical considerations of narrative inquiry methods, ensuring that the inquiry process remains sensitive and empowering to marginalized groups. This scholarly body of work is deeply considered in the presented re-storying methods of this research to reimagine dominant narratives in STEM fields. This study operationalizes the

experiential knowing related to re-storying methods through Lubin's developed methodology of Prototypical Narration Surfacing and Synthesis (Lubin, 2024) anchored conceptually by Flake's 4E's (Flake, 2023a).

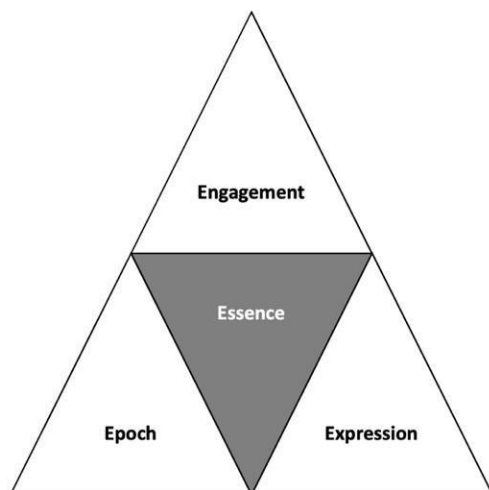
In summary, this literature review provides context for the following research study, which weaves the diverse perspectives of Black women of the diaspora with disabilities into a corroborated anthological narrative that underscores the transformative power of storytelling in shaping consciousness, with a particular emphasis on how prototypical narratives can unveil nuanced experiences of often marginalized and deindividuated voices.

Establishing the Protonarrative of Black Women of the Diaspora through Flake's Four Dimensions of Cultural Identity

Based on the re-storying methods of the Prototypical Narration Surfacing and Synthesis, this research distills the narratives of four study participants through the cross-section of their developmental, educational, and professional experiences as they relate to their four dimensions of cultural identity. The design of the narrative case study was based on Sherita Flake's Four Dimensions of Cultural Identity, which offers an explanation for the intersectionality of one's cultural identity (Flake, 2023b). Figure 1 provides a visual representation of the multidimensional cultural identities, while Table 1 provides a list of the cultural identities within each dimension of cultural identity. Throughout this study, the researchers underscore the four dimensions of cultural identity to learn from the narratives of Black women in STEM with a disability within the diaspora to answer the following two research questions: (1) What are the unique narratives, challenges, and achievements of Black women of the Diaspora in various STEM professions and from different origins, and how do these narratives challenge existing stereotypes and narratives? (2) How do the principles of decoloniality and critical pedagogy intersect to facilitate the empowerment of Black women of the Diaspora with a disability in STEM and to dismantle systemic barriers within the field?

Figure 1

Four Dimensions of Cultural Identity



Note. This image provides a visual representation of the four dimensions of a person's cultural identity, whereas essence cultural identity is the core of one's being.

Table 1

Identified Cultural Identities within the Four Dimensions of Cultural Identity

Essence	Engagement	Expression	Enoch
Nationality	Socioeconomic Status	Artistic Expression	Historical Events
Ethnicity	Education Level	Sports/Recreation	Social Justice
Geographic Region	Occupation/Profession	Genres of Art	Historical
Citizenship Status	Generation/Family	Popular Culture	Resilience/Resistance
Gender Identity	Structure	Body Image	Colonialism
Sexual Orientation	Cultural	Fashion/Clothing	Post-Colonial Narratives
	Practices/Traditions	Food/Cuisine	Social Justice
	Religion		
	Disability		

Note. This table provides the codes corresponding to the emergent cultural identity themes from the data sources.

Data collection for this study encompassed a group case study interview, individual interviews, an Identity Survey, and the analysis of personal artifacts. In the group interview, participants jointly constructed a collective narrative addressing the intersection of being Black women with disabilities in STEM fields. This narrative was formed through answers to deep-diving questions about their STEM experiences. In their individual interviews, participants provided cultural artifacts from their STEM journey, offering additional context and personal insights not shared in the group setting. They also took the Identity Survey in their own time, which gathered comprehensive information about how the various dimensions of their cultural identities intersect.

Navigating Cultural Identity and Perceptions

The voices of Black women with disabilities in STEM echo a shared complexity that was shaped by their unique cultural identities and the intersections of race, gender, and ability. The data collected from case study interviews and Cultural Identity Surveys revealed the challenges and accomplishments that arise as these women navigate a space often designed without them in mind. Their stories highlight the critical need to recognize and affirm their humanity, which is inextricably linked to their essence and engagement in cultural identities. From their earliest educational experiences to their current professional journeys, these women’s narratives point to three recurring themes: humanity at the forefront of cultural identity, the muting of voices and experiences, and navigating dual sets of rules.

Humanity as the Forefront of Cultural Identity

The participants in this study made one thing abundantly clear: before all else, they wish to be seen and valued as human beings. Their plea was not just for acknowledgment but for a paradigm shift where their essence cultural identity, comprised of their race, gender, and heritage, is viewed not as a barrier but as a vital contribution to STEM. This affirmation extended to their engagement in cultural identity, which includes their experiences with disability. These intersecting identities deserve the same respect and recognition historically afforded to scientists and innovators from privileged backgrounds. The participants’ stories challenge STEM communities to reimagine inclusion by humanizing the very individuals they have overlooked for so long.

For many study participants, their humanity was questioned in ways that had tangible consequences for their education. Research Participants A, B, and C shared the trauma of being excluded from advanced science courses until middle or high school, which they experienced

as a form of dehumanization. Participant A, for example, was deemed “not smart enough” for advanced math and science classes in middle school due to her slower processing speed and a manifestation of having Attention Deficit Disorder. This label diminished her potential in the eyes of her educators, and her unique cognitive style was framed as a deficit rather than a strength. In response, Participant A’s parents made the radical decision to homeschool her, tailoring her education to include advanced math and science content that nurtured her love for physics. This personalized approach not only helped Participant A discover her passion but also underscored the importance of affirming cultural and individual identities in fostering educational success.

The Muting of Voices and Experiences

Each research participant uniformly reported instances where their voices and lived experiences were disregarded or discredited. The narratives shared painted a picture of systemic silencing, where opportunities were obscured, and their stories were questioned for their veracity or relevance. For instance, Research Participant C recounted an instance where her lived experiences as a foster child were dismissed as fabrication, undermining her credibility and silencing her voice. Similarly, Research Participant A recalled efforts to marginalize her essence cultural identity and negate the reality of her disability. This was exemplified by a refusal to honor her disability accommodations approved by the university’s Office of Disability Services. As such, this strategy muted her needs and agency within the educational setting. In a similar way, Research Participant B shared an experience from a conversation she had with her professor. Research Participant B decided to share how she felt “overlooked” and “often ignored” during class. Instead of actively listening, her professor responded that she was “sorry [she] felt that way,” and “that is not what happened.” suggesting the experiences did not exist. These accounts spotlight the additional emotional and cognitive labor required to navigate environments where their authenticity is unjustly scrutinized.

Navigating Dual Sets of Rules

Each research participant identified the existence of a duality of rules within their STEM pathways. There was a visible set of guidelines applicable to everyone and an additional, obscured set of expectations imposed exclusively upon them. This divergence of rules reflects an inequitable landscape where Black women with disabilities in STEM are not only expected to perform by the standard measures but also comply with an unspoken code, further complicating their navigation through the STEM field. The uncovering of this dualistic regulatory environment underscores the need for transparency and equity in institutional policies and practices.

Research Participant A recounted her experiences as a first-year PhD Physics student. During her first year, Research Participant A consistently received lower grades compared to her classmates despite having correct solutions. She observed that although her answers matched those of her peers, her distinct but valid approach to the problems was not recognized by her professor as “allowable,” a rationale she found unjust, as it had been discussed in class. At the same time, each study participant illuminated a larger pattern where research participants felt professional organizations were not inclusive of all races, although their mission and vision mention diversity. The study participants recounted attending content-specific organizations where they were either the only or one of few Black people in attendance. They mentioned how those spaces lacked cultural inclusivity and often required an additional set of standards to follow for acceptance, which differed from their cultural norms.

Discussion

This study explores the intersection of essence and engagement of cultural identities faced by Black women in STEM fields, specifically within the African diaspora. By centering Flake's Four Dimensions of Cultural Identity, the findings provide a nuanced understanding of how intersecting identities influence the personal and professional journeys of Black women in STEM. The themes—humanity as the forefront of cultural identity, the muting of voices and experiences, and navigating dual rule systems—are situated within the broader historical and cultural context of the African diaspora.

Humanity and the Power of Cultural Identity

The study participants' demand for recognition as human beings beyond labels of race, gender, and disability reflects a deep, systemic issue that stems from colonial legacies. These legacies have shaped societal norms that continue to dehumanize Black women and undervalue their contributions. Within the African diaspora, cultural identity has long served as a source of strength and resistance against dehumanization. African cultural traditions, such as collective problem-solving, mentorship, and storytelling, emphasize the value of community and shared humanity.

STEM spaces have the opportunity to embrace these traditions by fostering environments that affirm cultural identity as a strength. This affirmation requires a fundamental rethinking of how cultural differences are valued in STEM education and practice. Integrating culturally relevant practices, such as collaborative learning and the inclusion of non-Western knowledge systems, can help create spaces where Black women from the diaspora feel their full humanity is recognized and celebrated.

Centering Diasporic Voices and Stories

The silencing of the research participants' voices reflects broader patterns of erasure experienced by African-descended people worldwide. This erasure robs STEM of diverse perspectives and limits the community's ability to innovate. Within the African diaspora, storytelling has always been a powerful means of reclaiming agency and shaping identity. The proto-narratives described in this study highlight the potential of storytelling to not only validate individual experiences but also challenge dominant narratives that exclude Black women's contributions.

STEM institutions must actively create platforms for sharing these stories. Amplifying the voices of Black women in STEM can help dismantle stereotypes while providing a richer, more inclusive narrative for the field. The stories of the study participants illustrate how personal and collective resilience within the diaspora can serve as a foundation for overcoming barriers and fostering a sense of belonging.

Navigating Dual Rule Systems: A Call for Equity

The dual rule systems described by participants expose the inequities embedded in STEM fields. Black women with disabilities are often held to invisible standards that create additional burdens, forcing them to navigate spaces that demand conformity to Eurocentric norms. This reflects a persistent imbalance of power that mirrors the historical exploitation and marginalization of the African diaspora.

To address this inequity, STEM organizations must prioritize transparency and equity in their policies and practices. Institutions should work to identify and eliminate implicit biases

in their evaluation processes, creating equitable pathways for all participants. This includes creating mentorship programs and culturally responsive support systems that recognize the unique challenges faced by Black women within the diaspora. These efforts are critical to dismantling the hidden hierarchies that perpetuate exclusion and inequality.

A Vision for Policy and Practice

The findings of this study highlight the need for transformative policies that reflect the experiences and contributions of Black women across the African diaspora. Policymakers must invest in initiatives that center diasporic perspectives, such as funding for culturally informed STEM education programs and research on intersectionality in STEM. These efforts must draw on principles of decoloniality, rejecting Eurocentric structures in favor of frameworks that honor diasporic knowledge systems and traditions.

Practitioners have an equally important role to play. Educators should adopt inclusive teaching practices that honor the cultural realities of their students. Frameworks like Flake's Four Dimensions of Cultural Identity can provide a roadmap for designing curricula that reflect the richness of diasporic experiences. Professional organizations must also prioritize the creation of safe spaces and networks for Black women in STEM, fostering environments where they can thrive as individuals and as leaders.

Future Directions for Research and Advocacy

Future research should explore how the experiences of Black women in STEM vary across different regions of the African diaspora, providing insights into the ways local contexts intersect with shared global histories. Longitudinal studies are also needed to examine the long-term effects of culturally responsive interventions on the retention and success of Black women in STEM fields. Such research can inform policy and practice, offering evidence-based strategies for addressing systemic barriers.

Conclusion

This research brings to light the compelling need for systemic transformation in the perceptions and treatment of Black women with disabilities within STEM fields. It emphasizes the integral role that the essence of cultural identity, which encompasses race, gender, and heritage, plays in the personal and professional narratives of the study's participants. Yet, these identities are frequently obscured by societal norms with their race, gender, and disability. Ultimately, this leads to experiences where the voices and stories of Black women with disabilities in STEM are silenced. Such silencing not only negates their realities but also robs the STEM community of their invaluable and diverse contributions. Compounding this issue is the prevalence of a dual rule system that unfairly burdens Black women in STEM with disabilities beyond what their peers encounter.

The urgency for academic and professional entities within STEM to address and ameliorate these disparities cannot be overstated. There is a crucial need to cultivate an environment that honors and celebrates the humanity and essence of cultural identity of every individual. To realize this, a comprehensive review and revision of current policies, curricula, and support frameworks are necessary to ensure they embody fairness, inclusivity, and responsiveness to the intricately nuanced needs of all, especially those navigating the complexities of intersecting cultural identities with race, gender, and disability. STEM fields stand to gain immensely from the breadth of skills and insights that diverse holders of knowledge can offer.

The study sheds light on the varied and poignant narratives, challenges, and successes of Black women of the Diaspora with disabilities in STEM, as told through the experiences of four individuals. Participant A, for example, was subject to misconceptions due to her ADD, affecting her early education in science. However, her narrative also highlights her triumph. Upon receiving a humanizing education tailored to her pace and interests, she excelled. As such, she challenged the pervasive stereotype that Black women, particularly those with disabilities, are less capable in STEM fields. The narratives and achievements, therefore, not only defy existing stereotypes but also serve as a critical testament to the inherent capacity and resilience of Black women in STEM. As such, there is a need to demand a reevaluation of the dominant narratives that often marginalize the contributions and experiences of Black women with a disability in these fields.

Moreover, the principles of decoloniality and critical pedagogy converge to support the empowerment of Black women in STEM and challenge the systemic barriers they face. Decoloniality, as examined in the works of Mignolo (2000) and Quijano (2007), rejects the Eurocentric hegemony that marginalizes non-Western knowledge systems, advocating for an acknowledgment of the cultural and intellectual contributions of Black women. Critical pedagogy, drawing on Freire's (2000), Giroux's (2011), and Flake's (2023) ideologies, echoes the need for an educational approach that transcends the transmission of knowledge to one that promotes critical consciousness and agency. In STEM fields, this intersectional approach encourages a learning environment where Black women with disabilities can be seen, valued, and heard. This results in the creation of spaces where their cultural identities are celebrated as assets rather than seen as barriers or dysfunction. This pedagogical shift demands the reconfiguration of academic and professional structures to recognize the multiplicity of a Black woman's cultural identities and experiences, paving the way for their full participation and leadership in STEM disciplines.

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