



The Vibes are Off: Considering Embodied Reflections by TBIPOC to Account for Displacement and Discomfort in Makerspaces

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Abstract

Makerspaces are identified in HCI to have great potential in fostering diverse participation in technology and computing—considering *making* as a democratic form of innovation. However, growing research also indicates many current makerspaces fail to address non-white and non-cisheteronormative perspectives. Prior works suggest embodiment as a core but seldom understood consideration for intersectional inclusion. Current trends in technologies and computing also stifle such considerations through two phenomena: broader implications of “woman lite” thinking, and what this provocation defines as “techno-disembodiments.” To combat perpetuating these phenomena in makerspaces, we posit looking to bodily and sensory responses, or embodied reflections, from communities of Trans and Black, Indigenous and People of Color (TBIPOC). Further, we examine prior works in visual auto-ethnography and diary studies for approaches to inquire about embodied reflections. In considering embodied reflections of TBIPOC communities, researchers can gain insights on decentering cisheteronormative whiteness to afford broader inclusion in maker culture.

CCS Concepts

• **Human-centered computing** → **HCI theory, concepts and models.**

Keywords

Transgender; BIPOC; TBIPOC; Non-binary; LGBTQIA2S+; Intersectionality; Makerspaces; Maker Movement; Embodied Reflection; Embodiment

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1 Introduction

As HCI researchers, we have long been privy to an enduring white, male-dominated presence in technology and computing [19, 41]. In efforts to foster better inclusivity and diverse participation, many technical/computing spaces, organizations, and institutes have developed events and opportunities that specifically invite the participation of women, racial and other gender minorities [19, 31, 42]. These events and opportunities include women of color in computing groups [31], scholarships and grants for women in STEM [42], hackathon events [16, 19, 26], and, of interest here, makerspaces. Makerspaces, also known as fablabs and hackerspaces [26, 41] have been identified in HCI as community and educational spaces with great potential to foster more diverse participation and education in technology and computing [1, 4, 47]. Traditional makerspaces are considered to be spaces for DIY (Do-It-Yourself) *making* practices with electronics, craft materials, digital fabrication, and more [1, 41]. These spaces promote both amateur and professional *making* and center learning and education as a core value—especially since makerspaces are commonly found in schools, universities and informal learning environments [1, 41]. Further, the Maker Movement [11] considers *making* to be a democratic form of innovation—allowing “anyone” the ability to innovate on technologies [1]. Many educators and researchers in HCI have co-opted this hopeful attitude and look to makerspaces and *making* as a means to diversify and grow accessibility in technology/computer education.

However, a growing body of research has also indicated that traditional makerspaces, and the current cultures they tend to cultivate [24, 46], are still centered around white, male sensibilities. Further, these spaces fail to consider intersectionally and multi-marginalized perspectives, which are often informed by multiple non-white and/or non-cisheteronormative perspectives in tandem [12, 24]. This lack of in-depth intersectional consideration leaves these spaces still widely inaccessible to multi-marginalized groups. To evaluate how makerspaces end up falling short of being the accessible and inclusive environments they are touted to be, this provocation points toward two phenomena that will be extended

and/or introduced and defined in this paper: 1) “Woman lite” thinking [45], and 2) “Techno-disembodiments.”

The term “woman lite” was originally coined to identify cultural misunderstandings of non-binary individuals online [45], but can be extended to understand a broader limiting framework of viewing marginalization that has been pervasive in makerspaces. Those who apply “woman lite” thinking often conceptualize non-binary individuals, intentionally or not, as either tomboyish women (if they were assigned female at birth), or effeminate men (if they were assigned male at birth) [45]. This thinking can be extended broadly whenever marginalized experiences are grouped under a dichotomous lens that dictates anything that is not “the default” experience, or essentially that of white cisheteronormative males [32, 38], as instead the singular “other” experience, which is misunderstood as solely that of white cisheteronormative females [32, 38]. A prominent example in HCI can be seen in survey experiments where gender is categorized binarily, with men as one class and “woman+” as the other—categorizing all women and gender minorities together. Intersectional works around concepts like misogynoir [3] also highlight the deficiencies of viewing marginalization, whether intentionally and subliminally [37], from the constricting standpoint of a “woman lite” lens. This lens ends up centering cishet whiteness, which leads to the erasure of various trans and queer experiences—be it trans masculine, trans feminine, or non-binary experiences—and BIPOC experiences, which can then extend to other intersectional misunderstandings of class, ability, and other identity categories [3, 37]. In makerspaces, this results in failed efforts to foster diverse participation among minorities, though well-intentioned, and ultimately do not thoroughly consider, recognize, and/or accommodate perspectives beyond cis white women [24, 25]. Moreover, in examining prior works, an underlying mechanism in makerspaces, as well as technology and computing broadly, which centers cishet-whiteness can be identified as “techno-embodiments.”

To situate “techno-disembodiments,” we must first define embodiment—or the ways our bodies and senses interact with and interpret the world around us. Embodiment can be recognized as a core but seldom understood consideration for intersectional inclusion and can help to provide insight into how makerspaces can foster more inclusive cultures and environments. This provocation builds on foundational works in HCI to define embodiment [14, 23] while also bridging work adjacent to HCI to extend its definition to incorporate cultures and identities of marginalized and multi-marginalized communities [2]. Through this extension, we can then recognize that culture and identity are embodied and felt differently by non-white and non-cishet individuals, and that these embodiments are dynamic and ambivalent [2, 28] and can compound multi-marginalized identities [2].

Recognizing such dimensions of embodiment is critical to understanding a greater phenomenon of “techno-disembodiments” that occurs in technology and is often subliminally perpetuated in makerspaces. The concept of “techno-disembodiment” was originally coined in 1977 as “an increasing abstraction of the way we live our bodies and widespread technological mediation of social relations” [27], in regards to erotic technologies. For this provocation, we reintroduce techno-disembodiments, nearly 50 years later as an extension as a broader phenomena in technical spaces

and practice, pluralizing the original concept to account for its systemic, multiplicitous, and ambivalent nature. As such, we define techno-disembodiments as broadly the upholding of white colonist techno-hegemony (or oppressive, systemic practices and ideologies within technology and computing), which operates through suppressing/erasing non-white cultural production through the degradation of embodied connection. Techno-disembodiments are deeply pervasive in today’s technical landscape, whether through the flattening of gender expression in AI face filters [5, 22, 28], unaccommodating affordances for platform moderation for blind and hard of seeing individuals [34], or the surveillance of Black and Brown bodies [6]. In makerspaces, we observe techno-disembodiments through prior literatures and examine the particularly bodily-felt discomforts of marginalized and multi-marginalized individuals though feeling displaced in these spaces.

Finally, to counter the phenomena of the “woman lite” lens and techno-disembodiments, this provocation looks to the the potential of observing the experiences of TBIPOC individuals or those who are Trans and Black, Indigenous and/or People of Color and how they respond to and navigate current makerspaces. It is pertinent to examine these experiences through their embodied reflections, or through documenting bodily and sensory cues. The particular focus on TBIPOC stems from how the dynamics between race and gender play a central role in understanding the effects of centering cishet whiteness. As stated before, these effects can then permeate to exacerbate other forms of marginalization, such as disability, class, etc. we examine prior HCI research in auto and visual ethnography as well as diary studies [8, 17, 20, 24, 28, 33, 43] as possible approaches for studying embodied reflections by TBIPOC individuals in makerspaces. These methods can help to reckon with how cishet whiteness is centered in these spaces and give a more complete picture of addressing intersectional needs by focusing on the bodily and sensory-informed reflections of TBIPOC.

2 Makerspaces and Inclusivity

Makerspaces as environments for *making* broadly have taken various forms, but within HCI research, the most focused on types of makerspaces present themselves as both formal and informal educational settings that center *making* around technologies and computing [18, 41]. These spaces are often exalted as mitigating common barriers around computing and STEM education that are prevalent in academic engineering spaces, which have identifiably white and male dominated cultures [24, 46]. Such barriers and effects on marginalized and multi-marginalized individuals include but are not limited to the impeding or disruption of identity formation for non-white engineering students [21], perpetuation of misogynistic and harmful attitudes toward women [9, 40], or harmful, discriminatory practices toward intersectionally and multi-marginalized individuals [9, 15]. However, recent literature indicates that these instances of discomfort and harm toward marginalized populations are still reflected in makerspaces [16, 24, 25, 46] Prior works have pointed toward various potential reasons as to why makerspaces replicate similar social cultures to that of traditional academic engineering spaces, from minoritized individuals feeling imposter syndrome [30], a deficit of inclusive educational materials [41], or inequality of access to *making* [18]. However, this provocation focuses on

particular perspectives around “woman lite” thinking as well as how discomfort from makerspaces for marginalized individuals stems from feeling displaced to lend deeper insight on the misunderstanding of marginalized and multi-marginalized experiences when promoting inclusivity in makerspaces.

2.1 “Woman Lite” Thinking

Initially, “woman lite” was a term coined to describe pervasively cishet and binary misunderstandings of non-binary individuals as a subcategory of women or effeminate men, limiting non-binary identity to the sex that individuals were assigned at birth. However, this form of binary and restrictive thinking toward those with marginalized identities extends beyond non-binary people and has emerged from positioning all gender minorities in relation to a binary framework. In such a framework, white and cishet masculinity is always assigned as the default identity [38], while white and cishet femininity is the singular deviation. Non-critical considerations for intersectionality have compounding issues when not considering, recognizing, and/or accommodating for minoritized experiences beyond cis white women. In the context of makerspaces, this has led to women-only makerspaces that are antagonistic environments for non-white women [21, 24], women+ computing groups and opportunities that don’t account for potential harms and dysphoria upon gender minorities with trans masc or non-femme aligned gender identities, and dissonances in research. Such as, attempts to foster better inclusivity in makerspaces for “underrepresented groups (i.e., women, girls, queer, non-binary, transgender, and intersex people alike)” [44] only to focus on findings for “women-only spaces” [44]. In centering cisheteronormativity and whiteness, “woman lite” thinking bleeds into more intersectional issues of exclusion in computing, which involve race, ethnicity, sexuality, class, ableism, etc. Accordingly, in order to promote authentic and critical inclusion in makerspaces, we should take proactive measures in decentering whiteness.

2.2 Discomfort and Displacement in Makerspaces

In critically examining recent literatures [4, 24–26, 47], it can be interpreted that the discomfort of marginalized individuals within makerspaces—and in technical and computing spaces broadly—stem from sentiments of displacement or the inability to “fit in” with to the broader social cultures in engineering that are still reflected in makerspaces [21]. There are countless examples, both in literature in HCI as well as anecdotal accounts, where such spaces broadly imbue bodily and sensory sentiments of discomfort for individuals with minority statuses [4, 21, 24, 47]. These discomforts come from a greater “hidden” socialization within technical and computing spaces that render marginalized individuals to feel incompatible [39] to their environments. Some embodied mechanisms for this socialization can be observed spatial arrangements, such as that of classrooms, cafeterias or dormitories that promote certain social hierarchies [39]. Again, makerspaces are not absolved from evoking feelings of displacement for marginalized and multi-marginalized individuals. Such instances include insidious and uncomfortable visual cues when entering makerspaces, like “portrayals of women [that] could be fetishized” through posters and artifacts around the

space that hold iconographies of misogynistic gaming and nerd cultures [24]. Other notable experiences were more subliminal, such as different expectations for safety between marginalized and non-marginalized when having windows and entryways open for anyone to walk in [24]. Individuals with marginalized identities would also feel the dissonance of a sense of culture being counter to the more dominantly white-centered cultures they found themselves in [24]. These discomforts from spatial arrangements, fetishization, non-safety, and cultural dissonance alike are inherently related to the body and a sense of one’s body and self not being in-tune with their environments. As a result, marginalized and multi-marginalized individuals feel that makerspaces extend a prevailing sentiment of displacement, which in turn has marginalized individuals internalize that technical and computing institutions are explicitly not available for them [24].

3 Embodiment As Culture and Identity

Popular definitions of embodiment in HCI come from understanding our experiences through embodied interaction—or how we move, sense, and take space [14]—and in the context of computing, how we engage and interact with the technologies in our physical and even digital spatial domains [14]. We can also extend definitions of embodiment to embodied contexts, or “how implicit social experiences are built from habitual interactions in a physical space” [29]. Embodied contexts and a framework highlights the bodily mechanisms of hidden socialization [39] of spaces in academia as discussed prior that antagonize marginalized individuals, as well as to how bodily and sensory experiences influence makerspace cultures. Within the information science canon, embodiment also holds a kind of “feminist objectivity” in that we all experience an embodied in-take of information that is not neutral and is specifically interpreted by various perspectives [23]. However, to fully parse through critiques and non-intersectional concerns from marginalized and multi-marginalized experiences, we must critically extend our idea of embodiment to explicitly incorporate non-white and non-cishet cultures and identities.

Marginalized identities can be recognized to embody simultaneous truths [2], in that culture and identity are not naturalized—gender and race are not natural phenomena but rather social constructs—but must still be accounted for in the real material conditions, barriers, and structural oppressions marginalized individuals face when holding such [2]. Here, we can understand culture and identity as dynamically formed and informed by constantly shifting contexts [2], becoming both materially real and intellectually elusive. In the embodied experiences of multi-marginalized individuals, displacement and bodily/sensory dissonances can be hard to pinpoint and articulate, yet are still discernibly present. The elusive nature of identifying embodied aspects of culture and identity can make it difficult to acknowledge and accommodate marginalized and multi-marginalized individuals, especially when trying to identify more pervasive issues in the embodied contexts of makerspaces. Moreover, this difficulty is exacerbated further when certain phenomena in technology and computing work toward erasing such experiences—phenomena such as that of “techno-disembodiments.”

3.1 Techno-Disembodiments

This provocation expands upon the original concept of techno-disembodiment from the 70s [27] and reintroduces the term in its pluralization “techno-disembodiments.” This distinction is important as it alludes to the systemic, multiplicitous and ambivalent nature of how techno-disembodiments operate as a broader phenomena in technologies and computing. Techno-disembodiments, as it’s understood in this provocation, is a phenomena in which socio-technical hegemonies, or normalized ideologies and systemic practices in technology that suppress/erase non-white and non-cishet communities’ cultural production through the degradation of their embodied connection. These ideologies are highly pervasive, manifesting in many current trends in technologies that strive for universal design and objectivity in user experiences [36] taking on a futurist approach. Futurism seeks to neutralize technology from ideas of cultures and identities while not fully erasing representation—often presenting technology as universal for users by being raceless and genderless [36]. These aspirations of universal design reflect makerspaces as well in how inclusion is addressed—yearning for representation without fully engaging with the complex relationships with race and gender alongside technology and computing. However, we see, at least in technology design, how these futurist perspectives create cognitive dissonance in representations [35, 36], where while claiming to be universal, the embodiment of cultures and identities are absent—fundamentally erasing how cultures and identities perceive, engage with, and are affected by technologies [35, 36].

We see these dissonances at play in many current technologies, including, but not limited to, computer vision systems that fail to detect deeper skin tones or white-wash users [5, 28] and surveillance technologies that are antagonistic to non-white and non-cishet bodies [6, 10]. These practices inherently contend with the bodily agencies of marginalized and multi-marginalized individuals and communities. By alienating these communities from their expressions and bodily and sensory forms of existing through these forms of technology—they lose their cultures, identities, and subsequent abilities to produce and reify such forms of embodiment and selves. Further, these technical practices erase cultures and identities that are specifically counter to whiteness and cisheteronormativity.

3.1.1 The Marginalized Body Considered. In considering how techno-disembodiments are inherently antagonistic to marginalized and multi-marginalized bodies, we can better understand that embodiment is crucial to preserving non-white and non-cishet cultures and identity. These considerations ultimately promote the idea that bodily and sensory experiences of marginalized and multi-marginalized individuals are integral to fostering inclusivity and diversity, both in technical and computing spaces and technologies themselves. For makerspaces, which are viewed as central sites of technology and computing education and technical innovation, embodiment must be proactively addressed and engaged with to better understand how technical and computing spaces cultivate white, cishet culture and, in turn, manifest further white, cishet techno-hegemonies. Such engagement can then inform how to build counter cultures and maker environments that can instead account for and foster flourishing of embodied experiences by marginalized and multi-marginalized individuals rather than erase them.

4 Inquiring About Embodied Reflection

In decentering cishet whiteness, we must account for individuals and communities that are at the margins of white cishet dominances—such as that of Trans and Black, Indigenous, or People of Color. This provocation has called for intersectionally understanding embodied reflections, and so we posit taking into consideration the complex, compounding cultures and identities of those at the very margins of society, like TBPOC individuals. Such considerations can be explored through embodied reflections as a vital way to enrich broader spatial understandings relating to complex interplay between race and gender, and how these extend to other forms of marginalization. To inquire about identity in holistic and meaningful ways, we can look to visual and auto-ethnographies and diary studies.

4.1 Methodologies around Embodiment

Various research in HCI demonstrate the power of visual ethnographic approaches, such as cultural probes [20], diary studies [7, 8], participatory-based crafting [17], to produce rich and holistic research data around marginalized experiences. For example, one study employed speculative, participatory, zine-making [28], or sketch collaging future design ideas for augmented reality technologies, and had individuals of trans communities visually reflect upon their ambivalent experiences with technology. Here, participants were able to reflect on their perspectives and experiences through expression and multi-modal crafting [28]. A particularly unique form of diary studies is body-mapping [8, 13], which has participants engage in taking note of their bodily senses in various forms of documentation, leading to higher understandings, reflections, and calls for attention to certain social behaviors [13] and intimate information like health and wellness [8]. Other forms of diary studies that take a multi-modal approach include PhotoVoice [33], or a means of storytelling around community needs through photography. Through this community and participatory-based method, community members took photographs related to thoughts and experiences around safety and surveillance as a response to expansion of surveillance infrastructure in underserved community spaces in Detroit. This form of visual noticing and documenting helped to enable better support in neighborhood safety through community members’ reactions with existing well-being/resilience programs [33].

Prior work has also already begun auto-ethnographic reflections in makerspaces as well, such as one study where women of color researchers documented their first-time experiences in makerspaces through photos, journaling, and voice memos [24]. This study involved visiting four different makerspaces and highlighted various physical, operational, and socio-cultural issues. Such issues were noted to be not accessible through interviews, promoting a more ethnographic approach to be key in finding more nuanced understandings of the space [24]. Ultimately, these forms of multi-modal documentations of sensory experiences helped to pin-point and articulate embodied reflections, confronting what often feel like invisible and hidden forms of displacement to then make tangible the embodiments of marginalized and multi-marginalized individuals.

5 Conclusion

This provocation hopes to evoke critical and fruitful curiosity in researchers to design and develop makerspaces and reflect on alternative futures for *making* that are more authentically and intersectionally inclusive. Embodiment plays a key role in understanding the complexities of non-white and non-cis/het experiences as well as how to accommodate them in *making* for broader cultural production outside the white, cis/het, and male status quo. This provocation identifies current phenomena pervasive in technology that have negatively affects the embodied experiences of intersectional and multi-marginalized communities, and how these phenomena are at play in makerspaces. TBIPOC communities and their embodied reflections should be deeply considered in how researchers can mitigate the perpetuation of "woman lite" thinking and technodisembodiments, as well as expand their understandings of intersectionality in the Maker Movement. This provocation also invites researchers to engage in inquiring about such reflections, whether through visual and auto-ethnographic and diary study approaches or even more expansive extensions of current practices. Finally, in considering identities at the margins, maker cultures can cultivate broader and diverse technical explorations, not confined to harmful techno-hegemonies, and bring forth expansive innovations for and by broader arrays of communities and cultural production.

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