
Partial Connections: The Search for Women in Science

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Abstract

In the *Cyborg Manifesto*, Donna Haraway [4] writes “there is nothing in being female that naturally binds women.” Yet, the dominant conversation about representation in Science, Technology, Mathematics and Engineering (STEM) treats women as a singular metric—a measure of inclusion, showing how the culture of computing has, or hasn’t, changed. This perspective treats women as a category, failing to provide an understanding of women’s embodied experiences as technology designers. Furthermore, it assumes that the mere presence of women has the power to change the masculinity that permeates computing: structurally, socially, and materially. Intersectional approaches to studying women in technology design are essential for understanding the limits and possibilities for participation, beyond the most basic level of access (e.g. admission). With this project, I take a feminist ethnographic approach to studying the practices and ideologies that define innovation in the burgeoning “maker” movement. My research goal is to extend definitions of technology to include integral technical work done by women, both presently and historically.

Author Keywords

Makerspaces; feminism, intersectionality; DIY technology; making; inclusion; access; media.

ACM Classification Keywords

K.4.0. Computers in Society: General.

Introduction

The special issue of *Time/Life American Inventors: A History of Genius* features four men on the cover [11]. Each of these men is white. Three invented objects that have been socially coded as male: the automobile [5], the lightbulb [6], and the personal computer [8]. While this might seem like an outdated relic, the issue was printed in 2016. Women are still largely unrecognized in the history of innovation—and, in turn, contemporary visions of who creates and builds new technology. Attempts at broadening participation in technology design have largely operated from “liberal-feminist” perspectives, focusing on equal access as the key to ending gender imbalance in the sciences [10]. This perspective is especially evident in MakerSpaces, where administrators are confident that no-cost, open-door policies remove the most significant barriers to women in technology design. Yet, STEM continues to face persistent gender disparities [1].

Project Overview

The proposed project is an ethnographic study of the women makers, artists, and students who design technological artifacts. It is a multi-site field study that primarily focuses on “MakerSpaces” in universities and other educational settings. MakerSpaces are an environment where hobbyists, tinkers, and experienced engineers can build prototypes and design technological artifacts. They’re characterized by a commitment to “open access,” accommodating a broad range of activities, purposes and levels of expertise. Academic MakerSpaces are a key place to witness how people produce technology—and how innovation, as an ideal,

is reproduced and institutionalized through education. This project is based in a communication approach to studying information industries, grounded in the examination of contemporary discourses of innovation and the Maker movement. I also use archival research to trace how technology design came to be associated with male-dominated fields such as engineering rather than other modes of design and construction.

The focus here is on the gendered forms of knowledge and expertise that are seen as central or peripheral to making, as a scientific activity. Ten weeks of pilot research at a university MakerSpace has revealed that, despite policies aimed at lowering barriers for entry, MakerSpaces continue to face the same problems of gender representation that characterize STEM as a whole. What other barriers exist once the door is open?

Beyond the Leaky Pipeline

The prevailing conversation about women in STEM is centered on the idea that simply accepting women into science classrooms—and informal learning environments, like MakerSpaces—will lead to more women in fields associated with technology. However, despite efforts to adopt inclusive admission guidelines and outreach programs, the number of women in STEM is actually decreasing [1]. This problem has been called the “leaky pipeline:” even as more women enter STEM learning environments, few women make it into STEM careers [7]. It’s become clear that open access isn’t enough to broaden participation—and certainly not enough to address the complex, multiple experiences of women.

The open-access solution rests on the assumption that simply adding “women” (as a gender category) into the

culture of computing will *change* the culture of computing—the heteronormative, white, masculine, and highly educated mode that has dominated STEM fields at almost every level. It is believed that simply including women will make science more feminist and better capable of addressing the needs of all women [10]. This approach is problematic, and I believe ultimately unsuccessful, for two reasons. First, it requires a single version of womanhood that fails to recognize the intersecting oppressions experienced by women of color, women at the economic margins, and transgender women. At times, it seems that “add women and stir” proponents believe that women’s predilection for care and understanding will make these work places more habitable for difference of all types. The 2016 election demonstrated that is not the case. White women disproportionately voted against the needs, and will, of other female demographics—many of whom are threatened by the now president-elect [3]. The fracturing of supposed sisterhood reminds feminist technology scholars that we have commitment not just to one type of woman but to feminism, feminisms and intersectional feminism.

The second problem with the open access solution is that it allows science itself to go unquestioned. Technology design is intensely reliant on genres of knowledge: both theoretical foundations of removed objectivity [4][10] and types of material expertise that have been dominated by men through historical divisions of labor [12]. These disciplinary norms either act as a barrier to participation or require conscription from women who continue to work in science. Even if the scientific world was suddenly populated by women alone, it would still be no less masculine in its ideology, interests, or outcomes. With this project, I seek to

explore radical feminist possibilities wherein experience and closeness are legitimate ways of knowing and craft-based practices are legitimate ways of making [see 9].

In light of these goals and challenges, it becomes necessary to approach techno-culture—rather than representation—as an object of study. This requires an intersectional lens of feminist *theorizing*, resisting the monolith of theory in favor of multiplicity and complexity [2]. As Haraway observes, rather than seeking a single feminism we must build unity in our feminist movement(s) through affinity, partiality and “political kinship” [4]. This shared understanding isn’t given biologically: by being of a certain sex, by being categorized as ‘woman.’ We have to do the work. We have to figure out what connects us in order to use our power for change. At this workshop, and through continued dialogue and engagement, I seek to develop a deeper understanding of how intersectional approaches to feminist research can be engaged methodologically. I want to move forward with partiality, without falling into gender essentialism or having to remedy every contradiction in the present.

Author Bio

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