23. (Re)making Whiteness

A Critical Discourse Analysis of Equity-Based Maker Literature

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Abstract: Recently, critical scholars have challenged the White, masculine foundations of the maker movement. That challenge has inspired others to create avenues for marginalized individuals to join these spaces. However, immediately jumping from critique to action often produces unintended consequences (Yancy, 2016). With this in mind, I pose the following research questions: How does diversity and equity–focused maker education literature position marginalized students in relation to making and makerspaces? And how does this positioning challenge or reinscribe Whiteness? To approach these questions, I conducted a critical discourse analysis on 14 different articles about equity in making. Findings show that these studies position marginalized subjects outside of the boundaries formed by maker culture and then invite subjects to either join in or redefine the boundaries of making. While beneficial, this process enacts what Ladson-Billings (2017) defines as the social funding of race and, in part, reinscribes Whiteness within making culture.

Introduction

Within the recent and growing body of maker literature, critical scholars have started to question the theoretical foundations at the heart of the maker movement. Britton (2015) exemplifies this push by claiming that the movement "reinforces an engrained culture of white masculinity in the design and deployment of technology while rhetorically claiming universality. Only certain types of Making are truly considered as part of the culture" (para. 1)This process of gatekeeping, in which only certain forms of making count within the movement, often excludes marginalized cultures and includes them only if those forms of making embrace predetermined White masculine practices (Britton, 2015; Vossoughi, Hooper, & Escudé, 2016). Delving even further into these issues, Ames (2018) challenges the constructionist base of maker education initiatives by questioning the atomized and individualistic approach to learning that sits at odds with other social movements. Without answering this challenge, maker initiatives (even those rooted in equity or diversity) remain doomed to replicate the White masculine culture they hope to challenge.

To that end, it becomes imperative for researchers and scholars to, as Yancy (2016) describes, "sit with the problem of whiteness" (p. xii). Rather than jumping to fix the problem, Yancy (2016) suggests that understanding the problem of Whiteness (and, in turn, masculinity) at the heart of any cultural context needs to occur first. To begin this process, this paper will address the following research questions: How does diversity and equity–focused maker education literature position marginalized students in relation to making and makerspaces? And how does this positioning challenge or reinscribe Whiteness? I pose these questions to specifically consider "white everyday practices and the ways in which those white practices re-center white power or challenge white power" (Yancy, 2016, p. xii) in spite of the best intentions of maker researchers. I argue that current attempts to diversify maker populations have proven successful in encouraging marginalized groups to engage in maker activities and spaces. However, these programs have accomplished this by recentering Whiteness and primarily considering maker practices that emerge from White masculine notions of making. This contributes to what Ladson-Billings (2017) describes as the social funding of race, further rooting Whiteness as the dominant (and most valuable) viewpoint within maker culture.

Theoretical Context

Before exploring how Whiteness operates within the maker movement, an overview of critical Whiteness literature proves helpful. As Owen (2007) notes, most literature defines Whiteness as one of three interrelated forms: a social identity, one foisted onto individuals with real-world consequences; an asset or property that acts as a limitless resource through which people gain privilege; or a cultural representation in the form of a visual and embodied understanding of the world, one crafted through imagery and media. Since scholars often frame making as a way of engaging with the world, this last form holds significance when exploring how Whiteness operates within this movement. Jacobson (1999) also notes that "the awesome power of race as an ideology resides precisely in its ability to pass as a feature of the natural landscape" (p. 10) with Whiteness in particular often remaining invisible to White people (yet highly visible to people of color). Yet despite these common factors, Twine and Gallagher (2008) also contend that Whiteness does not act as a universal force. Instead, Whiteness emerges contextually and maintains its power by discursively maintaining privilege for those with access to this dominant social identity. To this end, it becomes vital to individually and thoroughly investigate all cultural spaces (including the maker movement) to understand how Whiteness reinscribes itself (and the power it holds) as a social identity, cultural representation, and form of property in often invisible ways.

Critical scholars in the maker movement have engaged this work by questioning who has access to the benefits of making. This question remains vital to the evolution of the maker movement because, as Halverson and Sheridan (2014) note, "If we believe that making activities and maker identities are crucial for empowerment, then it is, in part, our job to set up situations whereby all learners have the opportunity to engage" (p. 500) in making. In describing the obstacles that hinder this democratization of making, Blikstein and Worsley (2016) contend that the maker movement within educational circles has managed to collapse into a singular and uncontested narrative that takes "the efficacy of 'making' for granted" without challenging how these historical origins influence those engaging in makerspaces and activities" (p. 68). This influence subsequently strips making of its ability to promote reflective intellectual practices while simultaneously delegitimizing ingenuity within marginalized communities. As Vossoughi et al. (2016) note, the discourse surrounding making recognizes only those practices that fit within the dominant economic structure and the cultural understanding of technology that follows. This approach therefore denigrates creative acts more commonly associated with poor communities of color and feminine work. A neutral approach to the movement that fails to reimagine what counts as making reinforces this status quo. Britton (2015) builds on this by asserting that the highly feminized craft movement often overlaps with maker communities but rarely enters the discourse. "This positions Making firmly in the realm of white masculinity, sustaining assumptions that masculine use of technology is normative and women need an invitation and an incentive or special 'female' reason to engage in this masculine space" (Britton, 2015, para. 3). Vossoughi et al. (2016) make a similar argument about race, claiming that the discourse surrounding the maker movement has largely considered White forms of making to the detriment of making practices that emerge from communities of color.

However, this line of critique raises the question of how to address these issues without recentering Whiteness in the conversation. The corrective measures to include marginalized groups described by the authors above often have the unintended consequence of reaffirming a White male status quo. Ladson-Billings (2017) defines this process of reinscribing race as a dominant category in society through both official and unofficial channels as the social funding of race. Rather than taking hasty steps to correct the issue (and subsequently socially funding both race and gender), Yancy (2016) calls for those addressing racism to instead sit with the problem of Whiteness, develop an understanding of how Whiteness operates, and uncover one's own relation to this problem. With this in mind, I will now turn to the discourse surrounding the maker movement to better understand how Whiteness operates within this social space.

Methods

As a first step toward sitting with the problem of Whiteness, I will use the rest of this paper to answer the following research questions: How does diversity and equity–focused maker education literature position marginalized students in relation to making and makerspaces? And how does this positioning challenge or reinscribe Whiteness? I have chosen this problem for reasons similar to those presented by Goldstein Hode and Meisenbach (2017), specifically that scholars often focus critical race analysis on overtly negative examples rather than investigating those prodiversity or equity texts that may unintentionally reinscribe problematic racial power dynamics. To address this question, I performed a text analysis on 14 different pieces of equity and diversity–focused maker education literature from the past five years (see Table 1). The goal of this research is to "see how broader formations of discourse and power are manifest in the everyday, quotidian aspects of texts in use" (Luke, 1995, p. 11) and to identify the dominant forces within these educational practices. While extant publications have nominated a number of other dominant forces within maker practices (masculinity and technocentric forms of upper middle-class culture in particular), I specifically will consider the ways in which Whiteness influences this body of literature.

Title	Authors and Date	Community Addressed
3D Printing with Marginalized Children – An Exploration in a Palestinian Refugee Camp	Stickel, Hornung, Aal, Rohde, & Wulf, 2015	Low income students Refugees
A Longitudinal Study of Equity-Oriented STEM-Rich Making Among Youth From Historically Marginalized Communities	Calabrese Barton & Tan, 2018	Students of color Low income students
Community Ethnography as Pedagogy in Equity-Oriented STEM-Rich Making	Calabrese Barton & Tan, 2017	Students of Color Low income students
Deconstructing Sociotechnical Identity in Maker Cultures	Marshall & Rode, 2018	Women
Educators, Gender Equity and Making: Opportunities and Obstacles	Justice & Markus, 2015	Women
Electronic Textiles as Disruptive Designs: Supporting and Challenging Maker Activities in Schools	Kafai, Fields, & Searle, 2014	Women
Equity-Oriented Pedagogical Strategies and Student Learning in After School Making	Ryoo, Kali, & Bevan, 2016	Students of color Low income students
Hands On, Hands Off: Gendered Access in Crafting and Electronics Practices	Buchholz, Shively, Peppler, & Wohlwend, 2014	Women
Iterative Design Toward Equity: Youth Repertoires of Practice in a High School Maker Space	Martin, Dixon, & Betser, 2018	Students of color Women
Leveraging Cultural Values and "Ways of Knowing" to Increase Diversity in Maker Activities	Holbert, 2016	Women
Putting Making into High School Computer Science Classrooms: Promoting Equity in Teaching and Learning with Electronic Textiles in Exploring Computer Science	Fields, Kafai, Nakajima, Goode, & Margolis, 2018	Students of color Low income students
The Makerspace Movement: Sites of Possibilities for Equitable Opportunities to Engage Underrepresented Youth in STEM	Calabrese Barton, Tan, & Greenberg, 2016	Students of color Low income students
Tinkering with "Failure": Equity, Learning, and the Iterative Design Process	Ryoo, Bulalacao, Kekelis, McLeod, & Henriquez, 2015	Women
Towards Critical Justice: Exploring Intersectionality in Community-based STEM-rich Making with Youth from Non-dominant Communities	Tan & Calabrese Barton, 2018	Students of color Low income students

Table 1. Texts analyzed in this study and the populations they engaged.

To conduct this analysis, I used the critical discourse methodology described by Jager (2001). First, I developed a structural analysis of proequity maker literature. This mainly entails describing and broadly characterizing the material selected along with locating the ways in which a given theme (in this case, Whiteness) either enters into or is absent from this material base. Second, a fine-grained analysis happens within a more narrow and prototypical selection of materials. Since the selection of articles remains somewhat limited, I conducted this analysis on all articles with a particular focus paid to the Methods and Findings sections. This process involves not only considering the larger themes of the article but using rhetorical devices to consider larger questions of discourse. In doing so, I used both descriptive and thematic coding methods (Saldaña, 2015) to analyze the ways that authors described students and their interactions with making practices. In doing so, I developed a number of themes that allowed me to propose what Glaser and Strauss (1967) define as a substantive theory of Whiteness within equity-focused maker literature. Finally, I concluded this work by connecting the fine-grained analysis to larger notions of discursive power.

Findings

At a structural level, the articles surveyed in this study were, unsurprisingly, very similar. Since all of them came from journals or conference presentations that emphasized empirical research, they largely followed a standard format: theoretical context or literature review, presentation of methods, findings, discussion, and conclusion. Sometimes the authors combined these sections or gave them different names, but the prototypical content from these sections still existed in some form. The content discussed within each of these sections also proved markedly similar. All of the Theoretical Context or Literature Review sections focused on two key areas: the efficacy of making as an educational model and the need to diversify STEM careers, computing fields, or makerspaces. The Methods sections provided a wide range of analytical methods, but the sites of research all focused on makerspaces or classrooms adopting maker practices that included marginalized students. For most of the articles, the research focused on students of color or female students. Stickle, Hornung, Aal, Rohde, and Wulf (2015) provide one exception by researching a makerspace within a Syrian refugee camp. Additionally, Justice and Marcus (2015) focused on gender disparities but considered teachers learning about making practices within professional-development sessions. The Findings sections mostly provided vignettes that displayed the ways in which individual students developed intellectually and socially through making and the Discussion sections connected those findings back to the extant literature. The authors of these studies often discussed how these findings challenged the status quo of making as a White masculine practice by considering new identities or forms of making. However, they rarely (if at all) discussed how Whiteness or masculinity continued to shape the culture or making practices of the study despite their inherent challenges. Buchholz, Shively, Peppler, and Wohlwend (2014) provide a clear exception by considering how gendered making practices and materials continually shaped student engagement with e-textiles projects.

Through a subsequent fine-grained analysis, I produced two pairs of interrelated themes through the coding process. The first relates to the ways that the surveyed literature positioned subjects in relation to maker culture and the act of making. One approach to this process involved positioning students from marginalized communities as outsiders who needed an invitation to participate in making practices. The need for this invitation stems from the assumption that making and makerspaces largely reinforce and reproduce the practices of Whiteness and masculinity that have traditionally dominated this movement. Holbert (2016) exemplified this approach when discussing his efforts to address gender, race, and class disparity in making: "To connect engineering activities and practices to makers underrepresented in STEM fields, we must reframe how and why we make to acknowledge and elevate the values and goals of [their] communities" (p. 16). It is important that Holbert tasks makers and STEM professionals with bringing in new identities, not the students who do the underrepresented forms of making. Justice and Marcus (2015) make this approach even more clear when they say, "We believe that makerspaces and FabLabs need to invite more diverse participation from people of different gender, racial and socio-economic backgrounds" (p. 3). Again, makerspaces and FabLabs do the inviting and the members of underrepresented groups react to that invitation.

In another approach to positioning students, some of the authors of these texts framed students as co-constructors in the act of defining making. Calabrese Barton and Tan (2018), whose study of two makerspaces in Michigan and North Carolina appeared in multiple texts in this study, encapsulated this theme when they stated that students "broadened the boundaries of a 'local maker community' to include salient others who might not be tapped as germane resources in a typical STEM-focused maker program" (p. 794). Rather than makers and STEM educators inviting students into a predetermined maker context, Calabrese Barton and Tan (2018) center the actions of students and credit them with defining making as a practice that incorporated members and actions already existing within this community. Martin, Dixon, and Betser (2018) also consider this theme within a moment of critiquing their research design: "The ways in which Deonne wanted to be a maker, and the rich repertoire of maker practices she brought into the class, were tolerated but not sufficiently embraced or supported" (p. 41). Again, the authors root their work in the actions and identities of the student, despite their inability to adequately respond in that moment.

Finally, the second pair of themes, which position students in relation to knowledge, represent a similar split to the one above. In some instances, the authors position students as needing access to knowledge provided by maker educators or maker experiences. This often referred to the kinds of knowledge related to STEM fields. When discussing their research into e-textiles, Kafai, Fields, and Searle (2014) noted that the foregrounding of aesthetics was "particularly critical as schools have struggled to connect STEM learning activities to students' personal interests and everyday lives" (p. 547). This phrasing positions students as unconnected from STEM practices and the process of making those connections rests in the hands of schools. On the other hand, authors also positioned students as having access to valuable knowledge a priori. Calabrese Barton and Tan (2017) exemplify this theme when discussing the work of students: "The problems the youth hoped to solve through engineering design in their makerspaces reflected both personal and community concerns or needs that were deeply linked to their community's unique history and context" (p. 2). Here, students exist as the source of knowledge about their community, which makerspaces subsequently serve, and about the issues they faced (as opposed to students only acting as recipients of knowledge found within maker practices). However, the distinction between these two themes was not always clearly defined. When Fields, Kafai, Nakajima, Goode, and Margolis (2018) state that "foregrounding student knowledge in front of the classroom framed students as sources of knowledge and validated the new expertise they were developing in the areas of circuitry and coding" (p. 28), they reference both themes simultaneously: They position the students as sources of some knowledge but consider STEM knowledge as coming from maker experiences developed by the researchers. This blurred distinction points to the dynamic nature of this writing in which authors often shifted the position of the subject throughout the article depending on their current focus.

Discussion

While these studies may address issues of diversity and equity within makerspaces at the local level, the findings from this analysis also imply that these practices contribute to the social funding of race. Especially when considering those moments when the authors position the subject as separated from the knowledge associated with making and, subsequently, in need of an invitation to participate within these spaces, this body of literature reinscribes race as a dominant category in contemporary society. As Ladson-Billings (2017) notes, "Even when structural barriers are removed, the social funding of race maintains the belief systems and actions of members of the society" (p. 101). The fact that students of color need a particular invitation into making contexts reaffirms the power and importance of this social construct. This affirms Britton's (2015) assertion that the status quo within makerspaces rests on the assumption of White masculinity and the need to invite othered populations into the space reaffirms that assumption. Moreover, the act of closing gaps by bringing others into Whiteness (a practice at the root of this invitation) furthers the social funding of race (Ladson-Billings, 2017). It also mirrors the unintentionally anti-Black activism described by Bassichis and Spade (2014), as the act of aligning certain practices from nondominant communities with the dominant culture benefits certain bodies while denigrating others.

Even in those moments when the authors position the subjects of their study as co-constructors, both in terms of knowledge and the act of making, similar issues emerge. If the assumption that making, as it stands, exists as a White masculine space, then redefining the boundaries of making still brings the actions and knowledge of these students into Whiteness. This boundary work then acts as a double gesture: By defining certain actions as *making*, the authors simultaneously define other actions or cultural practices as *not making*. Calabrese Barton and Tan (2017) reaffirm this notion when they state that they "see co-making [as] shifting the culture of making toward legitimizing multiple forms of expertise and spaces of making" (pp. 792–793). In other words, this assumes that making exists as a needed, legitimizing body and defining certain actions as making gives them legitimacy within contemporary (White supremacist, patriarchal) society. This assumption leaves certain actions, forms of expertise, and spaces behind. Stickel et al. (2015) reaffirm this critique in the following example of a girl learning how to 3D print:

> She really liked butterflies but was only able to draw them previously, what she frequently did. Through digital fabrication, she is now also able to make her own physical butterfly models that she wants to incorporate in her playing. Furthermore, her butterfly now has depth and a shape, e.g. a curved body.

While the authors go on to discuss how much the student enjoyed this new skill, it still devalues her previous creative efforts. Although subtle, it reaffirms the privileged status held by making as a cultural practice: "She was *only* able to draw them previously," the existence of a 3D model trumping her ability to represent a physical shape in two dimensions, and so forth. Drawing butterflies (a cultural practice that existed before the emergence of a makerspace within this marginalized community) gets left out when defining the boundaries of what constitutes making and further legitimizes the technocentric act of creating with a 3D printer. This mirrors the exclusion of the craft movement from maker discourse described by Britton (2015): Despite the fact that this student had frequently created new tangible artifacts by hand through the act of drawing, the newly defined technocentric boundary of making leaves drawing out and advocates only for her 3D printing efforts.

Conclusion

As Ladson-Billings (2017) notes, "The funding of race can actually occur when the ostensible action is to work against racial categorization or identification" (p. 93). To this end, I question whether reframing making to include othered bodies and practices challenges or reinscribes Whiteness. While all of these studies clearly demonstrate a benefit for the students involved, the assumptions behind these texts continue to reaffirm the White masculine practices of making in often subtle ways. But rather than jump to a solution, I reassert the challenge issued by Yancy (2016) and invite researchers to sit with the problem of Whiteness in the maker movement. As scholars continue to investigate making as a sociohistorical force within education, they need to question who benefits from these practices, boundaries, and definitions and critically investigate the historical practices that construct making and the bodies within this cultural space. Until maker educators and educational researchers truly understand the ways that makerspaces and making practices contextualize, rely on, and reinscribe Whiteness (and, simultaneously, masculinity) as a dominant social force, the problem of Whiteness will continue to influence maker contexts.

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