

Re-Tooling the Sisterhood: Conceptualizing ‘Meaningful Making’ through Maker Culture, Makerspace Politics, and Feminist ‘little m’ making-as-activism

by

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Abstract

Hactivism! Craftivism! DIY Feminism! The Maker Movement! In this dissertation, I unpack how certain Do-It-Yourself (DIY) practices have transformed from simple personal pastimes to meaningful sites for activism. To do so, I analyze three overlapping discursive terrains that I contend imbue DIY practices with a sense of ‘meaningfulness’—which I term *embodied materialism*, *critical making*, and *making as communication*. I contend that all three of these terrains co-constitute making-as-activism identities, ‘real-world’ maker activist communities (makerspaces), and the wider making-as-activism network (Maker Culture). However, this blending of ‘meaningful making’ discourses is not evenly distributed, nor is it without contradictory logics and practices. Therefore, in this dissertation I analyze both mainstream (hegemonic) and counter-cultural (non-hegemonic) narratives of Maker Culture, makerspaces, maker identities, and making-as-activism. Through this multi-sided and multi-sited approach, I discovered that both hegemonic and non-hegemonic discourses co-produce the definitional *boundary-work* around ‘what counts’ as making-as-activism. Furthermore, I also contend that in using ‘success narratives’ and ‘passionate work’, the work/labour involved in producing Maker Culture are entangled in *neoliberal logics*—like empowerment and entrepreneurialism—which reproduces *invisible structures of privilege* within makerspaces. I also analyze how DIY politics and makerspace community-building have been adapted by Canadian feminist makers. Using interview data and my own experiences, I argue that feminist makers are building a non-hegemonic representation of Maker Culture by broadening what making-as-activism looks like, who does it, and how it intersects with holistic critical pedagogies. However, despite using a more reflective critical maker approach, I also discovered that feminist making and makerspaces can also re-produce many of the same contradictory logics that are found in mainstream, hegemonic Maker Culture. In concluding this work, I re-evaluate making-as-activism practices, identities, and communities within the context of the ongoing COVID-19 global pandemic. I conclude that *collective care approaches* are vital for building healthy communities—including makerspaces—and that *joint responsibility* can untangle some of the contradictory messiness that comes with leading an activist life in this contemporary moment.

Dedication

For my parents, Lorraine Radke and Tom Ring, who instilled in me the value of tenacity.

And for my beloved dog Baxter (August 21, 2010 - October 29, 2020), who showed me the benefits of walks in fresh air and well-deserved cookie breaks.

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Introduction

Traversing the Unruly Terrain of Maker Culture

I became a Green Beret years ago and adopted the motto, “De Oppresso Liber.” This translates as “to liberate the oppressed”. Little did I know at the time that the real opportunity for me to help “liberate the oppressed” would come through helping TechShop¹ achieve its goal of democratizing access to the tools of the next industrial revolution.

—Mark Hatch, *The Maker Movement Manifesto* (2014, p. 8).

See, the *words* they say are [radical], but then the way they approach the actual work isn’t so much. [...] So, [in Hatch’s *Manifesto*] despite all of his, kind of, revolutionary rhetoric he thanks *DARPA*² in the fucking Introduction!³ DARPA! So, there are some people who [...] won’t work with any of the official Maker Media/*Make*: [as in the magazine] people anymore because they work with DARPA. And, yeah, you know, the military industrial complex.

—excerpt from my interview with ‘Jo’ (Toronto, 26 July 2017).

Hactivism! Craftivism! DIY Feminism! The Maker Movement! Within popular American and Canadian discourses, ‘Do It Yourself’ (DIY)—understood as simply making, repairing, and/or renovating things yourself rather than buying them or paying an expert—is typically viewed, as Martha Stewart famously quips, ‘a good thing’. Yet, as shown by the two quotes above, the ‘good’ accomplished through DIY is hotly contested. As such, my research conceptualizes DIY as a worldly concept that has traversed

¹ For context, Mark Hatch lists being “the first international, billion-dollar makerspace” (Davies, 2017, p. 36) as a key goal for TechShop.

² For clarity, this acronym stands for the Defense Advanced Research Projects Agency, which is a part of the US Department of Defense. They are responsible for developing military technologies and weapons of war.

³ Although Jo is correct that Hatch does give thanks to DARPA, this actually appears in the Acknowledgements section. He also credits a few corporate partners, including Ford, Lowe’s and GE for their help in creating “the Maker Movement” (2014, p. v).

multiple rather unruly discursive terrains—journeying through ancient cave drawings to Plato’s dinner parties, Victorian craft guilds, punk anarchism, hippie environmentalism, hacker rebellions, third-wave feminist interventions, and neoliberal entrepreneurialism. Given this extensive travel, it is perhaps of no surprise then that DIY is comprised of multiple contested narratives and various points of origin. Yet, one aspect of DIY that has proliferated within this discursive terrain that I find particularly fascinating is the way that it has been established as *politically meaningful*—described as a form of radical activism and/or civic engagement focused on creating empowered citizens, economic interventions, and/or social justice. Currently, this discourse is often situated within the American financial crises (2007-2012), when DIY in the United States was viewed as “a statement—a sign of respect for straightened times” (Davies, 2017, p. 16). Indeed, The Maker Movement⁴—largely affiliated with the commercial enterprise, Maker Media Inc.—has credited DIY with rejuvenating the American entrepreneurial spirit and democratizing small-scale manufacturing (e.g., Anderson, 2012; Lindtner & Li, 2012; Lang, 2013; Baichtal, 2014; Hatch, 2014). Within this context, DIY becomes politically significant when it manifests within newly established (circa. 2005 to present) *technologically-oriented communities*—referred to as makerspaces, hackerspaces, FabLabs, TechShops, hacklabs, or community laboratories (coLabs). These DIY ‘tech’ communities are widely celebrated for providing everyday people with inexpensive access to practical technical skill-building workshops and specific digital fabrication tools

⁴ Throughout this dissertation, I use capitalization (e.g., Making, Maker, Maker Movement) to reference the *hegemonic* representations of these practices, identities, or scenes, which I largely attribute to Maker Media Inc. and other mainstream discourse. Therefore, *non-hegemonic* representations—such as those from Canadian feminist makers—are intentionally not capitalized (e.g., making, maker).

and machinery—with a special emphasis on electronics, 3D printing, and computer-numerical controlled (CNC) machines. Within these communities, DIY is understood as radical because it empowers individuals through innovative problem-solving, technical knowledge-building, and playful experimentation. Therefore, from this perspective, DIY is enveloped in neoliberal discourses of self-improvement that confine liberation to individual manifestations of self-empowerment.

Yet, as suggested by the opening quote from Jo—a Canadian feminist maker—radical DIY requires more interventionist approaches. As such, alternative discourses view these same DIY communities as a *re-surfacing* of radical activist communities, such as those found in early hacker clubs, punk anarchism, hippie environmentalism, feminist crafting circles, and artist studios. From this perspective, makerspaces, hackerspaces, coLabs, and the like, are not just community-run tech workshops, but also sites that foster activist dialogues, critical pedagogies, and disruptive interventions. Underlying this DIY-as-activism perspective is a set of shared ‘leftist’ ideals, including equity, accessibility, diversity, collaboration, decentralization, anti-consumerism, environmentalism, and self-determination (e.g., Tiggs, 1971; Levy, 1984; Spencer, 2005; Ratto, 2011; Ryan, 2014; Toombs et al., 2014; Fox et al., 2015a, 2015b; Rosner & Turner, 2015; Tanczer, 2015b; Toupin, 2013, 2014; Ratto & Boler, 2014; Sayers, 2017; Bogers & Chiappini, 2019).

Red Chidgey states that “‘DIY’ operates primarily as an empty signifier: a host of different meanings are inscribed into this term and activated within widely different trajectories and contexts” (in Ratto & Boler, 2014, p. 108). For example, conducting a simple search of “DIY” in Omni⁵ yields over a thousand results, spanning multiple

⁵ The primary searching database used by MacOdrum Library (Carleton University’s library).

disciplines including music, sport, science, technology, business, art, computing, sociology, philosophy, gender studies, and more. Therefore, while I agree with Chidgey that DIY is not a static term, I disagree with their description of DIY as an *empty* signifier. On the contrary, in this dissertation, I will demonstrate that DIY is a *meaningful* concept that manifests through this ongoing discourse—whether that be in the form of accessible technological education, DIY entrepreneurialism, or radical activist disruptions. As such, I contend that DIY is best understood as a floating signifier, as it is constantly claimed and re-claimed, defined and re-defined, through a breadth of overlapping discourses provided by academia, mainstream media outlets, and DIY communities themselves.

Therefore, this contested space, within which DIY is constituted as politically meaningful, serves as the driving impetus for this dissertation. In researching DIY, I was mostly curious about its communicative significance; or how DIY—a concept typically described through a plethora of *individual* interests and practices—is situated within these stratified discursive contexts. Borrowing from Michel Foucault (1972), I conceptualize these discursive contexts as on-going processes of DIY “constituting itself” (p. 38). In other words, in this dissertation, I explore how knowledge *about* DIY and the knowledge enacted *within* these DIY communities share “strategic connections” (Foucault, 1972, p. 38) in developing a wider network, which I refer to as ‘Maker Culture’. To begin, in the first section of this chapter I provide an overview of two key discursive sites: the origins of hackerspaces and makerspaces. Not to be viewed as *the* beginning of DIY politics, since this terrain has multiple starting points, these selected origins serve as a preview of the discourses that shape, bend, and re-define the politics of

twenty-first century DIY. In the second section, I apply the concept of *discourse community* to demonstrate that how DIY is talked about—rather than practiced—provides a more suitable lens for studying the plurality of makerspaces and the political influence of Maker Culture. However, these discourses do not hold equal influence in steering public understandings of DIY politics. As such, I end this chapter with a brief discussion of power, and its role in shaping and maintaining both *hegemonic* and *non-hegemonic* representations of Maker Culture.

I.1 Hackerspace Origins: A Story of ‘Hoap’⁶

Although *hackerspace* is relatively new term in North America—largely associated with the founding of three inaugural US hackerspaces: NYC Resistor and HacDC in 2007 and Noisebridge in 2008 (Tweney, 2009; Moilanen, 2011)—their goal of creating *offline* hacker communities stems from a longer hacker history. For example, Stephen Levy (1984) studied the community-building ethics of early computer clubs—most notably the MIT Model Railroad Club (est. in 1961) and the Homebrew Computer Club (est. in 1975). Furthermore, while many hacker meet-ups moved to new online spaces in the 1990s, some groups—notable names like L0pht, New Hack City, the Walnut Factory, and the Hasty Pastry—thrived in offline spaces (Tweney, 2009; Farr, 2009). John Baitchal refers to these “programmer hangouts” (2012, p.7) as highly exclusive clubs that rarely admitted new members. As experienced by communication scholar Andrew Richard Schrock (2011), members of these spaces tended to work separately and rarely taught one another. For example, if someone asked how something

⁶ Read as ‘hope’.

worked, they would likely receive the response “RTFM” (Read the Fucking Manual) and shown the door. Schrock writes that in these earlier hacker clubs: “knowledge sharing was tempered with paranoia and elitism; you only shared with those you knew were on the same level, and mentorship was a more serious affair, and occurred in back rooms, not public spaces” (2011, np). Therefore, these early hacker clubs served as exclusive communities where elite hackers could meet ‘in-real-life’ (Schrock 2011; Baichtal, 2012).

However, outside of the American context, European models of offline *hacker collectives* are more representative of today’s hackerspaces: large offline hacker communities and events open to anyone and premised on inclusive ideals, like collaboration and sharing. Within this context, these offline hacker communities were dedicated to fixing the negative public image of ‘the hacker’—defined as the recluse nerd who has no friends and engages in childish illegal activities ‘because he can’—to a more legitimate, educational, activist persona. To establish hacking as an ethical practice, these European hacker communities viewed themselves as radical techno-activists who were disrupting and subverting oppressive neoliberal and capitalist power structures that black boxed technology—e.g., through copyrights, patents, arbitrary warrantees, and closed designs—to control the means of technological innovation.

Germany’s Chaos Computer Club (CCC), which was founded in 1981 by Jens Ohlig and Lars Weiler is considered one of the most influential hacker collectives (Hielscher et al., 2015). Their community space—c-base—is often cited as the first hackerspace (Baichtal, 2012; Hielscher et al., 2015; Davies, 2017). According to research by Sabine Hielscher, Adrian Smith, and Mariano Fressoli (2015), CCC was different

from traditional hacker clubs established in the 1980s and 1990s, because they addressed social issues *in addition to* hardcore technical computing skills, including emergent cultural issues related to surveillance, privacy, data security, communication infrastructure, freedom of information, amongst others. Additionally, where other hacker clubs were mainly concerned with keeping knowledge secret and limited to a close group of trusted friends, CCC was publishing their findings and sharing them through public events, like the Chaos Computer Congress. Established in 1999, this Congress became the largest annual hacker conference that brought together hackers from all around the world (Hielscher et al., 2015).

It is at this Congress—or, more precisely at its 23rd edition—that the story of HoaP and American hackerspaces is said to truly begin. After attending Congress and visiting c-base in 2006, American hacker, Nick Farr, was so impressed and inspired by this activist-oriented version of hacking that upon returning to the US he immediately began raising money so he and several other influential American hackers—including Mitch Altman and Bre Pettis—could fly to the next Congress, which he playfully referred to as operation ‘HoaP’: Hackers on a Plane. At the 2007 Congress, attendees—which included HoaP—formed a session called ‘Hackerspace Design Patterns’, which served as a preliminary ‘How To’ guide for establishing your own hackerspaces, like c-base. True to their ethics of openness and transparency, this guide was posted to the newly established hacker wiki website *hackerspaces.org* (purchased by Paul Bohm in 2006). After the 2007 Congress, Farr co-founded HacDC (in Washington), Altman founded Noisebridge (in San Francisco), and Pettis founded NYC Resistor (in New York City).

However, the spread of the German hackerspace model is not limited to the US. By 2008, *hackerspaces.org*, which was now established as a community-run ad hoc hackerspace networking tool, listed 72 operational hackerspaces worldwide. Also in 2008, Canada established its first three hackerspaces: FOULAB (in Montréal), Vancouver Hackerspace (VHS), and Hacklab.to (in Toronto). Since then, the number of hackerspaces available around the world have grown exponentially. As of October 2020, *hackerspaces.org* has listed 2,387 global hackerspaces—993 of which are marked as ‘active’ and 357 of which are ‘planned’.⁷ In Canada, 43 active hackerspaces are listed on *hackerspaces.org*, most of which are in Ontario and Québec.^{8,9} According to Schrock, this explosion of new hackerspaces has revitalized “talk of tinkering with a purpose” (Schrock, 2011, np) that encourages hackers to extend their interests “beyond their immediate community” (Schrock, 2011, np). In other words, within this hackerspace narrative, contemporary hacking has been transformed from a safe-guarded elitist geek practice to one premised on radical activism, knowledge-sharing, and open community-building.

In transforming hacking from an elitist geek practice to one geared more towards building activist communities, hackerspaces forward the ‘Hacker Ethic’ as a shared ethos of hacker communities. First conceptualized by Stephen Levy in 1984, there are three general principles that define ‘the Hacker Ethic’: 1) technoliberalism, 2) anti-

⁷ *Hackerspaces.org*, “List of Hackerspaces”, last visited 9 October 2020: https://wiki.hackerspaces.org/List_of_Hacker_Spaces.

⁸ *Hackerspaces.org*, “Countries Page: Canada”, last visited 9 October 2020: <https://wiki.hackerspaces.org/Canada>.

⁹ A note on data: *hackerspaces.org* is entirely user generated and updated content. As such these numbers are loose estimates as not all hackers/makers/crafters/etc. are contributors of this site, and those that are do not necessarily update it regularly.

establishmentarianism, and 3) meritocracy. Technoliberalism and technological determinism go hand in hand—the former holding the perspective that technology can “change your life for the better” (Levy, 1984, np), and the latter maintaining that technology serves as the driving force behind society and social changes (Adam, 2005). As such, hacker community practices are understood as motivated towards creating decentralized and accessible technologies, with the expectation that they will create a more equal and democratic society (Jordan & Taylor 2004; Adam 2005). Therefore, the Hacker Ethic espouses strong libertarian and free-market principles, maintaining that technological innovation should be free from regulation and legislation.

Rebellious leftist ideologies that embrace anti-establishmentarianism and anti-authoritarianism also intersect with technoliberalism. Levy (1984) captures this attitude by stating that hackers must “Mistrust Authority—Promote Decentralization” (np). Levy (1984) explains that from the hacker’s perspective bureaucracies hinder their ability to create improved systems:

Bureaucracies, whether corporate, government, or university, are flawed systems, dangerous in that they cannot accommodate the exploratory impulse of true hackers. Bureaucrats hide behind arbitrary rules (as opposed to the logical algorithms by which machines and computer programs operate): they invoke those rules to consolidate power, and perceive the constructive impulse of hackers as a threat (Levy, 1984, np).

This rebellious attitude is especially important in understanding hackerspace organization, in which hierarchical decision-making, rules, laws, and other blockages (e.g., copyright protections, patents) are generally viewed with scorn and as barriers that must be subverted (Davies, 2017). As such, many hackerspaces pride themselves in having no official rules, like codes of conduct or explicit community standards, and

instead espouse generic community expectations, like “Be excellent to each other” (Altman, 2012).

This view that hackerspaces do not need official rules or standards is justified through the shared value of meritocracy, where individuals are judged based on their hacking abilities as opposed to “*bogus* criteria such as degrees, age, race or position” (emphasis added; Levy, 1984, np). Levy (1984) explains that this “meritocratic trait was not necessarily rooted in the inherent goodness of hacker hearts—it was mainly that hackers cared less about someone’s *superficial characteristics* than they did about *his potential* to advance the general state of hacking” (emphasis added, np). Interestingly, sex/gender identity is not listed by Levy as a ‘bogus’ criterion that should be ignored. Additionally, Levy does not provide examples of hacker acceptance through meritocracy where the individual being accepted is racialized and/or non-male gender conforming. Therefore, although it is widely acknowledged that hackers do not *always* employ all these values (Levy, 1984; Raymond, 2001; Taylor & Jordan, 2004; Himanen, 2001, 2009; Coleman, 2013), in conceptualizing these ideals as shared values, these tenets of the Hacker Ethic often serve as a universal hackerspace ethos (Himanen, 2001, 2009; Davies 2017).

Yet, despite these noble ethics, like meritocracy and liberty, the development of the ‘Hacker Ethic’ and indeed the mainstream origin stories of American, Canadian, and German hackerspace ‘movements’ are mostly premised upon hacker *histories*, which forwards and upholds the assumption that hacking practices and communities began with young, White, intelligent, middle-upper class, cis-gender men. Indeed, in constructing the Hacker Ethic, one of Levy’s interviewees states that “women, even today, are considered

grossly unpredictable [...] how can a hacker tolerate such an imperfect being?” (1984, np). However, rather than challenging this sexist comment, Levy concludes that there “never was a star-quality female hacker” (1984, np) and that hackers “formed an exclusively male culture” (1984, np) because women are not ‘designed’ for hacking. This conclusion is based on the assertion that men and women have “hardware differences” (Levy, 1984, np). According to Cornelia Sollfrank (2002), hackerspaces are “highly gendered zones” that are representative of the “old boys club” (np). Interestingly, many of the same sexist and essentialist ideologies forwarded by Levy in 1984 are still being used two decades later to explain why there are so few female hackers:

What I found staggering in talking to the ‘experts’ is that [they] based their arguments on essentialist ideas about the differences between men and women. It seems almost a genetic thing—women are not ‘coded’ to code, leaving out any consideration of the socially constructed caricatures of the male techno nerd and the female communicator (Sollfrank, 2002, np).

Therefore, sexist assumptions are baked into the origins of hacking and permeate into contemporary hacker communities. As such, it is of no surprise that hackerspaces tend to be dominated by White men who espouse a particular “dudecore” culture (Toupin, 2013, np). Across the board, feminist writing centered on hackerspaces discuss first-hand experiences of harassment (both physical and verbal), patronization, and an on-going pressure to prove their technical skills. According to Sarah Fox, Rachel Rose Ulgado, and Daniela K. Rosner (2015a, 2015b), although hackerspaces are meant to be premised on diverse ideologies of ‘what counts’ as hacking expertise and skill, in practice the interests of White, college educated, men are prioritized and drive the agenda of these communities. Liz Henry (2014) also writes that hackerspace practices are gendered,

resulting in coding, hacking, programming, electronics, and engineering skills being viewed as the only valuable practices for these communities.

Whiteness is also baked into the Hacker Ethic, which constitutes the hacker activist (or, hacktivist) identity and shapes contemporary hackerspace communities. For example, in constructing the Hacker Ethic, Levy makes no reference to the role of race in shaping the political and ethical standards of hacking. Therefore, while Levy states that race and ethnicity are ‘bogus’ criteria that do not impact hacker community development, he also provides no examples of non-White hacker ‘superstars’. Furthermore, although ideals like meritocracy and liberalism, are forwarded as ‘race-neutral’, critical race scholars maintain that these values are underpinned by White ideals, customs, and norms. For example, within critical race theory, meritocracy is framed as a “foundational societal myth” (Zamudio et al., 2010, p. 12) that “assumes a level playing field where all individuals in society have an equal opportunity to succeed” (Zamudio et al., 2010, pp. 11-12). Similarly, liberalism forwards the notion of ‘equality’, and assumes that within liberal societies everyone has the same opportunities for success. However, within critical race theory, both meritocracy and liberalism are widely critiqued because neither account for the role that White power plays in providing greater advantages for some over others (Zamudio et al., 2010; Delgado & Stefancic, 2017). More specifically, this myth of living in a meritocratic and liberal society renders invisible multiple structures of White power and control that provide White individuals with more power and privilege (Zamudio et al., 2010; Delgado & Stefancic, 2017). As aptly stated by Sara Ahmed, “a disidentification from whiteness (a not seeing whiteness) [is] what keeps whiteness in place” (2012, p. 152). Indeed, in using White ideals as a method to create ‘diverse’ and

‘inclusive’ communities—which, Levy claims the Hacker Ethic does—Ahmed maintains that “*diversity can be a method of protecting whiteness*” (emphasis in original; 2012, p. 147).

George Lipsitz refers to these White power structures as the “possessive investment in Whiteness” (2018, p. 2), and argues that racial categories—such as White, Black, Indian American, and Mexican American—are historical social constructs invented to de-possess non-Whites from their land, raw materials, labour, and wealth and transfer it to White settlers. In other words, “white settlers institutionalized a possessive investment in whiteness by making Blackness synonymous with slavery and whiteness synonymous with freedom” (Lipsitz, 2018, p. 3). Therefore, while *White* individuals living in a White liberal meritocratic system may be judged based on merit alone, non-White people were never included in this system. As such, Lipsitz argues that “all relations among aggrieved racialized minorities stemmed from recognition of the rewards of whiteness and the concomitant penalties imposed upon ‘nonwhite’ populations” (2018, p. 4). And while it may be tempting to dismiss the impacts of race and racial inequality as a ‘dark side’ of long-past history, Lipsitz writes that:

The possessive investment in whiteness today is not simply the residue of conquest and colonialism, of slavery and segregation, of immigrant exclusions and ‘Indian’ extermination. Contemporary whiteness and its rewards have been created and re-created by policies adopted long after the formative stages of Indigenous dispossession, the emancipation of slaves in the 1860s, and even after the outlawing of de jure segregation in the 1960s. [...] Contemporary racism has been created anew in many ways over the past half century, most dramatically by the putatively race-neutral, liberal, social democratic reforms of the New Deal era [...] (2018, pp. 4-5).

Therefore, structural racial inequities are largely explained away through White cultural values stemming from meritocratic liberal myths of ‘equal opportunity’ and ‘fairness’ (Zamudio et al., 2010; Delgado & Stefancic, 2017; Lipsitz, 2018). As such, through their

staunch views on meritocracy and liberal ethics, and their refusal to unpack the privileges and advantages such values provide to Whites over non-Whites, I contend that contemporary hackerspaces maintain this possessive investment in Whiteness.

However, it is not just through their commitment to White ideologies, like meritocracy and liberalism, that Whiteness shapes activist hacking practices and communities. Indeed, the hacking practices and concerns that are defined as ‘political’ and worthy of hacker intervention typically only reflect White causes. Therefore, whereas hacking capitalist financial institutions is viewed as an appropriate site for hacking activism, using hacking to decolonize technology, reclaim non-White technological histories, or exposing racist affordances within technology are viewed as ‘too political’ or not relevant to hacker ethics (Tanczer, 2015b, np). As explained by Micha Cárdenas—a transgender hacker activist of colour:

I feel the idea to make hacktivism [hacker activism] inclusive still centres white people. It has a notion of white people having a party and people of colour are lucky enough to be invited. [...] Focusing solely on digital technology means you have to have enough money to have a computer or some kind of device to be a hacker. However, writing science fiction and developing a story about a new technology that you have invented could also be a form of hacking. Working towards affordability of hacks and starting with experiences of marginalisation and violence when designing [a] hacktivist project is important. You should really centre your activities on the concerns of marginalised people. This is important in the conversation about hacking, where hackers often do not like to engage in aspects which are too political, because they would be purely interested in technology for its own sake, often as a form of entertainment. They ignore however, that centring your own concerns over others is still a political choice (in Tanczer, 2015(b), np).

Therefore, the guiding principles of the Hacker Ethic, which ultimately shapes contemporary hackerspace identities and defines hacker activist practices, uncritically forwards many deep-seeded racist and sexist assumptions and stereotypes.

As such, it is not surprising to discover that feminists who have engaged in these spaces have found them to be uninviting, and even hostile, towards women, queer folks, and people of colour (Toupin, 2013, 2014; Henry 2014; Greenfield, 2014; Fox et al., 2015a, 2015b). In response to these negative experiences, many feminists have left traditional hackerspaces to form their own models. In 2015, a group of feminist researchers created “A Guide to Feminist Hackerspaces” (Fox et al., 2015b), a publicly accessible ‘zine’ to help feminists create their own hackerspaces. In this zine, accepting diverse perspectives, subjectivities, and skills are listed as fundamental ideals of feminist hackerspaces. As such, within feminist hackerspaces there is an intentional blending of skills and knowledge that tend to be branded as ‘masculine’ or ‘feminine’, to disrupt the hacker binary that privileges some skills over others. As explained by Fox et al.:

As in many hacker communities, members of feminist hackerspaces tend to engage in activities associated with traditional ideas of ‘hacking’—technical practices such as electronics prototyping and programming. In women-oriented and feminist spaces, a significant amount of time also tends to be dedicated to learning other creative and practical techniques such as writing, fiber arts, visual arts, and fermenting and canning foods (2015b, p. 3).

Feminist hackerspaces also attempt to blur the binary between technological ‘expert’ and ‘non-expert’, by “actively recruiting members outside of the tech industry in an effort to diversify their membership and skills valued” (Fox et al., 2015b, p. 3). As such, not all members identify as ‘hackers’, or work in technical industries (Fox et al., 2015b).

Therefore, unlike other hackerspaces, which espouse generic ‘open-door’ ideologies, feminist hackerspaces strategically *curate* their communities to create more accessible and diverse hackerspaces.

Furthermore, in feminist hackerspaces the value of openness is not privileged over concerns for safety. As explained by Sophie Toupin (2014), unlike typical hackerspaces,

feminist hackerspaces acknowledge the privileges associated with meritocratic cultures and work to “enable feelings of *safety* rather than simply openness” (emphasis mine; np). As such, although rules tend to be viewed as antithetical to hacker culture, feminist hackerspaces often create explicit community values and enforce them through formal mandates and/or Codes of Conduct. As explained by Fox et al., although feminist hackerspaces are “different in their implementations, these spaces share a core tenant that women and other marginalized people should be welcomed to perform technical practice without being subjected to discrimination or abuse” (2015b, p. 3). As such, while non-feminist hackerspaces are described as ad hoc collectives with few formal rules or structures (Davies, 2017), feminist hackerspaces are premised on clear mission statements that detail their feminist ideals and require that members follow fundamental rules and possess similar values (Fox et al., 2015). Therefore, in feminist hackerspaces comfort, support and safety are considered key components to collaboration. However, as I demonstrate in Chapters Four and Five, ‘safety’ also serves as a contentious term within intersectional feminist communities, as some approaches—like hiring uniformed police officers (Chapter Four), creating legal contracts (Chapter Four), or establishing ‘women-only’ spaces (Chapter Five)—only protect an already privileged group (e.g., White cis-gender women).

While the ideals and contributions of *individual* feminist hackerspaces have been well documented (e.g. Toupin, 2013, 2014; Greenfield, 2014; Henry, 2014; Fox et al., 2015a; Tanczer, 2015b; Rosner & Fox, 2016; Davies, 2017; Foster, 2017, 2019; Foster & Boeva, 2018; Kirtz, 2018; Wernimont & Losh, 2018; Loes & Chiappini, 2019), conceptualizing these spaces as a part of the wider global hackerspace network is lacking.

As explained by Fox et al. (2015a, 2015b), the exact locations of feminist spaces are sometimes not made public to keep the site safe from potentially hostile outsiders—for example, aggressive agitators like Men’s Rights Activists, individual abusers, or other toxic individuals. As such, knowledge about new feminist spaces can be guarded and sometimes only made available through trusted private networks—e.g., from friends, or at feminist meet up events. Therefore, where general hackerspaces are publicly accessible from day one, feminist hackerspaces tend to be more cautious in how they curate their communities.

However, once established, some feminist hackerspaces have replicated the communication channels used by other hackerspaces. For example, where *hackerspaces.org* is a key hacker-generated networking site, the *Geek Feminism Wiki* serves a similar purpose for feminist hackers. In fact, *Geek Feminism Wiki* compiled a list of “Feminist and Women’s Hackerspaces”,¹⁰ which they divided into two groups: what I will refer to as ‘autonomous’ feminist hackerspaces—those that are a separate entity—and ‘integrated’ feminist hackerspaces—groups that operate within larger hackerspaces. On this page, seven autonomous feminist hackerspaces are listed: most of which (5 out of 7) were in the US, one was in France, and one was in Spain. The page lists another seven integrated feminist hackerspace groups: four of which were in Europe, one was in the US, one was in Brazil, and one that was in Canada. Many of these spaces are used in academic case studies (e.g., Toupin, 2013, 2014; Fox et al., 2015a, 2015b; Foster & Boeva, 2018; Savic & Wuschitz, 2018). For example, all of the spaces listed on this *Wiki*

¹⁰ Geek Feminism Wiki. (Last accessed 23 October 2020). “Feminist and women’s hackerspaces”. Online: https://geekfeminism.wikia.org/wiki/Feminist_and_women%27s_hackerspaces.

were also listed in Fox et al.'s feminist hackerspace zine (2015b). Therefore, the origins of these groups serve as our starting point.

Reading the 'about us' sections on these groups' websites—when available—revealed that Mz Tek, an integrated UK feminist hackerspace that started in 2009, was the first space from this list to be established. Canada's 'FouFem'—an integrated group in Montréal—was the first North American space, starting in 2011. Interestingly, *autonomous* feminist hackerspace origins largely occurred between 2012-2014, with five spaces starting in this time frame.¹¹ Adding to this intrigue, all these spaces are American. This finding left me wondering whether US feminist hackerspaces have their own story of 'HoAP'. I discovered that, like the 2007 CCC Congress, the AdaCamp 'unconference' held in San Francisco in June 2013 served as a spark for many American feminist hackerspaces. Like the 'Hackerspace Design Patterns' session, at this gathering Leigh Honeywell—the founder of the newly established feminist hackerspace, Seattle Attic—freely shared information about starting a feminist hackerspace. This session inspired a group of about ten women to continue meeting weekly that summer, in which they planned their own spaces.¹²

However, many of the autonomous feminist hackerspaces listed on the *Wiki* have since ceased operations. As of October 2020, only two of the seven remain functional: Double Union and Mothership HackerMoms, both of which are in California. Within the US, the closure of these other autonomous feminist hackerspaces occurred between 2016-

¹¹ Note: I was unable to verify the starting date for the other two autonomous spaces listed on the *Wiki*—Le Reset in France and *Pechblenda Lab* in Spain (Catalonia).

¹² My thanks to Amelia Greenhall, Valerie Aurora, and Liz Henry—co-founders of Double Union—for documenting this history on their website (<https://doubleunion.org/about/>).

2018—after the election of President Donald Trump. While it is unclear whether this change in leadership is directly related to the closures of these spaces, the Trump administration has significantly reduced national funding for non-profits, including canceling grants for community arts and science programs (National Council of Nonprofits, 2019). On the other hand, integrated feminist makerspaces tend to fare better, with six of the seven groups appearing to be functional in 2020—e.g., they have events planned in 2020 or current social media/blog posts.¹³

Therefore, this exploration into the origins of feminist hackerspaces as a *network* has revealed several salient issues: 1) feminist hackerspaces typically appear in cities with an already established hackerspace scene—e.g., they are integrated within an established space, or are located in a ‘hacker hotspot’ (e.g., San Francisco, Washington DC, Berlin, Montréal); 2) integrated feminist hackerspaces started earlier and have lasted longer than autonomous feminist hackerspaces—with separate spaces operating for, on average, less than five years; 3) there are substantially fewer feminist hackerspaces within the larger hackerspace network; and, 4) since 2016, feminist hackerspaces have been steadily diminishing. In Chapter Two, these issues re-emerge as salient methodological challenges for my study of feminist makerspaces in Canada.

I.2 Makerspace Origins: Making, Incorporated

According to Gui Cavalcanti (2013), author for *Make:* magazine, many people who are “in the know” (np) usually do not distinguish between ‘hackerspaces’ and

¹³ It is worth noting that the one integrated space that is now inactive may be defunct because the members of this group are also named as co-founders of a few autonomous US spaces.

‘makerspaces’. However, Cavalcanti also acknowledges that the need for distinction may be important for people who prefer to call themselves *makers* rather than *hackers*, since ‘hacking’ still tends to be associated with sexism, elitism, criminality, and other exclusionary practices. Yet, while hackerspaces tend to have a clear point of origin and spread within North America—through the story of HoaxP—the history of makerspaces is not so straight-forward. One reason for this has to do with terminology: while the term ‘hacking’ is often limited to computers, ‘making’ tends to be more open-ended, and can include art, crafting, food preparation, decorating, and other DIY practices. As such, while hackerspaces spawned from computer clubs, makerspaces took numerous shapes, including studios, craft corners, classrooms, museums, libraries, laboratories, kitchens, backyards, and barnyards. For example, in a 2015 survey of American makerspaces, 45 of the 51 sites surveyed did not directly refer to ‘making’ or ‘maker’ in their name. Instead, a plethora of other identifiers were used, such as ‘tinkering’, ‘idea’, ‘play’, ‘arts’, ‘media’, and ‘innovation’ (Davee et al., 2015). Therefore, the first key difference between ‘makerspaces’ and ‘hackerspaces’ can be found in language: hackerspaces tend to be *explicitly* centred on ‘hacking’, where makerspaces are more likely to define themselves using a broad lexicon of ‘DIY’ identifiers.¹⁴

Another key distinction between makerspace and hackerspace histories lies in their pedagogy. While the knowledge produced in hackerspaces is community-led and

¹⁴ I want to preface this statement by acknowledging that is the trend in English. Within the Canadian context, French language regulations (*La Charte de la Langue Française*) require that English terms on business signs be translated into French. However, in 2018 the Office québécois de la langue française advised against using the term “makerspace” because it does not uphold “la norme sociolinguistique du français au Québec”. Instead, terms like “atelier de fabrication collaboratif”, “espace de fabrication collaboratif”, and “atelier collaboratif” are recommended (see: http://gdt.oqlf.gouv.qc.ca/ficheOqlf.aspx?Id_Fiche=26527333).

controlled (e.g., made for hackers by hackers and disseminated through hacker networks), *makerspaces* tend to be affiliated with formal learning institutions, like schools, libraries, and museums. According to Shanshan Yu (2016), public libraries have, to some degree, always been used as resource spaces for making. In an *American Libraries Magazine* article titled “Manufacturing Makerspaces” (2013), the creation of Gowanda Ladies Social Society in 1873 is cited as the first makerspace—it was a social circle that met outside of ‘the home’ to quilt, sew, knit and discuss books. This circle later transformed into a formal public library in 1900. In 1905, the children’s department of Carnegie Library in Pittsburgh established at-home crafting libraries for working-class families, where children learned valuable crafting and repair skills. And in 1976, the first ‘tool library’ was established in Columbus, Ohio. In Canada, the Manitoba Crafts Museum and Library was established in Winnipeg in 1933 and served as a meeting place and resource centre for people interested in various arts and craft activities.

However, twenty-first century makerspaces are often described as sites to learn about science, technology, engineering, and mathematics (STEM). For example, the establishment of the FabLab educational outreach program at the Massachusetts Institute of Technology in 2001 is often referenced as a key moment in twenty-first century makerspace history (Davee et al., 2015; Yu, 2016). FabLabs are trademarked makerspaces that operate like a franchise—to be a ‘FabLab’, all spaces in the network must have the exact same tools, materials, and processes. Therefore, FabLabs are standardized makerspaces: users can enter a FabLab in Boston, Gatineau, Delhi or Amsterdam and expect to find the same equipment and resources. According to the Fab Foundation, start-up costs for establishing a new FabLab range between \$25-65K (USD)

for equipment and cost \$15-40K (USD) a year in consumables.¹⁵ Given these high start-up costs, FabLabs tend to appear in well-funded libraries, elementary schools, and universities. As of October 2020, there are over 1,750 FabLabs around the globe, 31 of which are in Canada. Most of these Canadian sites (23) are in the province of Québec.¹⁶

A third key difference found in makerspace and hackerspace narratives lies in its culture. While contemporary hackerspace cultures are described (by some) as more open than their predecessors, hacking still tends to be presented as a counter-cultural rebellious activity. For example, in her extensive research on twenty-first century American hackerspaces, Sarah R. Davies writes that hackers “see themselves as counter-cultural and unusual, part of a new tide in how to live in majority world societies” (2017, p. 146). On the other hand, makerspaces focus on *mainstreaming* DIY by emphasizing the need to incorporate its pedagogical and entrepreneurial approaches into institutionalized education and business sectors. The central impetus for this mainstreaming effect is largely accredited to the success of *Make: magazine*, which launched in 2005 by O’Reilly Media (later to become Maker Media Inc).¹⁷ The reason why this company is so fundamental to Maker Culture and makerspaces is because it is often cited—both by researchers and Makers—as the first company to successfully transform Making from an individual hobby into a mass market (e.g., Currie Sivek, 2011; Waldman-Brown et al.,

¹⁵ See “Setting up a Fab Lab”. Online: <https://fabfoundation.org/getting-started/#fab-lab-questions>.

¹⁶ See FabLabs.io. Online:

https://www.fablabs.io/labs?utf8=%E2%9C%93&q%5Bcountry_code_eq%5D=ca&q%5Bactivity_status_eq%5D=active&per=100&commit=Filter.

¹⁷ Note: Earlier issues of *Make: (Issues 1-36)* were published by O’Reilly Media until the magazine and its affiliated media and products became a separate corporate entity (Maker Media Inc.). In June 2019, Maker Media Inc. abruptly ceased operations and in July 2019 it was rebranded as Make Community LLC. The bulk of the research for this dissertation was conducted prior to Maker Media Inc.’s 2019 rebranding initiative. As such, all references to Maker Media only refer to products and publications from O’Reilly Media and Maker Media Inc.

2015; Buechley, 2016; Davies, 2017; Bogers & Chiappini, 2019). In order to penetrate a diverse mainstream audience, Maker Media Inc. content takes varied forms, including: 82+ published books and project guides, *Make:* magazine, the makezine.com website, the Make: Community social media platform, the Make: television channel, K-12 educational programs and camps (MakerEd), and the worldwide Maker Faire events. In other words, although DIY cultures have long histories, these scenes tend to be described as niche subcultures or counter-cultures. However, due to the popularity of Maker Media Inc.'s suite of products, DIY politics have been successfully assimilated into mainstream discourse, driving new global entrepreneurial policy-making initiatives and educational reforms. In Chapter Three, I further analyze Maker Media Inc.'s role in establishing a universalizing 'Maker' profile, which I contend enacts further assimilation with mainstream science and technology cultures.

Yet, despite presenting these sites as open and inclusive, like hackerspaces, makerspaces are overwhelmingly occupied by White, educated, cis-gender men (Maker Media Inc., 2015a; 2015b; Waldman-Brown et al., 2015; Wernimont & Losh, 2018). Fundamentally, while the ideals of the Hacker Ethic are typically associated with contemporary *hackerspace* communities, I contend that, in maintaining the ideals of meritocracy and liberalism, makerspace community standards intersect with this hacker community ethos. This intersection is perhaps most evident in how both of these communities forward notions of 'inclusion' or 'diversity'. As I further explain in Chapter Two, like the European hackerspace model, makerspaces are widely celebrated for their 'openness'—which is typically expressed through 'open door' policies and a lack of formal conduct rules. Therefore, underpinning these approaches to inclusion and diversity

is the continual circulation of liberal and meritocratic myths that envision societal structures as level and fair ‘playing fields’. As such, by simply opening a door, anyone who wants to join in these communities can and will do so. However, these ‘inclusion’ policies do not properly address how oppressive systems of power intersect—including race, gender, education, ability, class, and others—thereby limiting this ‘fair playing field’ to only some (Zamudio et al., 2010; Ahmed, 2012; Lipsitz, 2018). Sara Ahmed explains that in simply calling yourself ‘diverse’—or, in the case of makerspaces ‘open’—these terms become routine descriptions of organizations, where “diversity becomes a convention, or a conventional way of speaking about [these organizations]” (Ahmed, 2012, p. 58). In other words, in becoming a routine convention, ‘inclusion’, ‘diversity’, ‘openness’, and ‘equality’ becomes nothing more than “lip service” (Ahmed, 2012, p. 58) and act as a way to *maintain* oppression-based exclusions—especially those related to White supremacy, patriarchy, and neoliberal capitalism. For example, Jacqueline Wernimont and Elizabeth Losh (2018) describe makerspaces as “an all-white space of privilege” that “actually reinforce barriers to entry by following a script of common design choices that cater to particular kinds of users” (pp. 98-99). According to Peter J. Woods, even ‘equity-based’ maker education programs, which are designed to foster diversity and inclusion, center Whiteness as “the dominant (and most valuable) viewpoint within maker culture” (2020, p. 189) by “primarily considering maker practices that emerge from White masculine notions of making” (2020, p. 189). Yet, Woods (2020) contends that rarely—if at all—is Whiteness or masculinity interrogated as constituting concepts for makerspaces and maker identities. Educator Suzette Duncan (2016) writes that defining makerspaces as *new* communities premised on developing

STEM knowledge and skills—such as computing, coding, and soldering—exclude those who are interested in other, more established, DIY practices, like crafting, textiles, and art. She maintains that these exclusions are more harshly felt by women and people of colour. In her *Atlantic* article titled “Why I am Not a Maker” (2015), Debbie Chachra views the term ‘maker’ and its accompanying Maker Culture as explicitly patriarchal, “with its goal to [give] everyone access to the traditionally male domain of making” (np).

She writes:

Walk through a museum. Look around a city. Almost all the artifacts that we value as a society were made by or at the order of men. But behind every one is an invisible infrastructure of labor [sic]—primarily caregiving, in its various aspects—that is mostly performed by women. [...] The cultural primacy of *making*, especially in tech culture—that it is intrinsically superior to not-making, to repair, analysis, and especially caregiving—is informed by the gendered history of who made things, and in particular, who made things that were shared with the world, not merely for hearth and home (emphasis in original, 2015, np).

Therefore, Chachra claims that “Making is not a rebel movement [...] it mostly reinscribes familiar values, in slightly different form: that artifacts are important, and people are not. [...] Describing oneself as a maker—*regardless of what one actually or mostly does*—is a way of accruing to oneself the gendered, capitalist benefits of being a person who makes products” (emphasis mine; 2015, np). Furthermore, educator Josh Giesbrecht writes that by claiming 3D printing and CNC machines as *distinctly* ‘Maker Culture’, makerspaces are simultaneously denying the expertise of those who have been teaching ‘maker’ skills for centuries. Consequently, funding for established school woodshops, home economics classrooms, sewing classes, and automotive shops is being re-directed into ‘new’ school makerspaces, equipped with Arduinos, circuit boards, and 3D printers. He writes: “[a]s it stands now, the maker movement seems just fine with letting sewing classes fade into nothingness while busily stocking up on Lilypad

Arduinos” (2014, np). Therefore, in mainstreaming DIY through Maker Media Inc. and its “uniquely digital insecurity” (Griesbrecht, 2014, np), this version of Maker Culture fails its central premise of promoting diverse DIY skills and interests.

Of course, most makerspaces have no formal affiliation with Maker Media Inc. or its corporate enterprises. However, as aptly stated by Davies, “there is inevitably some transfer between *Make:* and the way in which people imagine makerspaces” (2017, p. 35). These residual influences of Maker Media Inc., and the discourses produced within wider Maker communities, have left many—including me—to question who benefits from participating in makerspaces and who does not (e.g., Currie Sivak, 2011; Alper, 2013; Ratto & Boler, 2014; Waldman-Brown et al., 2015; Sayers, 2017; Wernimont & Losh, 2018; Bogers & Chiappini, 2019; Gollihue, 2019)?

I.3 Making Discourse Communities

As shown through these origin stories, hackerspaces and makerspaces are often defined through a set of specific practices (e.g., hacking or making), which Mark Hatch refers to as *communities of practice* (2014). As explained by Etienne Wenger, Richard A. McDermott and William Snyder (2002), communities of practice are simply “groups of people who share a common concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis” (2002, Chapter One). A few examples of the various forms these communities can take include groups of electrical engineers, soccer parents, artists, or gang members (Wenger et. al, 2002). Therefore, while they are heterogenous in composition, these communities are united through a shared interest or skill—e.g., an artist community that

meets every Tuesday to discuss a new art technique. Within these communities of practice, there is an emphasis on the singular—they are built from *a* shared topic. However, as I demonstrated above, ‘DIY’ encompasses a variety of overlapping interests, practices, skills, and areas of expertise. For instance, within a makerspace, you can (theoretically) find engineers, programmers, seamstresses, artists, textile crafters, woodworkers, and more all working together. Furthermore, combining different interest areas—such as ‘e-textiles’ (electronics worked into clothing)—is a common trend within makerspaces. Additionally, this emphasis on singularity does not provide a lens for examining how some DIY practices have come to be viewed as *more political* than others. As aptly stated by Davies, “no one is claiming that joining a quilting circle is going to prompt a new industrial revolution” (2017, p. 143). As such, while these communities do emphasize DIY practices and foster knowledge-building, labelling them as communities of practice—defined through a singular practice or one area of interest—does not fully capture the overlaps and tensions found within makerspaces/hackerspaces.

Since mapping the politics of DIY produced a vast terrain of discourses, I instead conceptualized makerspaces/hackerspaces as *discourse* communities. Linguist John M. Swales¹⁸ defines a discourse community as “a group of people who *share a set of discourses*, understood as basic values and assumptions, and ways of communicating about their goals” (emphasis mine; 2016, p. 9). Within the context of my research, I found two aspects of Swales’ discourse community to be especially salient. The first aspect that I found useful is the multi-level influence that discourse communities can

¹⁸ Note: Swales did not invent the term ‘discourse community’—for that he credits Martin Nystrand (1982). However, his revisiting of the term in his 2011 article for *ASP* applied contemporary examples that was a helpful resource for conceptualizing makerspaces as discourse communities.

have, both on individual members and within the wider publics in which they are situated. As explained by Swales:

[...] when a university becomes established in a town, the presence of this *constellation of discourse communities* influences the wider urban environment; as a result, the urban environment provides services that are helpful to the university, such as cheap student housing, cheap restaurants, museums, and more bookshops, which in turn further consolidates our sense of a university town like Cambridge, Heidelberg, or Uppsala. And the same shaping forces create other kinds of towns: religious ones like Lourdes, Assisi, or Mecca; sporting towns like Le Mans, St. Andrews, or Saratoga; or government towns like Washington, Ottawa, or Canberra (emphasis mine; 2016, p. 11)

As such, conceptualizing makerspaces/hackerspaces as discourse communities, allows for me to analyze the significance of these groups on both micro- and macro- levels. At the micro-level, I can analyze how DIY is established as meaningful by those who participate in a select sample of individual communities. However, at the macro-level, in viewing this sample of DIY communities as a part of a wider *constellation* I can also explore some of the broader influences of these communities on other social contexts, and, how these social contexts simultaneously lend shape to individual makerspaces/hackerspaces. As such, within this dissertation when I am discussing individual communities, I use the term ‘makerspace’,¹⁹ whereas I use ‘Maker Culture’ when conceptualizing these spaces as a network or wider constellation.

The second aspect of discourse communities that I found useful for framing makerspaces and Maker Culture is that it allows for *plurality*. Unlike communities of practice which are defined in the singular, discourse communities are formed through a *set* of discourses. Since this study traverses the unruly terrain shaped by overlapping DIY

¹⁹ For an explanation on why I use ‘makerspace’ over other similar terms (e.g., hackerspace, coLab, FabLab) see Chapter Two.

discourses, plurality is fundamental to fully understand both Maker Culture and makerspaces. Furthermore, this focus on plurality also creates space for exploring the role of competition, tensions, or disagreements *within* a discourse community. As explained by Swales:

[...] when we visit a department in the university that is new to us, our immediate impression is typically one of a homogenous and sedate disciplinary world with wide agreements about such matters as methodology and epistemology. However, the more we get to know it, the more it seems to be fragmented and compartmentalized, and perhaps even fractious and adversative. To an outsider, a linguistics department, for instance, might seem to represent a collectivity of folks with a like-minded interest in language. However, to an insider, there are clear differences between a phonetician and a phonologist, or between those who pursue the relationship between language and mind, and those who pursue the relationship between language and society” (2016, p. 11).

Like Swales’ linguistics department, descriptions of makerspace practices and purposes also tend to leave the impression of a unified group with the same worldviews. However, as demonstrated through hackerspace and makerspace origin stories, these communities are rife with tensions and disagreements, both externally (e.g., hackerspaces versus makerspaces) and internally (e.g., feminist versus non-feminist group members).

Although Swales’ conceptualization of discourse communities is useful for understanding micro- and macro-levels of influence, plurality, and intra-group tensions, one of his shortcomings is that he does not offer much insight in the role of *power* in shaping and maintaining these communities. For example, while he states that there are clear differences between phoneticians and phonologists within linguistics, he does not indicate whether one group is more influential in setting the department’s agenda or in defining the ‘true purpose’ of linguistic study. In other words, during intra-group disagreements, which set of discourses are used to establish the groups’ goals and values?

Michael Karlberg, a Professor of Communication Studies at Western Washington

University, states that in “Western-liberal societies, our discourses of power are almost exclusively conflictual or adversarial. Power tends to be associated with competition at best, coercion or domination at worst” (2005, p. 1). From this perspective, intra-group conflict within any given discourse community must be adversarial: imagined as one dominant sub-group holding more sway and therefore establishing a ‘shared’—or hegemonic—view for the whole community. These hegemonic discourses are enforced through the silencing of non-hegemonic perspectives. For example, within hackerspace and makerspace origin stories, the conflict between feminist and non-feminist makers/hackers is always framed as adversarial. Therefore, Maker Culture discourses often forward either a hegemonic *or* non-hegemonic perspective. Hegemonic discourses are those that privilege a techno-centric Maker Culture, framing its politics as those related to accessible technologies. Furthermore, this hegemony affects not only individual communities, but the wider public understanding of this scene. For example, the Maker Culture *Wikipedia* page defines this scene as “a contemporary culture or subculture representing a *technology-based* extension of DIY culture” (emphasis mine).²⁰ Furthermore, a simple Google search of images of makerspaces (and hackerspaces) overwhelmingly feature people sitting at computers or hands playing with wires. On the other hand, the growing body of feminist discourses that connect makerspaces and Maker Culture to legacies of craft rarely penetrate the public imaginary of this scene. As such, seldom do images of crafting circles or artist studios appear in this mainstream narrative. Therefore, the power to shape Maker Culture discourse is not evenly distributed.

²⁰ Wikipedia. (Last accessed 2 August 2020). “Maker Culture” (see: https://en.wikipedia.org/wiki/Maker_culture).

However, after spending time within Canadian makerspaces and interviewing Canadian feminist makers, I discovered that the relationship between hegemonic and non-hegemonic Maker Culture discourses are not *always* adversarial. Indeed, referring to feminist theorizations of power, Karlberg states that power also manifests relationally through *mutualistic* expressions. Writing in the 1940s, Mary Parker Follett explains that a “conception of power-with, a jointly developed power, a co-active, not a coercive power” should be used when examining social and political relations (quoted in Karlberg, 2005, p. 6). Within the context of Maker Culture, I contend that non-hegemonic discourses are *co-active* in shaping this scene through re-definition and representation. Therefore, the overarching goal of this work is to provide a *discourse intervention*, defined by Karlberg as “an effort to change our social reality by altering the discourses that help constitute that reality” (2005, p. 1). In framing hegemonic and non-hegemonic Maker Culture discourses as both adversarial *and* mutualistic, my aim is to further understand how power relations within this scene are simultaneously about privilege and domination, *in addition to* empowerment and change.

I.4 Conclusion: Mapping the Road Ahead

The remaining six chapters of this dissertation continue to map the unruly terrain of Maker Culture. The next chapter focuses on academic efforts to establish DIY as *meaningful*. Starting in ancient Greece and ending with contemporary ‘critical maker’ scholarship, my aim in this chapter is to understand how specific academic discourses have conceptualized ‘making things’ as a worthy activist pursuit. Within this chapter, I also distinguish between making-*in*-activism and making-*as*-activism, prefacing that this

dissertation is premised on the latter. Chapter Two outlines the method and methodology of this dissertation by explaining the key underlying epistemological assumptions and approaches I used to study Canadian makerspaces and Maker Culture. In this chapter, I also reflect on the challenges I faced in establishing the source data needed to conduct this research, while acknowledging the fluid nature of this scene and its politics. Chapters Three to Five serve as the main analysis chapters of this dissertation, each of which focuses on a key theme that emerged as salient within both hegemonic and non-hegemonic Maker Culture discourses. Chapter Three applies Thomas Gieryn's concept of *boundary-work* to explain how Maker Media Inc.'s narrow rhetorical and symbolic representations of Maker Culture produce hegemonic discourses that have crippled its aims of diversity and inclusion. However, in my interviews with Canadian feminist makers, boundary-work was reproduced in *non-hegemonic* discourses, as the same stereotypical symbols and rhetoric of Making and Maker Culture are used to justify the need for feminist makerspaces and/or feminist maker pedagogies. To explain this phenomenon, I frame it using Susan Leigh Star and James R. Griesemer's (1989) concept of *boundary objects*. Although Star and Griesemer view this concept as facilitating intra-group collaboration and shared meanings, in Chapter Three I demonstrate how 'Making' is a *contested* boundary object for Canadian feminist makers.

However, power in Maker Culture does not only circulate through its hegemonic discourses. In Chapter Four, I demonstrate how a *lack* of hegemonic discourse pertaining to the actual work/labour structures required to maintain Maker Culture—within both individual entrepreneurship and makerspace contexts—have produced *invisible structures of privilege* that further establish this scene as one designed for, and sustained

by, an already advantaged select few. However, in Chapter Five, I re-center non-hegemonic Maker Culture discourses—in this case, those from Canadian feminist makers—and discuss some of the *adaptive strategies* employed by these groups, which re-situate making within critical DIY pedagogies and feminist community-building in Canada. However, while the feminist makers I met with endorsed Maker Culture as a useful site for feminist activism, in Chapter Five I also explain how this connection demonstrates the uneasy, and at times contradictory, relationship between radical activist ideals and practices.

Most of my comprehensive and field research into DIY discourses and Maker Culture took place between 2013-2018. However, since 2019 the Maker Culture landscapes analyzed throughout this dissertation have experienced significant turmoil and upheaval. Perhaps most notable was the unanticipated demise of Maker Media Inc., which entered a state of insolvency in June 2019. A month later, the company re-branded itself as the much smaller Make: Community LLC, limiting their focus to their offline community events (e.g., Maker Faire), online social media platform (Make: Community) and *Make:* magazine. Additionally, with the global COVID-19 pandemic leading to waves of lockdowns around the world—hitting Canada in March 2020—and the resulting rule changes for non-essential social gatherings (which include makerspaces) the future of Maker Culture is left unclear. In the Conclusion of this dissertation, I re-evaluate the ‘meaningfulness’ of DIY within the context of COVID-19 and conclude that a shift towards *collective care* and *joint responsibility* serves as a vital first step in reviving makerspaces and maintaining Maker Culture.

Chapter One

Making It Meaningful: Uncovering the Academic Discursive Contexts of Maker Culture

While there are numerous examples of handcrafted symbols and DIY aesthetics that have been infused into activist movements—such as hand painted banners and signs at women’s liberation and civil rights protests, Occupy Wall Street camps, knitted Pussy Hats, homemade ‘I can’t breathe’ masks and T-shirts, I consider this kind of engagement more as ‘DIY-*in*-activism’, where DIYed objects are mostly aesthetic symbols used to complement or enhance an existing political protest or movement (e.g., suffrage, civil rights, Black Lives Matter). As such, the act of engaging in making in and of itself is not considered the political act. In this dissertation, I am more interested in exploring discourses focused on ‘making-*as*-activism’: or how does the act of making something yourself (or with others) constitute a form of meaningful engagement? What institutions and/or sites of power are being challenged by making things?²¹

In the Introduction of this dissertation, I defined makerspaces as *discourse communities* and Maker Culture as their broader network. In this explanation, I argued that makerspaces and Maker Culture are premised within stratified discursive contexts—which I referred to as hegemonic and non-hegemonic discourses. I concluded that although the practices that shape these communities are various and overlapping, makerspaces also forward a shared discursive premise that views DIY approaches as

²¹ This explanation of making-*as*-activism intersects with the broader ‘art world’, which is often entwined with the ‘meaningful making’ discourses explored in this chapter. For example, the books by Nina Felshin (1995), Deborah Barndt (2006) and Alana Jelinek (2013), have all focused on examining how art is understood as political, and how artists engage in activism through their artistic practices.

politically, socially, and economically meaningful. With the rise of ‘new’ university makerspaces, ‘critical making’ panels or displays at academic conferences,²² and an increasing appreciation of ‘hands on’ materialist learning methods in social science and humanities classrooms, questions about the power of—and power in—making have become rather prominent in twenty-first century academia. But, of course, it is important to temper this excitement of ‘the new’ by remembering that DIY politics are not new. Likewise, since the time of Plato, making has been framed by academics as meaningful for humanity. During the Industrial Revolution, the Arts and Crafts Movement, which viewed maintaining traditional handicraft skills and knowledge as a political imperative to stop the momentum of the ‘Machine Age’ is a popular example used by academics when historicizing DIY as *politically* significant (Tiggs, 1971; Callen, 1979; Crawford, 1997). Other key examples used by scholars to constitute ‘meaningful’ making include: radical environmental movements that started in the 1960s (Wall, 1999); the DIY ethic of the 1970s punk movement (McKay, 1998); the riot grrrl scene and radical zine cultures of the 1990s (Bail, 1996; Ratto & Boler, 2014); feminist craftivism (Stoller, 2004; Penteny, 2008; Winge & Stalp, 2013; Greer, 2014); and, The Maker Movement (Currie Sivek, 2011; Ratto & Boler, 2014; Davies, 2017; Lindtner & Lin, 2017; Bogers & Chiappini, 2019). While the social, political, environmental, technological, and economic contexts vary between these examples, when read together a shared discourse emerges that conceptualizes DIY making as a positive way for individuals to empower themselves, learn vital skills, reclaim agency, make real-world connections, and take control of their

²² The most notable example being the annual ‘Making and Doing’ exhibit at the Society for the Studies of Science (4S) that was first established in 2015 (see: Lachney & Foster, 2020).

lives. But how does making things lead us toward self-determination, social justice, and economic equity? In this chapter, I examine how ‘making things’—in the broadest sense—has been conceptualized within academic discourse as ‘meaningful’. Beginning in ancient Greece, I establish a philosophy of making to frame the current debates circulating in more contemporary Maker Culture scholarship. Through this framework, I contend that ‘meaningful making’ is conceptualized through three overlapping discursive contexts: 1) embodied materialism; 2) critical making; and 3) making as communication. I conclude that these three contexts form the discursive bedrock of contemporary Maker Culture and the sites studied for this dissertation. However, despite this mutualistic shaping, throughout this dissertation I will demonstrate that the power these three contexts have in shaping hegemonic—or mainstream—representations of Maker Culture is unevenly distributed.

1.1 The Philosophies of Making

Academic interest in ‘making’—humans creating physical objects with tools and/or their hands—has a long history. For example, making appears in Plato’s *Symposium*, “The Nature of *Eros*”, dating between 385-370 BC. In this dramatization, the character Diotima refers to the concept of *poiesis*, which she defines as “begetting or bringing forth upon” (Plato, “The effects of *Eros*”, 204d- 212a) or making/creating in the widest sense. Diotima further explains that *poiesis* has three formats: 1) natural *poiesis*, obtained through human procreation; 2) *poiesis* in the city, achieved through heroic fame; and 3) *poiesis* in the soul, attained through arts, crafts, and knowledge production. In explaining why this kind of making is important for humanity, Diotima states that *poiesis*

is about creating “a movement *beyond* the temporal cycle of birth and decay” (emphasis in original; Plato, “The effects of Eros”, 204d- 212a). In other words, for Diotima, making or creating, whether that be successors, fame, or culture, provides the maker with a sense of meaningful existence or purpose for living. From this perspective, making involves the body (e.g., sexual reproduction and heroic action), the mind (e.g., knowledge production) and/or the soul (e.g., crafting and art). As such, for Diotima, *poiesis* allows makers—whether that be makers of children, legends, or objects—to feel some semblance of immortality as they leave traces of their existence long after their death. Diotima claims that “mortals ‘by nature’ seek immortality” (Plato, “The effects of Eros”, 204d- 212a); as such, a logical conclusion is that making is fundamental to human life—through it, human existence is imbued with meaning and purpose.

However, other perspectives on the meaning of making offer a more object-oriented, or materialist, approach. Here, making undergoes a Cartesian split, and things made by ‘the body’ are viewed as separate from those created in ‘the mind’. For example, in *Nicomachean Ethics*, Aristotle lists five virtues that constitute thought: *technē*, *epistēmē*, *phronēsis*, *sophia*, and *nous* (Parry, 2020). For Aristotle, *epistēmē* refers to scientific knowledge; but, not in the contemporary sense with laboratories and experimentation. Instead, scientific knowledge is an abstract form of knowledge-production, where knowing something is premised on proving theorems or theoretical premises. Geometry is a classic example used by Aristotle to explain *epistēmē*, describing it as a process of “understanding how the geometrical axioms lead to a theorem that right triangles have a certain property” (Parry, 2020, np). Therefore, *epistēmē*, or knowledge, produces understanding about the world. Within a contemporary context, *epistēmē* is

purely theoretical knowledge: ideas or concepts that are relevant to hypothetical situations, but often perceived as divorced from or inapplicable to ‘real-world’ experiences or contexts. As such, although academics ‘make’ knowledge, rarely are they viewed as ‘makers’. Therefore, while Diotima may have considered knowledge to be a form of *poiesis*, for Aristotle, *poiesis* is an *external* practice that involves working within the *physical* world.

This separation between mind and body is reiterated in Aristotle’s concept of *technē*, which he uses to refer to art or craft. In this more limited understanding of *poiesis*, Aristotle describes *technē* as the process of making products that ultimately exist outside of the maker (Parry, 2020). As such, for Aristotle a fundamental distinction between *epistēmē* and *technē* is the outcome: where *epistēmē* is concerned with “necessary truths” (Parry, 2020, np), *technē* is focused on creating products. Richard Parry (2020) explains that, from this perspective, “presumably, then, the craftsman does not choose his activity for itself but for the end; thus, the value of the activity is in what is made” (np). For example, carpenters engage in carpentry not because they have a passion for carpentry, but rather because they want to build a certain type of product (e.g., a house). As such, building something well is the motivator for carpenters (and other craftsmen), rather than learning *how to build* just for the sake of knowing. Therefore, from this Aristotelian perspective, *epistēmē* is a deductive process that involves thinking about all possible outcomes and reaching a logical conclusion, where *technē* is an instrumental process motivated by a desire to create specific material products.²³

²³ Although Aristotle provides a clear distinction between *technē* and *epistēmē* in *Nicomachean Ethics*, Richard Parry (2020) notes that this distinction blurs in his later work. For example, in *Physics*, Aristotle concedes that the student of nature would study both “form and matter” (Parry, 2020). For example, a

However, in addition to creating separations between *technē* and *epistēmē*, in *Nicomachean Ethics* Aristotle also distinguishes between making (*poiesis*) and doing (*praxis*). Although both involve embodiment, Aristotle maintains that they are not the same. Fundamentally, Aristotle maintains that the key difference between *poiesis* and *praxis* is that *praxis* is related to virtue, explaining that virtue is a way of *doing* something, not *making* something. Therefore, where *poiesis* is only concerned about achieving the outcome (e.g., the product), *praxis* involves using knowledge to guide one's actions towards living well (Parry, 2020). In other words, for Aristotle there is nothing inherently virtuous about *poiesis* or the craftsmen—or making things is not an inherently ethical practice. On the other hand, *praxis* is about taking virtuous (or informed) action. Therefore, from this Aristotelian perspective, there is nothing politically meaningful about making things.

Both Plato and Aristotle provide two key philosophical frameworks for organizing the abundant academic discourses that lend shape to contemporary Maker Culture. From Plato's framework there emerges what I refer to as an *embodied materialist discourse* where DIY politics are rooted in embodied, 'hands on' practices. Under this framework, the process of creating material objects, especially with the hands, is viewed as a politically meaningful act that resists post-material cultures and hegemonic sites of power, like consumer capitalism, the academe, and patriarchy. On the other hand,

physician would study both the theory of 'health' (*epistēmē*) as well as the physical body (*technē*). Parry writes that "if medicine is an *epistēmē* which studies health, it is also a *technē* which produces health". Parry states that this blurring of *technē* and *epistēmē* is not limited to medicine, stating that Aristotle presents a "mixed picture" of the two throughout his work.

Aristotle derides the production-focus of craftsmen, maintaining that only through *praxis* can one achieve virtue. I contend that *critical maker discourses* take shape under this Aristotelian framework, where critical knowledge production plays a vital role in constituting making as politically significant. Fundamentally, in critical making, holistic knowledge production is an equally valued—if not more so—outcome to DIY politics as the made-object itself.

1.2 Making with The Body: Materiality as Activism

Although there are ongoing debates surrounding what practices and objects ‘count’ as making within DIY politics, there is also a shared perspective that forwards making as an *embodied* practice, or something that requires the use of the human body. However, at times, there is a tendency to prioritize some elements of the human body over others. For example, while Diotima considers ‘the womb’ as a site for natural *poiesis*, Aristotle’s view of *poiesis* (through *technē*) only involves the external body (e.g., the limbs). Other perspectives further dissect the maker’s body through a fixation on ‘the hands’. For example, in her book, *The Human Condition* (1958), Hannah Arendt examines how the “birth of *homo faber* and the coming into being of a man-made world” (p.122) demarcates the “work of the hands” (p. 136), from the “labor [sic] of our bodies” (p. 136). She writes that “*homo faber* who makes and literally ‘works upon’ as distinguished from the *animal laborans* which labors [sic] and ‘mixes with’—fabricates the sheer unending variety of things whose sum total constitutes the human artifice” (emphasis in original; 1958, p.136). From this perspective, making—as represented by

the *homo faber* and traditional craftsmen—is not only an embodied *technē* practice, but also is one performed by ‘the hands’.

This fixation on ‘the hands’ continues in more recent academic literature as well. For example, while studying early computer clubs at Massachusetts Institute of Technology, Stephen Levy maintains that these groups “always yield to the Hands-On Imperative!” (1984). As such, even though these ‘hackers’—makers who build and improve computers—were students and professors at a prestigious American college, their learning environment, as described by Levy, was nothing like the classic lecture-style classroom commonly associated with elite colleges/universities. Instead, these clubs mobilized a ‘hands-on’ approach, which involved using their hands to take computers apart, experimenting with new gadgets or components, breaking pieces, and trying to re-assemble them again. Therefore, rather than pursuing theoretical knowledge about computers gained by listening to an expert or reading the manual, the Hands-On Imperative is exploratory, tactile, and experiential. Levy maintains that some of the biggest breakthroughs in computing, like using a screen and developing games, emerged from the Hands-On Imperative. In her 2017 book *Hackerspaces*, Sarah R. Davies affirms that the Hands-On Imperative is still a key guiding ethic for American hacker communities, writing “this learning process was viewed as something that had to be hands-on and active. If you wanted to learn to weld, you didn’t prepare by reading books about welding or going to a college class on it. True knowledge—we were told—is only ever experiential” (2017, p. 68). Davies writes that for these groups, this hands-on approach is vital in twenty-first century society where people feel disconnected from the world around them and alienated by the constant surging force of technological change.

However, it is not just technophiles who emphasize the imperativeness of using ‘the hands’. I maintain that this fixation with ‘the hands’ serves as a shared site of great concern among various groups of artists, crafters, makers, hackers, and the like. For example, in the Victorian Era, prominent socialist writers and artists like Thomas Carlyle and John Ruskin loudly voiced their growing concern that the ‘Machine Age’ was leading to the degradation and obsolescence of manual labour and traditional handicrafts. In 1829 Carlyle wrote that “the living artisan is driven from his workshop, to make room for the speedier inanimate one. *The shuttle drops from the fingers of the weaver, and falls onto iron fingers that ply it faster. [...]. Men have grown mechanical in head and hearts, as well as in hand*” (emphasis added; quoted in Callen, 1979, p. 2). Therefore, with the rise of the Industrial Revolution in England in the nineteenth century, the livelihoods of craftsmen, artisans, and artists were under threat by the prominence of new mechanized manufacturing. Handcrafted products, that once required significant skill and time to make, were now being mass-produced in factories and sold at a fraction of the price, saturating the market with inexpensive replicas. Described as an “active rebellion” (Callen, 1979, p. 2) against mechanization, The Arts and Crafts Movement was created by William Morris (and likeminded craftsmen and artists) in 1860. Rising resentment and concern over ‘Machine Age’ manufacturing was the primary driver of this Movement. Morris lamented that “it is allowing machines to be our masters and not our servants that so injures the beauty of life nowadays” (quoted in Callen, 1979, p. 214). As explained by Anthea Callen:

Taken up and amplified by William Morris, the ideals of craftsmanship, good design, fitness of purpose, reuniting designer and maker, and a renewed dignity of labour found both practical and theoretical expression. [Morris’s] creation of craft workshops and his concern with the revival of numerous dying traditional crafts

through a personal energetic involvement, made him a figurehead and example for the majority of later developments in the movement (1979, p. 2).

As such, the Arts and Crafts Movement was fundamentally working towards increasing the social and economic value of ‘handmade goods’, touting that objects produced by factories were soulless and lacked any true value or meaning (Crawford, 1997).

These ideologies forwarded by Arts and Crafts Movement supporters serve as a key starting point for understanding the *political* significance of making things ‘by hand’. Arguably, one of the key accomplishments of the Arts and Crafts Movement was the establishment of handicraft design schools, guilds, and societies (Callen, 1979), all of which taught traditional making skills. For example, the Art Workers’ Guild (formed in 1884) and the Arts and Crafts Exhibition Society (formed in 1888) were the cornerstone of the Movement, which “fulfilled the crucial arena for discussion and the exchange of ideas among like-minded architects, designers, artists, and craftsman, thus giving its members a sense of solidarity and common identity” (Callen, 1979, p. 15). Therefore, the Arts and Crafts Movement was driven by a strong desire to keep handicraft making as an active and embodied practice, largely focusing on practices that involved skilled hands. Furthermore, through the formation of guilds and societies, the ‘craftsman’ became a shared identity cemented by these common political views.

Turning to the twenty-first century’s ‘Information Age’, we still hear echoes of Carlyle’s anxieties and Morris’s influence almost two centuries later. For instance, in his 2012 book, *Makers*, Chris Anderson, editor of *Wired* magazine and proponent of ‘The Maker Movement’, claims that people have become disconnected from the ‘atoms’ of the physical world, using their fingers to manipulate ‘bits’—hence the term ‘the digital’—rather than objects of substance. He writes: “digital natives are starting to hunger for life

beyond the screen. Making something that starts virtual but quickly becomes tactile and usable in the everyday world is satisfying in a way that pure pixels are not. The quest for ‘reality’ ends with making real things” (2012, Chapter 2). This view of making is particularly salient within ‘the material turn’ in the social sciences and humanities, with disciplines like cultural studies, communication/media studies, science and technology studies, and digital humanities moving away from poststructuralism in order to re-centre ‘the object’ (Bogers & Chiappini, 2019). For example, Loes Bogers and Letizia Chiappini explain that the value of making physical objects lies in its ability to anchor humans to materiality:

[...] after the linguistic turn, reducing everything in the world to social constructs shuts our eyes to its vibrant materiality, to return to the realm of active agents that shape, resist, and even speak through material difference (for those who know how to listen). Viewed in this light, making becomes a mutually transformative act between non-human and human, where material and discursive actors continuously come into being together (2019; p. 14).

Steve Mann explains that with the dominance of the Internet, “we have increasingly been living in the post-material world”, in which “materiality or physicality has given way to abstract concepts like cyberspace and cyborg space” (2014, p. 31). However, with the re-emergence of hands-on making practices, Mann claims that we have “come full circle, though, back to what I call the ‘post-postmaterial age’ or ‘post-cyborg age’ wherein we must combine the material (physical) and the immaterial (computational) worlds” (2014, p. 31). The popularity of 3D printing serves as a prime example for how computational and material worlds are working in sync.

Materialism and embodiment are also key concepts in ‘third-wave’²⁴ feminist scholarship and activism. According to Kathy Bail, Do-It-Yourself (DIY) feminism, which started in the 1980s, emerged as a response against the prevailing assumptions that “feminism is something you had to learn: you do a course in it at university; it has its own section in bookshops; it has become a predominantly intellectual pursuit removed from daily, grass-roots activity” (1996, p. 7). Bail further explains that DIY feminists “demand for positive ‘how to’ tips rather than doses of theory” (1996, p. 8). Jack Bratich and Heidi Brush (2011) contend that by crafting in public, women render visible what art and historians have erased for centuries—women’s production and unpaid domestic labour.²⁵ Taking this point further, Rosie Cross maintains that DIY feminism is about creating “self-produced content, or buying and exchanging products within one’s own community” (1996, p. 82). Writing about feminist zine cultures, Red Chidgey offers a similar community- and culture-building perspective, stating:

DIY seeks to ‘cut out the middlemen’ of politicians, corporations, and policy makers. ‘Maker cultures’ are seen as potential antidotes to the excesses and apathies associated with consumer capitalism. For such activists, making your own culture and politics, rather than consuming those of others, is a political mode of engagement (in Ratto & Boler, 2014; p. 104).

Allyson Mitchell (2001) also views DIY feminism as a site for feminist community building, writing: “DIY is the link that connects [lesbian-feminist-punk-riot-grrrl-youth-

²⁴ I use scare quotes to indicate my acknowledgement of the criticisms associated with defining feminist activism as ‘waves’. As discussed in Kinser (2004), in understanding feminism using a ‘wave’ model, the influences from non-White, non-middle-class women during early feminism are often rendered invisible. However, like Kinser (2004), I also find there is some rhetorical significance to the ‘wave’ model when discussing notions of space in that these terms gave later feminists a rhetorical advantage when cultivating new ideas while still being connected to older, more established feminist ground. Therefore, I use the ‘wave’ model here to provide contemporary feminist activism with clout and acknowledge that feminist concerns are neither new nor fleeting.

²⁵ In Chapter Four, I further analyze how the work and labour of creating and maintaining makerspaces is also gendered as it intersects with patriarchy and privilege.

alt.] subcultures—the Do It Yourself politic that urges people to create their own culture and not rely on the mainstream to do it for them” (p. 221). Referring to the politics behind feminist graffiti writing, Mitchell contends that:

Myths are exploded when girls pick up spray cans, carry sidewalk markers with them and start their own political sticker campaigns. [...] By leaving a mark using non-legitimate means, graffiti resists the authority of those who control private property, of corporations and of laws—it makes visible the existence of the invisible on the very bricks and mortar owned by those in power” (2001, pp. 222-223).

However, Mitchell clarifies that DIY activism is not the only way to ‘do’ feminism—instead, DIY feminists are best viewed as a “subculture within a subculture” (2001, p. 226) that broadens what civic engagement and resistance can look like. Beth Ann Pentney (2008) writes that crafting in this way is regarded by some as a meaningful feminist practice in the way it fuses “fun with politics” (np), and fosters “women’s community building through do-it-yourself” (np). Therefore, from this DIY feminist perspective, not only can crafting products be read as activism, but selling or trading these products *within* feminist crafting communities is a pragmatic way to support feminist action. Therefore, the popularity of DIY feminism parallels other making-as-activism movements in its desire for pragmatic, material, and embodied engagements with activism.

What I find interesting and salient about this ‘hands on’ embodied materialist perspective of making-as-activism, are the ongoing ontological tensions between embodiment, materiality, and intellectualism. Throughout this literature, there is the recurring premise that making serves as an anecdote to intellectualism. To clarify, my use of the term ‘intellectualism’ here should not be conflated with intelligence; instead, this anti-intellectual tension serves more as a critique to the predominance of rationalism that

underlies Western philosophy and forms the roots of the academe. For example, in his 1927 book, *Being and Time*, Martin Heidegger uses the concept of *poiesis* to explain the importance of ‘being’, or having things just exist without the need for philosophical or scientific reasoning (Blitz, 2014). For Heidegger, *poiesis* disrupts the inevitable spiral towards nihilism that humans have been trapped in since the emergence of Western philosophy (Blitz, 2014). Similarly, Hannah Arendt contends that the work of the *homo faber*—the maker of the man-made world—is essential because of its “objectivity” (1958, p. 137). Arendt writes that the value of the objects created by *homo faber* lies in their durability, as they are able to “‘stand against’ and endure, at least for a time, the voracious needs and wants of their living makers and users” (1958, p. 137). Therefore, *homo faber*’s objects serve the function of “stabilizing human life” (1958, p. 137), allowing humanity to “retrieve their sameness, that is, their identity, by being related to the same chair and the same table. In other words, against the subjectivity of men, stands the objectivity of the man-made world” (1958, p. 137). In their book, *All Things Shining* (2011), Hubert Dreyfus and Sean Dorrence Kelly maintain that we should all strive to become craftsmen, claiming that *poiesis* is vital for achieving existential meaning in everyday life. They write that “the task of the craftsman is not to *generate* the meaning, but rather to *cultivate* in himself the skill for *discerning* the meanings that are already there” (italics in original; p. 209). Therefore, fostering a common ‘maker’ identity and politic, and maintaining the sites where people can use their hands to create physical objects—things with mass—are viewed as crucial for humanity, which has a long tradition in making scholarship and artist and craftsmen led countercultures. However, this emphasis on *physicality* raises further questions about who can fully participate in

embodied materialist making? Meryl Alper writes that “analyzing maker culture requires us not only to look closer at the materials, techniques, and activities that constitute making, but also the *social context* that surrounds participation in and exclusion from maker culture” (emphasis added; 2013, section 2). In the next section, I explain how critical making discourses consider these wider social contexts through the concept of *praxis*.

1.3 Making It Critical: Making with *Praxis*

Over the past decade, making-as-activism scholarship has taken a critical turn against the objectivity and instrumentalism forwarded by embodied materialist makers. Coined by Matt Ratto in 2011, ‘critical making’ is viewed as extending this object-orientation by requiring the maker to make apparent the *intention* underlying their work thereby “furthering critical knowledge” (2011, p. 252). Therefore, for Ratto, critical making “signals a desire to theoretically and pragmatically connect two modes of engagement with the world that are often held separate—critical thinking, typically understood as conceptually and linguistically based, and physical ‘making’, goal-based material work” (2011, p. 253). As such, although critical making also engages with embodiment and materiality, in the sense of creating physical objects ‘by hand’, learning for the sake of making more ‘things’ is not the end goal. Instead, Ratto writes:

[...] through the sharing of results and an ongoing critical analysis of materials, designs, constraints, and outcomes, participants in critical making exercises together perform a practice-based engagement with pragmatic and theoretical issues. [...] Using a shared process of making as a common space for experimentation encourages the development of a collective frame while allowing disciplinary and epistemic differences to be highlighted and hopefully overcome (2011, p. 254).

Writing three years later, Ratto maintains that critical making is “an activity that provides both the possibility to intervene substantively in systems of authority and power and that offers an important site for reflecting on how such power is constituted by infrastructures, institutions, and practices” (Ratto & Boler, 2014; p. 1). In their book *DIY Citizen* (2014), Matt Ratto and Megan Boler (2014) write:

such activities can be understood as political in the sense that they *potentially challenge existing systems of authority*—questioning ownership rights to media, for instance, or putting to the test traditional systems of peer review. Many of these ‘maker’ activities begin to take on additional importance as dominant institutions, such as the military, corporations, and governments, increasingly recognize the ways in which DIY activities challenge traditional hierarchies of authority and the existing status quo (emphasis added; p. 5).

Therefore, a fundamental difference between critical making and embodied materialist making is that critical making seeks a more holistic understanding of the interconnectedness between making, materials, and broader systems of power through an intentional engagement with these entanglements. In other words, rather than seeing DIY making as an inherently political act—in which simply making things for oneself constitutes making-as-activism—the critical maker perspective situates DIY approaches within critical theory frameworks to materialize elusive concepts, like the Anthropocene, and the complex entanglements of making within wider systems of power. I contend that this shift towards critical making more closely aligns with Aristotle’s notion of *praxis*, rather than *poiesis*, signaled by ‘made products’ playing a lesser role in determining making processes (*poiesis*); instead, critical knowledge production and ethics guides critical making motivations and approaches.

To illustrate how critical making processes provide space for these intimate entanglements, I turn to Kat Jungnickel’s project of handcrafting a nineteenth-century women’s cycling skirt—a long skirt that could be raised using a hidden pulley system—

from an original patent. Jungnickel writes that “in their flattened form, [patents] give the appearance of an incontrovertible list of claims. Their formulaic nature is deliberately designed to make complex knowledge appear ordered, neat, and, as a result, persuasive” (2018, p. 496). However, in executing the design from a patent, Jungnickel discovered that the process of making something was much more complicated than it appeared, writing:

To make from a patent involves interpreting the inventors’ instructions and paying close attention to the labor [sic] involved, including time to accomplish small tasks such as making buttonholes that enabled larger systems to operate. It invites a close consideration of materials, technologies, skills, and bodies in the making of knowledge, such as mine as the maker but also the communities of women in the 1890s who shared skills, devices (such as sewing machines), fabrics, patterns, patent agent recommendations, and ideas (2018, p. 497).

Therefore, through the process of making the design from a patent as a research method, Jungnickel discovered that engaging in various making processes unveiled a web of hidden histories, communities, and bodies of subjugated knowledges.

However, one of the major concerns raised by critical maker discourse is the over-emphasis embodiment and materiality has had in steering DIY politics. Claims centered around the political imperativeness of ‘the hands’ and objectivity has led to a contradictory politics that ideologically resists environmental degradation, while also contributing to it through the making of more ‘stuff’. For example, although Mann celebrates the return of post-postmateriality with the popularity of 3D printing, Davies reports these tools “have almost exclusively been used to print what we might term cheap plastic junk” (2017, p. 7). A similar critique was levied by Josh Giesbrecht, who writes that “3D printing is great if what you want to make is a whole lot of small plastic doodads that you have to keep buying spools of plastic to create” (2014, np). In her article for *Medium*, Anna Waldman-Brown postulates that the hands-on embodied materiality of

maker activism is creating a “reverse environmental offset” (2015, np), writing that “the material of choice for all this new stuff we're clamouring to make is overwhelmingly plastic” (2015, np).

A similar tension emerges when one considers the intersection between DIY making and consumer capitalism. While the embodied materialist perspective contends that hands-on making disrupts consumer capitalism’s endless cycle of passive consumption and mass production, some critical making scholars have questioned whether this is actually the case. For example, Nicole Dawkins’ (2011) study on feminist crafting in Detroit found that certain types of crafting (e.g., knitting, crochet, sewing) are gendered, classed, and raced. In her study, 91% of her respondents self-identified as either ‘Caucasian’ or ‘White’, leading Dawkins to conclude that: “the ability to choose and distinguish between making something out of necessity and making as part of a larger aesthetic or moral calling was a matter of (white) privilege and of cultural capital” (2011, p. 268). She concludes that, in many ways, DIY feminism is still largely connected to the “interests of post-Fordist capitalism”, which reinforces “deep-rooted structural inequalities” (Dawkins, 2011, p. 263). Loes Bogers and Letizia Chiappini are also skeptical that this kind of making will garner the change it seeks, writing: “slick promises and good intentions often obscure a non-solution with more undesirable and unintended consequences than you can fit on a product poster. Nevertheless, you too can build this—provided you can spend 150 Euro on sensors, boards, and acrylic sheets” (2019, p. 8). Bogers and Chiappini maintain that, while it is often not discussed in the literature, “making always intersected with class in a particular way” (2019, p. 11). Sarah R. Davies (2017) also shares this perspective, pointing out that despite all of the pomp

and circumstance surrounding embodied materialist making, in the end this rhetoric fails to create meaningful change, writing:

The irony is, of course, that these efforts to escape the power of markets and bureaucracies are themselves constantly being commodified. [...] [The rhetoric of DIY] strokes our egos, entices us with potential lifestyle changes (I've definitely been seduced by visions of myself as a committed aqua-hiker, jam-maker, or successful internet dater), and it turns us into ever more committed users of the services [it] provides. However counter-cultural the thinking behind DIY is, then, it is constantly being absorbed back into the market and turned into something that can be consumed (p. 23).

Susan Currie Sivek (2011) also postulates whether this kind of making can still be considered activist. Like Davies, she also contends that materialist making allows individuals to *feel* like they are resisting powerful institutions and logics, when in actuality they are “often simply acting in just the kind of small ways that don't threaten these powers” (p. 205). Therefore, a key distinction between embodied materialist making politics and critical making is that while embodied materialist making views all forms of making as ‘everyday resistances’, critical making discourses require makers to become intimately entangled within their ideological contradictions throughout their making processes.

Although critical making projects are highly interdisciplinary—often described as forming a bridge between science, technology, the humanities, social sciences, and art (Ratto, 2011; Ratto & Boler, 2014; Sayers, 2017; Loes & Chiappini, 2019; Lachney & Foster, 2020)—when viewing critical making as a discursive context, it is often produced by Science and Technology Studies (STS) and digital humanities scholars. Therefore, although critical making includes ‘traditional’ crafting—like Jungickel’s nineteenth century bicycle skirts—typically this discourse tends to focus more on making within the twenty-first century, which privileges the digital, the electronic, and the computational.

John Hunter, Katherine Faull, and Diane Jakacki (in Sayers, 2014) write that the “academy is pouring resources into the maker movement” (Chapter 14, p. 4), in response to “a social environment where digital skills are deemed essential in secondary schools and fundamental to nearly all academic outreach outside the humanities” (Chapter 14, p. 4). They argue that this global shift towards ‘the digital’ has resulted in a decline in humanities enrollment due to “a toxic combination of economic anxiety, spiraling costs, and media and parental suspicion of the humanities’ value in the world” (in Sayers, 2014, Chapter 14, p. 2). As such, in many ways critical making is a recruitment strategy to rejuvenate the humanities and establish its relevance for twenty-first century students. However, the problem with this strategy is that ‘making’ tends to be reduced to technological practices—digital literacy, computational skills, electronics, power tool use, and digital fabrication. In other words, through critical making, STEM skills and practices are incorporated into social sciences and humanities in order to secure its relevance; however, rarely do the valuable critical pedagogies and approaches produced by the humanities and social sciences flow back into STEM making discourses. As such, while critical making may form a ‘bridge’ between STEM and cultural disciplines, this flow of knowledge tends to be unidirectional. This means that while critical making scholarship appears to be on the rise, with many social science and humanities departments investing in makerspaces and/or ‘critical making’ classes, typically only certain kinds of making—those inspired by embodied materialism and digital technology—are viewed as worthy. Therefore, although “armchair critic” (Mann, 2014, p. 37) intellectualism has fallen out of favour in critical scholarship for its inapplicability to everyday lived experiences—or existentialism—when critical scholars conceptualize

making as a meaningful practice, intellectualism re-appears as the foil against which making is constituted as an imperative practice. While abstract intellectualism fosters nihilism, disconnection, and passivity, making is constituted as a solution. It is important to caveat this point with an acknowledgement that this resistance to intellectualism is not just rooted to DIY discourses—it is symptomatic of wider societal shifts. As Judith Butler recently stated during a *New Statesman* interview, “we are living in anti-intellectual times, and that is evident across the political spectrum” (in Ferber, 2020, np). Therefore, the desirability of making is situated within an anti-intellectual turn within social science and humanities as scholars are re-connected to objects of material reality. As such, through making, academia maintains its relevance to contemporary digital society, mitigates inevitable existential crises, and stabilizes a world full of meaningless post-structural constructs.

Therefore, it is important to recognize that in conceptualizing the politics of DIY, critical making discourses are not separate from embodied materialist ones. From the embodied materialist perspective, DIY making maintains skilled handcrafters that actively resist the surge of automation, passive consumption, and nihilism. On the other hand, critical makers consider ethical approaches to making to highlight the messiness of social, political, economic, legal, and ecological systems of power. As such, the political motivations and areas of concern (e.g., passive consumerism, subjugated knowledges, mass production) remain the same. Therefore, the boundaries created by Aristotle around the material, theoretical, and actionable have become rather blurry within our current digital-material reality, if not entirely obsolete. The discourses of embodied materialism

and critical knowledge production become increasingly entangled within the third and final discursive context of contemporary Maker Culture: making as communication.

1.4 Making Connections: Building Communities Through Shared Discourses

Although I presented embodied materialist and critical making as separate discursive contexts in this chapter, it is important to emphasize that, although different in approach, throughout this rich body of academic research echoes the shared position that making is meaningful because it fosters a tangible connection with the material world. However, underlying this shared position is a hidden caveat: while making things is important, *sharing* these objects with a community of like-minded makers is where the true potential of DIY politics lies. For example, embodied materialist scholars all describe the Arts and Crafts Movement, early hacker clubs, and DIY feminists as fostering a strong sense of community, co-production, and shared identity. Furthermore, critical maker scholars maintain that creating critical knowledge through making is a collaborative process that involves an ongoing sharing of ideas and approaches with others. Therefore, while DIY is often viewed as an individual endeavour, in conceptualizing making as meaningful, both embodied materialist and critical maker scholars situate these practices within a “networked individualism” (Ratto & Boler, 2014, p. 1). In framing making as a network, these endeavours are not just casual hobbies but *substantive forms of communication*. For example, communication and media scholar David Gauntlett writes: “making is connecting because through making things and sharing them in the world, we increase our engagement and connection with our social and physical environments” (2011, p. 2). Therefore, Gauntlett conceptualizes making as a

form of meaningful communication, where “an individual is given the opportunity to reflect, and to make their thoughts, feelings, or experiences manifest and tangible. [...] [Making] can generate insights which would most likely not have emerged through direct conversation” (2011, p. 4).

In studying the histories of communal craft-based socializing—such as quilting bees or knitting circles—Katie Orton-Johnson contends that contemporary maker communities represent “networked leisure citizenship” (in Ratto & Boler, 2014, p. 143), which combines pleasure and leisure with participation and public engagement. She explains that:

The shift of the personal practice of knitting into the sphere of public activity enables participants to express, produce, and consume ‘community’ as part of a new form of networked leisure citizenship. This provides us with an alternative definition of participation and citizenship as a form of leisure and pleasure and as an act of collaborative connectivity, and it points to the spaces and modalities in and through which citizenship is practiced (in Ratto & Boler, 2014, p. 142).

Orton-Johnson concludes that the true value of these communities is that they shape maker identities through discourse, writing: “a sense of self as ‘maker’ is discursively produced through the relationships between imagined, virtual, and ‘real’ communities” (in Ratto & Boler, 2014, p. 142). Building from this premise, I contend that DIY is not *inherently* political—I do not uphold the position that making things is always ‘a good thing’ premised in radical anti-capitalist politics or social justice activism. Instead, in this dissertation, I demonstrate how making *becomes* meaningful once it is situated within a *discourse community*²⁶, which manifest from these three overlapping discursive contexts. In other words, within ‘the makerspace’,²⁷ making is meaningful because it fosters

²⁶ For a refresher on what this term means, see the Introduction chapter.

²⁷ See Chapter Two for an explanation of how I am defining ‘the makerspace’ in this project.

embodied materialism, critical *praxis*, and community-building. As such, these three academic discursive contexts form the mortar which holds the individual bricks of meaningful making together, each of which represent a DIY project and practice.

1.5 Conclusion: Bringing Meaning to Maker Culture (and Beyond)

From this literature review, it is clear making has been conceptualized through a breadth of terms—whether it be *poiesis*, *technē*, *epistēmē*, *praxis*, DIY, hacking, crafting, or critical making—each of which provide a slightly different perspective on how making is meaningful. For some, the meaningfulness of making lies in its embodied materialist quality, and the simple act of making handcrafted objects is constituted as a rebellious act that can disrupt hegemonic institutions and logics that perpetuate passive consumption and capitalist modes of mass production. Some examples that I see as representing this perspective include the Victorian Era’s Arts and Craft Movement, The MIT hacker club, and DIY feminism. On the other hand, others maintain that simply making ‘stuff’ is not politically meaningful, claiming that rather than disrupting passive consumption cultures this kind of making actually *maintains* these institutions and logics, which have detrimental effects on the environment. I referred to this view as the ‘critical maker’ perspective, and demonstrated that in this form of making, *praxis*—or critical knowledge production—is upheld as an important outcome of meaningful making. Another way that making is viewed as meaningful is when it is conceptualized as a form of communication through its community-building potential. From this perspective, embodied materialist and critical making discourses converge, and making becomes significant as both a manifestation of pragmatism and idealism. In maker communities, individuals can learn

practical DIY skills and techniques, while also connecting their projects to activist pedagogies rooted in critical knowledge building.

In the remainder of this dissertation, I explore how this making-as-activism discourse—premised in embodied materialism, critical making, and making as communication—is produced by and circulated within both hegemonic and non-hegemonic makerspaces and across the broader Maker Culture network. In Chapter Two, I explain in detail how I developed this multi-sited and multi-sided approach, including how I defined and collected these sources and the epistemological assumptions underlying my research design and analysis. In my analysis chapters (Chapters Three to Five), I unpack how all three of these discursive contexts are strangely—and unevenly—blended across both hegemonic and non-hegemonic representations. For example, mainstream sources of Maker Culture, like *Make*: magazine and Maker Media Inc. books and guides, all emphasize the need for everyone to engage in hands-on Making, thereby prioritizing Making discourses that value physical objects over the intangible (or, digital). In Chapter Three, I contend that this emphasis on a specific type of embodied materiality within Maker Culture—one that focuses solely on science and ‘hard’ technology—produces *boundary-work*, which distinguishes, and elevates, ‘Making’ from other creative pursuits like crafting and art. Making connections to the logics of passionate work and neoliberalism, in Chapter Four I focus on the hidden work/labour structures underlying makerspaces to highlight the complex—and, at times frustrating—entanglements making-as-activism holds for individuals attempting to simultaneously work in *and* against prevailing structures of power, like passive consumerism and patriarchy.

On the other hand, Maker Culture is also linked to education, both formally such as launching ‘Maker Ed’ programs in K-12 schools, community libraries, and museums, and informally through the development of makerspaces, where makers meet in-person, share tools, and, most importantly, learn from one another. Yet, despite this emphasis on knowledge-production, many of the feminist makers I interviewed for this project informed me that *critical* knowledge production is still met with resistance in many mainstream makerspace communities. In Chapter Five, I analyze how these Canadian feminist makers have created adaptive and holistic feminist making approaches rooted in critical knowledge production and intersectional feminist politics. However, I also discuss how feminist makerspaces and feminist making practices remain entrenched in oppressive power structures, such as White privilege, gender essentialism, and neoliberalism. In Chapter Six, I conclude this project by examining how the context of COVID-19 has re-shaped and transformed aspects of embodied materialism, critical making, and making as communication discourses. I contend that this new context provides two important lessons for both making-as-activism and broader activist communities. First, while often excluded from organizing strategies, *collective care* and *joint accountability* are vital approaches needed to build healthy and effective activist communities. And second, activists, activist communities, and activist networks must recognize their complex entanglements within wider structures of power and privilege and their role in both disrupting *and* maintaining oppressive sites of power.

Therefore, while my analysis is centered on making-as-activism discourse, makerspace communities, and the Maker Culture network, I contend that the concepts and theoretical frameworks used throughout this work provide further understanding into

the complex tensions between widespread ‘meaningful’ activist discourse, activist ideologies, and community-building practices. Fundamentally, my goal is to develop a deeper connection between both hegemonic and non-hegemonic academic and popular activist discourses to better understand how they work together to shape and re-shape ‘meaningful’ practices for activism.

Chapter Two

Plurality, Praxis, and Empowerment: A Story About Studying Feminism and Maker Culture

Recently, a first-year PhD student asked me: “what was your research process like?” Although my instinct was to provide an answer that made me sound like an experienced and methodical researcher, my only answer for her was: “it has been a long and winding road”. However, since our meeting, I have spent time reflecting on my past seven years as a PhD student and candidate—thinking about the project I initially proposed in my PhD application to the dissertation I am now writing—and realized this journey, and its many bumps, might serve as a helpful lens to introduce this chapter. Feminist researcher, Shulamit Reinharz (1992) maintains that feminist researchers are reflexive in their research practices, from research design to data analysis, and theorizing to writing the final product. This ongoing reflexive process allows feminist researchers to question what the purposes of this research are, and whether the methods used for analysis are appropriate in demonstrating the complexities associated with multiple power dynamics encountered by the researcher and participants alike. Therefore, although there is no single ‘feminist method’, a shared element underlying all feminist research projects is the assumption that theory, ontology, and epistemology intertwines with how the research is conducted (Pillow & Mayo, 2012). Therefore, I use the story of my doctoral journey to reflect on the role that I, the lead researcher, have played in shaping the outcome of this project through my numerous theoretical tweaks, epistemological pivots, and ontological re-thinks.

It all began in 2013, when I, a Master of Arts student in Women's and Gender Studies, was coming to the end of my degree and needed to decide if I wanted to pursue doctoral studies. At the time, the research and activism I was pursuing was centered on feminism, the penal system, and mental health (see: Ring, 2014). While I thought this research was important—and still do—it was also emotionally exhausting and, quite frankly, depressing. I really did not want to continue doing this kind of research for the next 5+ years. However, during my coursework, I took a class that focused on feminist engagements in digital technologies, which included video games. As a self-declared 'gamer', I was intensely excited by this kind of scholarship: I actually asked my professor, "you mean, I can play video games, record my experiences, and call it 'research'?" And that is exactly what I did for my term research paper—I wrote about my experiences as a feminist gamer in the massively multi-player online role-playing game *Lord of the Rings Online*, to demonstrate how this game allows me to queer the binary between 'male-dominated' and 'pink games' discourses. Not only was this paper well received by my professor, but she encouraged me to send its abstract to the Pop Culture Association of Canada's (PCAC) annual conference—which I did, leading to me presenting at PCAC in May 2013. Until this class, I always understood research as a rather 'serious' affair—my undergraduate degree was in Criminology (Law Concentration), so research methods meant analyzing case law, legislation, and legal discourse. However, this experience of developing a project from *my own lived experiences*—versus my thesis which was about recounting someone else's—sparked a new love for academia.

At this time, although #GamerGate had not appeared publicly, from my experiences as a feminist gamer I was very familiar with the concept of ‘trolling’. And, in the spring of 2013, trolling was especially relevant within the toxic online environment surrounding the 2012 ‘revenge porn’ case involving Amanda Todd, and the 2013 Rehtaeh Parsons cyberbullying case. When police cited a ‘lack of evidence’ as a reason to not pursue either of these cases, *AnonyMISS*—a feminist sub-sect of the popular hacker group Anonymous—doxxed²⁸ the alleged perpetrators and sent the evidence to police, resulting in a re-opening of both cases. Although ‘doxxing’ is generally perceived as spiteful—it is linked with malicious intentions, like encouraging ‘real-world’ threats of violence and stalking—these examples led me to wonder whether hacking could be a site for feminist activism? Motivated with new research questions, I applied for a PhD in Legal Studies in 2013.

Throughout my first year, my project remained centered on feminist hacking—which had spread to the wider world of ‘hacktivism’—and, in year two, I began my comprehensive exam by researching the relationship between hacktivism, the ‘Hacker Ethic’, and feminism (see: Ring, 2015). I knew from the beginning that engaging in primary research was fundamental to my project—I really was not interested in producing another research project based solely on secondary sources. However, turning this desire into a sound method proved to be quite difficult for a fledgling researcher. By 2014, *AnonyMISS*—my primary research site—disappeared after members received a barrage of rape and death threats. This intense toxicity spread beyond *AnonyMISS*, with

²⁸ This is a practice of locating private information about someone—e.g., real names, home addresses, phone numbers, place of work—and publicizing, typically it online.

#GamerGate resulting in orchestrated cyberattacks against several well-known ‘gamer’ feminists. This ongoing toxicity and the real danger hacker communities posed to feminists during 2014-2015 led me to re-think my initial research site.

This need to pivot away from online spaces led me to search for similar manifestations of feminist hacking in ‘offline’ settings. This search led me ‘down the rabbit hole’ and into the world of hackerspaces, makerspaces, The Maker Movement, craftivism, fix-it culture, citizen science, and DIY. Entering this world sent me back to my childhood. When I was eight years old, we moved to a remote sixty-six-acre hobby farm. Located outside of the small farming village of Westmeath, Ontario—population of about 500—our closest ‘retailer’ was a general store which only carried the staples—eggs, milk, bread, some canned and frozen food, and snacks. A trip to a ‘real’ grocery store required a longer drive to Pembroke, Ontario—a forty-minute drive away (round trip, on dry roads). Additionally, in my early childhood, my father made his living repairing small electronics—televisions, stereos, VCRs, microwaves, and the like. But, when manufacturers stopped using replaceable parts and the cost of replacing devices became more affordable than repairing them, I watched as my father’s profession slowly vanished. Therefore, for us, DIY was simply a way of life: growing our own food and ‘making do’ was just the way it was.

The more I thought about DIY, I found I became steadily less interested in the legal and ethical frameworks of ‘hacktivism’ and started pondering questions about the political significance of teaching people how to make/hack/fix stuff. Although this shift in thinking seems obvious now, at the time, I really did not realize it was happening until my supervisor pointed it out to me during one of our meetings. Along with this

realization came a wave of panic—I am a PhD student in *Legal Studies* and here I am obsessed with DIY pedagogy and community-building. After reeling for—what felt like some time—my supervisor offered a solution: transfer to a PhD in Communication and study all these wonderfully exciting things. In September 2015, I did just that, plunging full steam ahead into the research that would ultimately become this dissertation.

Although this was a rather long story, it illustrates the constant thinking and re-thinking that went into creating this final document. Importantly, this narrative serves as a way for me to position myself within this project. As explained by Reinharz, “feminist researchers frequently start with an issue that bothers them personally and then use everything they can get hold of to study it. In feminist research, then, the ‘problem’ is frequently a blend of an intellectual question and a personal trouble” (1992, p. 259-60). In a way, this project stems from the shock I feel when I see someone wasting food or throwing out perfectly usable items. I mutter under my breath when my in-laws toss the carcass of the Thanksgiving turkey into the trash rather than a soup pot. I shake my head in dismay when children—or worse, my adult friends and family—are not able to identify how common foods are grown.²⁹ But, shaming people for not DIYing is not the goal of this work. Indeed, if my childhood taught me anything it is that DIY is not easy—it requires a tremendous amount of time and effort. Furthermore, I too am frequently seduced by shiny new things and the ease of ‘throw-away’ culture. Therefore, the overall aim of this research is to better understand how activists reconcile the ongoing tensions between their political ideologies and their contradictory practices. While this dissertation

²⁹ For example, see Jamie Oliver’s *Food Revolution*. (see: https://www.youtube.com/watch?v=bGYs4KS_djg).

focuses on makers and Maker Culture, I contend that its analyses apply to any activist group that works against *and* within oppressive sites of power.

To this point, I have focused my discussion on the *background* assumptions that underpin this project. In the remainder of this chapter, I demonstrate how key feminist epistemological assumptions have influenced my approaches in conducting this research. For example, in the next section, I explain how two core feminist concepts—praxis and empowerment—served as a general guide for my fieldwork practices, including how I designed the research questions and conducted my interviews. The second section provides key definitions of makerspaces and feminism as ‘research objects’. However, in this section, I also discuss some of the challenges I faced in creating these ‘research objects’ and how I addressed them. In the final section of this chapter, I provide an overview of my general methods, including how I collected and analyzed the data. I conclude this chapter by recounting the lessons I have learned from this journey.

2.1 Establishing a Methodology: Doing Feminist Research

As I stated in the introduction of this chapter, this dissertation is both inspired by, and aims to contribute to, an existing volume of feminist research. But what makes research ‘feminist’? Borrowing from Sandra Harding (1991), this project upholds the assumption that there are no ‘feminist methods’, but rather that there are multiple frameworks for *doing* feminist research (feminist methodologies) and producing knowledge. Underlying these frameworks is the fundamental assumption that “research relations are never simple encounters, innocent of identities and lines of power. Rather, they are always embedded in and shaped by cultural contradictions of similarity,

difference, and significance” (DeVault & Gross, 2012, p. 215). These cultural contradictions are especially salient when both researcher and participant wish to present and hear a clear view on a specific topic. Therefore, no matter how rigorous the researcher is in designing an objective and value-free study, feminist researchers uphold the perspective that *all research is performative*, which requires a reflective consideration of the intricacies between communication, self-concept, and self-presentation (Beebe et al., 2007). As such, rather than attempting to obscure the intrinsic messiness of the research process, feminist studies purposefully investigate the impact of multiple power dynamics—such as those influenced by systems of gender, race, class, ability, age, sexuality, education, culture, religion, and so forth—and their influence on researcher decisions about research design, data collection, and analysis. To understand how these complexities of power, privilege, voice, and representation influenced my choices as a researcher, I frame them using two feminist concepts: praxis and empowerment.

2.1.1 Designing Research as Praxis

As I explained in Chapter One, the Greek term *praxis* is generally related to active practices—e.g., as ‘doing’ or ‘making’ something (Plato, 385-370 BC; Ratto & Boler, 2014). Within feminist scholarship, praxis is often conceptualized as a combination of theory and practice (Wenimont & Losh, 2018). In other words, in addition to generating sound theories, feminist research is “action-oriented and political in nature as well as in intent” (Archibald & Crnkovich, 1995; p. 107). For Red Chidgey, praxis involves researching *daily life activism*, or the “strategic processes through which people reclaim power in their everyday lives” (in Ratto & Boler, 2014, p. 104). Similarly, Jacqueline

Wernimont and Elizabeth Losh explain that praxis allows for feminists to explore how “the assemblages of personal and [...] lived experiences of feminist thought mutually impinge on one another” (2018, p. 98). As I outlined in the beginning of this chapter, this dissertation is premised on key questions and concerns that resonate with me on both an intellectual *and* personal level—the contradictory nature of living a feminist activist life while working within oppressive power structures is something I grapple with daily. As aptly explained by Wernimont & Losh: “feminist theories and practices focus on the ways in which we live *with* and *within* systems” (emphasis added; 2018, p. 100). Therefore, inspired by feminist praxis, the goal of this project is to create a space to connect personal, everyday struggles with wider theories of power and oppression.

To accomplish this goal, one way I applied feminist praxis was in ensuring my research questions reflected the concerns of everyday, real-life Makers (and makers), crafters, DIYers, artists, and hackers. To get a sense of what these issues may be, I relied on two key data outlets. For the first outlet, I used online searching tools and compiled an inventory of academic and non-academic sources that have described the challenges of engaging in makerspaces and/or Maker Culture. For the second outlet, I turned to my research journals, which served as a 4-year record (from 2015-2019) of my experiences when attending various Canadian (limited to Ontario and Québec) and international (Michigan, USA; Illinois, USA; and, Porto, Portugal) makerspaces, hackerspaces, community labs, studio spaces and Maker Culture events—e.g., conferences, meetups, markets, and *faïres*.³⁰ These journals take the form of two hardcover notebooks, and their

³⁰ Our of respect of maintaining the anonymity of my participants, I am choosing to not disclose the actual names or locations of these makerspaces or events.

contents were quite diverse covering anything I felt was noteworthy, such as: interesting conversations or controversies; connections and contradictions between different events/interviews; reflection entries of my personal feelings about an event/interview; and general descriptive information like the size of the makerspace, its demographics, featured projects/practices, and location. In analyzing this diverse source data, I discovered that many of the key concerns relating to makerspaces and Maker Culture can be categorized into three general areas: 1) issues of identity and belonging; 2) issues of work/labour and care; and 3) issues with activism. As such, these three themes are what I used to develop the frames for the research questions and purposes of this study (see Table 1).

Table 1: Research Questions and Purposes

	<i>Research Question</i>	<i>Purpose</i>
1)	What is the difference between Makers and other creative pursuits? What materials, tools, and practices constitute Maker Culture?	The aim of this question is to understand how diverse Maker Culture discourses define Making and Makers to assess whether this kind of Making is distinct from other similar creative practices and identities (e.g., artists and crafters).
2)	What organizational strategies and challenges are required to develop and maintain a makerspace?	In this question, I investigate the diverse organizational choices as well as the internal governance strategies required to create and maintain a makerspace. Through this investigation I consider the different work/labour structures that produce makerspaces.
3)	What is the relationship between Making and anti-oppressive, intersectional feminist activism?	My purpose in asking this question is to analyze whether Maker Culture is a useful site for feminist activism.

Another way that praxis influenced my research design is through my sampling choices. For instance, in analyzing my two data outlets (my inventory and my research journals) I noticed they shared an overlapping trend: mainstream conceptualizations of makerspaces and Maker Culture—including their histories, aims, and practices—were largely stemming from Maker Media Inc. Furthermore, this popular discourse overshadowed other conceptualizations of activist making and maker communities, such as those developed in feminist makerspaces. Therefore, within Maker Culture discourse, *hegemonic* representations—including those produced by Maker Media Inc.—emphasize digital fabrication, electronics, and computing as central to Maker Culture. On the other hand, *non-hegemonic* representations disrupt this dominant discourse by expanding the focus of this scene to include a breadth of DIY skills and politics. However, these non-hegemonic discourses rarely appear in mainstream Maker Culture narratives.

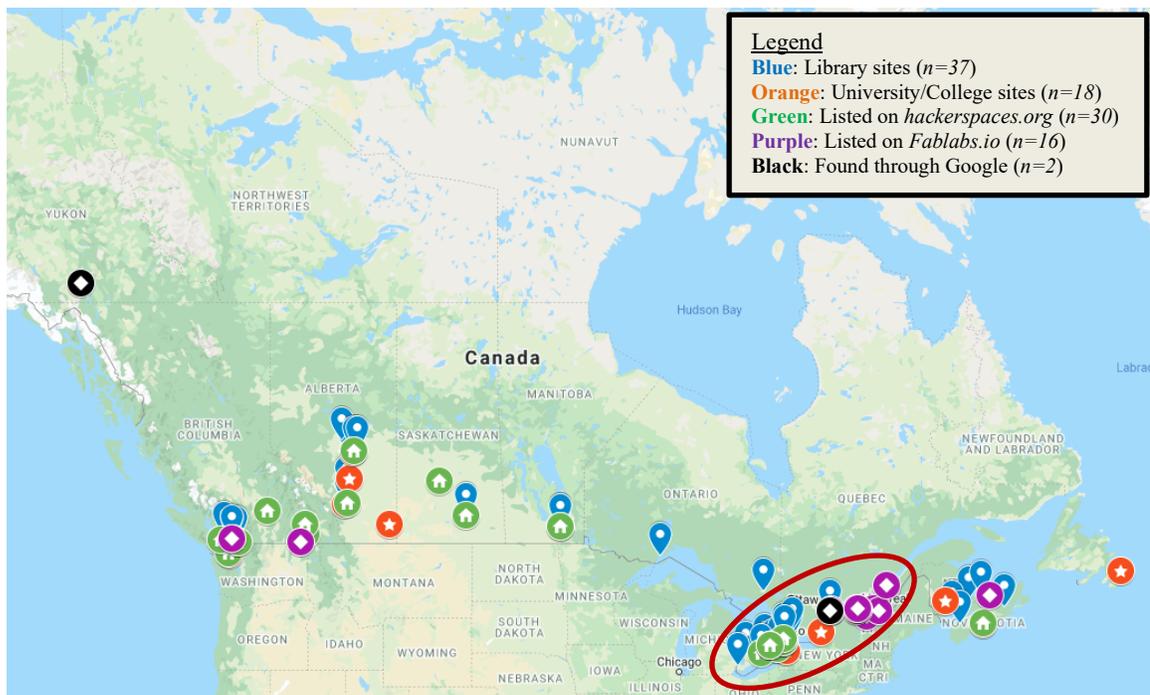
Furthermore, much of this non-hegemonic discourse stemming from critical maker scholarship—including feminist, queer and BIPOC³¹ scholars—is situated in the United States. However, as I discussed in the Introduction, Maker Culture can be found in Canada through hackerspaces, FabLabs, makerspaces, at the like. In June 2018, I mapped the number and location of these Canadian communities by performing an online search of key Maker Culture networks—including *hackerspaces.org*, *Fablabs.io*, library websites, and university/college websites—and pinned each location in Google Maps.³² I also included a basic Google search of “Canadian makerspaces” and “Canadian hackerspaces”—restricting my search to the first five pages of results—and added any

³¹ Black, Indigenous, and People of Colour.

³² Duplicate sites appearing in multiple source lists were only counted once.

spaces that did not appear in the formal network to the Map. From this exercise, I determined that in June 2018, Canada has *at least* 103 different Maker Culture sites (see Illustration 1).³³ However, most of these sites are concentrated in Ontario and Québec—with many clustered around Toronto and Montréal. Furthermore, over half of these Canadian sites (55) are found in formal education institutions—e.g., libraries and colleges/universities.

Illustration 1: Mapping Canadian Maker Culture, June 2018 Snapshot



However, despite the strong presence of Maker Culture in Canada, few scholars have selected Canadian sites when analyzing this scene (notable exceptions being Ratto,

³³ I emphasize ‘at least’ here to acknowledge the likelihood that there are numerous other Maker Culture sites in Canada that do not have an online presence.

2011; Toupin, 2014, 2015; Foster & Boeva, 2018; Foster 2019). Therefore, this research serves as a Canadian contribution to Maker Culture discourse. My sample is comprised of communities located in one of three Canadian cities: Ottawa, Toronto, or Montréal, represented by a red circle in Illustration 1. Toronto and Montréal were selected because they represent two Maker Culture ‘hot spots’, characterized by their heavy concentration of Maker Culture sites. I decided to include Ottawa because it represents a ‘cool-zone’ on this map: despite having a population of almost one million people, my mapping exercise revealed that, in June 2018, Ottawa only had three Maker Culture locations. Furthermore, I decided to sample from these cities because each one contains an interesting ‘DIY *milieu*’. For example, in Ottawa, the maker communities I visited tended to emphasize hegemonic Maker Culture ideals of entrepreneurship and technological industry. On the other hand, maker groups I toured in Toronto and Montréal tended to purport more radical grassroots ideologies centered around art, hacking, and anti-consumerism. Furthermore, during one of my trips to Toronto, one of my participants informed me that in the Toronto maker community there is a heavy resistance to Maker Media Inc. She told me that due to this lack of support the city of Toronto rejected hosting Maker Media’s Maker Faire event. Interestingly, Maker Faire events have been hosted in Ottawa and Montréal. Therefore, the discourses that shaped the ideological premises of the makerspaces I selected for this study tended to vary by location. As such, when I provide direct quotes from makerspace participants, I provide the city they were interviewed in to situate this perspective within this shifting Maker Culture milieu. Therefore, this project is one shaped by feminist praxis. Its research questions were formed by diverse ‘real-life’

concerns and its data stems from non-hegemonic Maker Culture discourses and experiences.

2.1.2 “Maybe it’s just me ...”: Research as a Site for Empowerment

The concept of *empowerment* has been widely criticized in feminist scholarship, including its associations with The White Feminist Savior complex (e.g., Mohanty, 1988) and its depoliticization within widespread neoliberal rhetoric of individualism.³⁴ However, during my fieldwork, I encountered numerous *empowering* moments, such as affirming a shared experience of sexism or venting about mutual frustrations. As such, from these experiences, empowerment manifested more as a process of establishing *mutualistic* power relations, described by Michael Karlburg as “people who are acting in a cooperative or mutualistic manner in the pursuit of a common goal” (2005, p. 10). In this section, I recount how *self-disclosure* and *validation* created mutualistically empowering effects during my interviews.

Traditionally, research methods that involved human interaction (e.g., interviews, focus groups, surveys) tended to provide very little information about the goals of the project to prevent tailored responses or biased results. However, in their research on interviewing women, Shulamit Reinharz and Susan E. Chase (2003) concluded that there is very little academic data showing that this kind of disclosure biases research responses. On the contrary, they maintain that their research has demonstrated that interviewer self-disclosure creates a more comfortable interview environment that encourages participants

³⁴ For more on this, see Chapter Five.

to be more forthcoming with their answers (Reinharz & Chase, 2003). Christopher Dunbar Jr., Dalia Rodriguez, and Laurence Parker (2003) supports this finding, arguing that self-disclosure eases interviewees' suspicions, thereby fostering more accurate accounts:

The researcher enters a situation wanting to learn everything about the interviewees without disclosing anything about him- or herself. Being approached by someone with such intentions would make any one of us suspicious. I think it is important to the success of the interview for the researcher to disclose something about him- or herself to the interviewees. This is foundation work; that is, it tells the interviewee where the researcher is coming from (p. 143).

Of course, these researchers also caution that engaging in interviewer self-disclosure does not guarantee a comfortable and productive interview. For example, Reinharz and Chase (2003) write that instead of “adopting an abstract commitment to self-disclosure, interviewers need to think carefully about whether, when, and how much disclosure makes sense in the context of the particular research project and with specific research participants” (p. 80).

During my field research, in which I interviewed Canadian feminist makers, self-disclosure became a useful research tool. Inspired by feminist interviewing techniques, my intention was to create an interactive interview environment by developing semi-structured questions. Therefore, although I had a set of potential questions geared towards specific participants (e.g., organizers versus members),³⁵ my goal was to develop a spontaneous and conversational interview style. As such, often the question guide was used more as a topic guide, which I used to ensure certain inquiries were covered throughout the sixty-minute interview. I also actively encouraged my participants to ask

³⁵ For a detailed summary of my interview questions, see my Interview Question Guide in Appendix A, A.5.

me questions throughout the interview, to which I responded openly and honestly. Furthermore, before beginning each interview, I provided each participant with an Informed Consent form³⁶ that outlined the goals of the research project, the structure of the interview, the data collection process, and the steps for withdrawing from the study. To set the stage during the formal interview, I verbally reiterated the goals of the research project and recounted the three key issues that shaped my research questions. And finally, in my interview guide I created a closing question that asked participants whether they had any questions for me. Although not all my participants asked me questions, the ones who did tended to ask similar questions, primarily framed around my identity as a feminist and/or maker and my experiences of Maker Culture (see Table 2).

Table 2: Sample of Interviewer Self-Disclosure

<i>Gabriela</i>	Well, I was just... can I ask you something?
<i>Me</i>	Absolutely!
<i>Gabriela</i>	So, are you an art maker?
<i>Me</i>	So, I'm <i>not</i> ... <i>asterisk</i> . [Both laugh]. I entered this project as a 'non-Maker' so to speak. But I grew up on a farm, so we always, you know, we didn't have a lot of money, so we always tended to make and repair rather than buy.
<i>Nesryn</i>	What was your experience [at the maker event we met at]?
<i>Me</i>	I loved it as well!
<i>Nesryn</i>	Had you been to the last one?
<i>Me</i>	I've never been to it before.
<i>Nesryn</i>	Like, that whole cop thing [at the event], right? Did you read [the organizer's social media post]?
<i>Me</i>	Oh yeah! I did read that.
<i>Nesryn</i>	[Later on in the conversation] Like, have you had negative run-ins with police?
<i>Me</i>	No, not really. But I was still surprised.
<i>Me</i>	Were you going to ask a question?
<i>Amelia</i>	I was. Yeah. So, you mentioned like making stuff, but maybe in a more science kind of way?
<i>Me</i>	Mmhmm.
<i>Amelia</i>	So, are you looking at crafts and art and stuff like that as well?

³⁶ To see my Informed Consent Form, see Appendix A, A.4.

<i>Me</i>	Yeah! That's a great question. So, in this project I've been thinking about the concept of 'tinkering' and making/crafting/hacking and how sometimes these terms are very gendered, very raced, very classed—
<i>Amelia</i>	Yep! Right!
<i>Me</i>	But also, I am trying to have people help me to define what the boundaries around—if there are boundaries around—these practices, especially making and crafting.
<i>Amelia</i>	Okay. Interesting!

Therefore, in this project, researcher self-disclosure was baked into the research design through a detailed Informed Consent form, providing a verbal summary of the project, and creating a conversational interview environment where participants were encouraged to ask questions. I viewed self-disclosure as an important tool to intentionally create an empowering interview environment—one in which participants felt comfortable being forthcoming with their answers, especially those that may be construed as contrary to my own experiences.

However, while creating an empowering interview setting through self-disclosure was an intentional research design choice, it resulted in another unexpected empowerment outcome—one that I call ‘*validation*’. This form of empowerment appeared most often when my participants discussed their encounters with sexism in their makerspaces—e.g., eye rolling, mansplaining, or distasteful ‘jokes’ and commentary. During these conversations, there were numerous times when a participant would absolve these sexist behaviours by assuming that they were outliers in this experience, commenting “maybe it’s just me”, or “I’m probably the only one to say this, but...”. According to Reinharz (2003), feminist research is premised on validation and the re-centering of marginalized narratives told by women and others who have been considered ‘outliers’ in traditional social science theorizing. Therefore, rather than remain neutral or changing topics, I explicitly validated these experiences by connecting them with the experiences of others—e.g., experiences I either had myself or had read/heard about from

others. For example, I would follow up with comments like “you are not alone”; “that’s happened to me too”; “I’ve heard of that happening elsewhere”; or “that is a common theme in feminist writing about makerspaces, you should check out ...”. Therefore, like my feminist foremothers who sat at kitchen tables and discovered ‘the personal is political’, through validation I was creating space for consciousness-raising that connected a private feeling or experience—assumed to be inconsequential—to the wider landscape of feminist politics and network of feminist maker cultures.

Therefore, while I am generally quite critical of ‘empowerment’ (see Chapter Five), within my fieldwork experience, I simultaneously created both intentional and unintentional empowering effects. Through self-disclosure I was able to clearly articulate what the project means to me personally, and build an interview environment premised on shared experiences, or a rapport. Admittedly, self-disclosure was an intentional research strategy intentionally built into the research design meant to foster forthright and frank responses. However, this strategy also allowed for me to validate my participant’s negative experiences and connect their personal stories to wider feminist politics. Therefore, while my goal in doing interviews was to collect data about feminist making and makerspaces, in creating an empowering interview environment, I was able to perform feminist activism through the interviews themselves.

2.2 Defining Makerspaces

As I outlined in the Introduction of this dissertation, the composition of individual hackerspaces and makerspaces is wildly diverse, as each of these communities is established within their own discursive milieu. As aptly described by Sarah R. Davies:

“hacker and makerspaces can look, feel, and smell quite different to each other” (2017, p. 44). Therefore, one key challenge in using makerspaces to study Maker Culture is conceptualizing them as a single research object. In other words, to understand how these separate spaces constitute a ‘Maker Culture network’ I must make authoritative decisions about what key features and terminology are fundamental to defining this network. But, in doing so, I ultimately limit the extent to which the plurality and diversity of this scene can be studied. Michel Foucault (1972) encountered a similar research quandary, stating that:

Establishing a corpus of source data does indeed pose a problem for my research, but this is undoubtedly a different problem from the one encountered in linguistics for example. With linguistic or mythological investigations it is first necessary to take a certain corpus, define it and establish criteria of constitution. In the much more fluid area that I am studying, *the corpus is in a sense undefinable*” (emphasis added; p. 38).

However, since my research involved interacting with human participants, the Carleton University Ethics Board required a clear articulation of which sites I planned on researching, and who would be eligible to participate in this research. As such, the first decision I had to make involved defining what terminology I would be using moving forward: hackerspace, makerspace, community labs, or DIY communities? In my inventory of research, all three of these terms circulate within the communities I was interested in studying. In some cases, authors do not distinguish between these terms and opt to use slashes—e.g., hackerspaces/makerspaces/DIY communities. However, as a reader and as someone who presents this research orally at conferences or in lectures, I personally found this ‘slash’ terminology to be overly cumbersome. Therefore, for me, using a less complicated approach to terminology was preferable. As I outlined in the Introduction of this dissertation, in many ways these terms are synonymous with each

other. As such, it is the people *within* these spaces, rather than the name on the door, that is of relevance.

However, in my Introduction, I also demonstrated that key outlets have established a hegemonic discourse that clearly distinguishes between these practices and communities: hacking is rebellious and counter-cultural, Making is mainstream and commercial, and other DIY/crafting/art practices are isolated from ‘The Maker Movement’. Therefore, in both reading about and experiencing Maker Culture events, I began to understand that these terms—hacker, Maker, crafter, DIYer—are not value neutral. To study a ‘hackerspace’ may serve to exclude feminist crafters and artists; but, in studying ‘makerspaces’ I may miss the feminist hacker scene. In many ways this dilemma represents the no-win situation of social science research—it requires the researcher to draw clear authoritative boundaries around fuzzy multi-dimensional social scenes.

To make my decision, I relied heavily on the sources within my research inventory, and informal discussions with people I met at events in 2015/2016. From these sources, I discovered that the term ‘hacker’ is still quite controversial within many feminist, queer, and BIPOC communities—it is widely viewed as hostile to these groups, especially for those who work within information-technology industries. On the other hand, ‘making’, ‘tinkering’, and ‘DIY’ were viewed as more inclusive terms—and, importantly for this research, radical feminist hackers still worked in spaces using this lexicon. Furthermore, since the hegemonic sources in my inventory heavily emphasized the term ‘Making’, I decided that this term is the most useful for a project that explores the interaction between hegemonic and non-hegemonic discourses. As such, in the

remainder of this project, I refer to the groups studied for this project as ‘*makerspaces*’ and the broader network they contribute to as ‘*Maker Culture*’. However, I must emphasize that while a few of the groups I selected for this study used the term ‘makerspace’, others called themselves ‘hackerspaces’, ‘artist studios’, ‘laboratories’, and ‘crafting’ events. Similarly, although I use the term ‘makers’ when discussing the individuals I interviewed, in reality they all identified themselves using a plethora of DIY terms—including maker, hacker, crafter, tinkerer, creator, crafter, and artist—and, at times, a combination of multiple identifiers (e.g., “I am an art creator”, “I am a craft maker”). In Chapter Five, I discuss further how this identity-work becomes even more complicated through the addition of the term ‘feminist’.

Since there are no standards for creating a ‘makerspace’, in order to create a robust, but comparable, sample, I returned to my inventory of Maker Culture research and selected the sources that defined makerspaces, hackerspaces, or other similar groups, and noted the key elements they identified as fundamental to these sites. Through this process, I discovered that while there are numerous elements that are used to define these sites, when compressed into a single list, they shared several common features, such as: 1) large ‘offline’ workspaces; 2) an emphasis on community collaboration and shared access to tools and technology; and, 3) the value of ‘DIY’ pedagogies (e.g., hands-on learning, playful experimentation, empowerment) (e.g., Baichtal, 2012; Moilanen, 2012; Cavalcanti, 2013; Toupin, 2013; Toombs et al., 2014; Hatch, 2014; Agency by Design, 2015; Davee et al., 2015; Fox et al., 2015; Dougherty, 2016; Peppler et al., 2016b; Davies, 2017; Foster & Boeva, 2018; Bogers & Chiappini, 2019). Therefore, to find Canadian locations suitable to study I first defined ‘makerspaces’ broadly through five key shared

elements: 1) all sites studied primarily operated in the physical world, or ‘offline’; 2) these sites primarily cater to adults; 3) all sites had some degree of public access (e.g., open house nights for non-members, public events); 4) all were premised on some form of DIY/making/crafting/hacking/tinkering practices; and, 5) all engaged in knowledge production activities (e.g., held workshops, events, or other learning formats).

Furthermore, I only selected sites that were operational during my field research window (1 May 2017 – 30 April 2019) and headquartered in either Ottawa, Montréal, or Toronto. As such, groups with corporate and/or operational ties outside of Canada (e.g., official FabLabs) were not considered for this project.

To locate eligible groups, I heavily relied on Google, Twitter, Facebook, and personal recommendations. My goal was to create a vibrant but manageable sample comprised of nine different sites (three groups from each city) that reflected the diversity of makerspace site locations, organization, and governance structures that is found within the larger Maker Culture network. During the recruitment phase, I contacted eleven maker groups or events: three were in Toronto, three were in Montréal, and five were in Ottawa. Of these groups, seven agreed to participate in my research. Two groups were in Montréal, two groups were in Toronto, and three were in Ottawa.³⁷ While I refrain from naming the groups selected for this study in order to protect the anonymity of my participants, in the remainder of this section I outline the general profile of these groups and provide justification for their inclusion in this study. Furthermore, I also discuss some of the challenges I faced in defining, locating, and recruiting eligible groups for this study.

³⁷ For a more thorough breakdown of each group selected for this study, see Appendix B, B.1 and B.2.

2.2.1 Site Selection

Typically, makerspaces tend to be defined *spatially*, which emphasizes large workspaces, open floor plans, and industrial infrastructures—e.g., high voltage outlets, ventilation, and soundproofing—as fundamental to any makerspace (e.g., Maker Media Inc., 2013; Cavalcanti, 2013; Davee et al., 2015). From this perspective, makerspaces are presented as permanent, offline, pragmatic, urban workshop spaces that house communal tools and materials. However, within many urban landscapes, the costs associated with renting/owning large, permanent, industrial spaces are astronomical. As such, a key strategy of makerspace organizers is to have a large membership base that shares these costs, resulting in affordable monthly fees—usually averaging \$50-150/month. This emphasis on materiality and physical embodiment within makerspaces intersect with wider making-as-activism discourses that conceptualize making—and by extension the spaces that facilitate these activities—as politically meaningful. In defining makerspaces as a site for research, I also limited my definition of makerspaces to physical, offline sites. Therefore, all seven makerspaces selected for this study primarily operate offline³⁸ and engaged with the public through ‘real-world’ events, workshops, meetings, and so forth.

However, only three of these sites could be described as a ‘typical’ makerspace—large workshop style spaces,³⁹ outfitted with electronics, heavy machinery, computer-

³⁸ When I say that these sites *primarily* operate offline, I am referring to their pedagogical and activist activities, rather than their organizational or promotional strategies. As I mentioned previously, all sites selected for this study had an online presence at the time of recruitment and many used online tools (e.g., Slack, Email, and social media platforms) to communicate with one another.

³⁹ According to their websites, one site measures 2,000 square feet (~186m²), the second is approximately 3,200 square feet (298m²), and the third is over 19,000 square feet (1,765m²).

controlled equipment (e.g., CNC, 3D printers), various hand tools, soldering iron stations, cement floors, fluorescent lighting, and large wooden workbenches. Additionally, all three of these spaces had a large membership base, ranging from 60 – 2,000 annual users. While I met a few activist-minded makers within these spaces—including feminist makers—I found that these spaces were not premised on *explicit* activist ethics. As such, while activists were found within these makerspaces, the space *itself* was not defined as politically motivated. Since the aim of my research project was to study makerspaces as sites for Canadian feminist activism, I found that these narrow spatial definitions of makerspaces failed to locate the *activist* communities I was interested in studying. To remedy this shortcoming, I broadened this common conceptualization of ‘a makerspace’ by including sites that foster maker/hacker/crafter/tinkerer pedagogies *and* activism. In other words, within this extended makerspace definition, I incorporated sites that foster making-as-activism discourses within the ‘typical’ makerspace network.

In broadening my scope, I found numerous *feminist* spaces, which took various shapes, sizes, and structures that overlapped with the broader makerspace network. I included four of these sites into my study to demonstrate the similarities and differences between feminist and non-feminist makerspaces, as well as between different feminist groups. Two of the feminist makerspaces were housed in permanent, physical locations—one of these locations was a large artist-run media centre and the other was a small maker collective. While the artist-run media centre was well-funded through membership-fees and public grants, the small maker collective shared costs amongst themselves. The other two feminist makerspaces did not have permanent locations at the time of my field research—one was an annual one-day feminist maker event, and the other was a small

group of mobile feminist makers. While some may question whether events or mobile groups ‘count’ as a makerspace, I contend that both sites are relevant within the framework of this study for two reasons. First, they both have been hosted within ‘typical’ non-feminist makerspaces, which demonstrates the overlaps between both feminist and non-feminist makerspace networks in Canada. Second, including transitory makerspaces affirms the struggle that finding and maintaining a ‘typical’ makerspace within urban landscapes present for un(der-)funded activist communities. As such, transitory makerspaces demonstrate the adaptability of maker activists as they transform gay/lesbian and queer archives, cafés, offices, conference rooms, and community centers into temporary makerspaces and engage in making-as-activism.

2.2.2 Organizational Structures

While there are numerous online resources for how to start a makerspace, there are very few resources on how to build a robust maker community. One reason for this oversight is because the term *makerspace* has largely come to be associated with K-12 Maker Education classrooms. As such, makerspace guidebooks and websites like the *Makerspace Playbook* (Maker Media Inc., 2013), *The Makerspace Workbench* (Kemp, 2013), *How To Build a Maker Community* (EdSurge, nd), and *Makerspaces.com* all forward the assumption that readers are building a classroom makerspace for children. As such, child-friendly locations, tool lists, safety considerations, and pedagogical approaches are emphasized as important aspects of makerspace development rather than community-building, funding, and governance.

However, as I outlined in the Introduction, hackerspace organizations have been integral sites for understanding both the politics of Maker Culture and building adult-led making-as-activism communities. Indeed, as I concluded in the Introduction, the difference between an adult-focused, community ‘hackerspace’ and ‘makerspace’ is mostly semantic. As such, to understand the organizational choices and governance structures needed for building *adult-centred* makerspace communities I relied on hackerspace resource material. For example, *hackerspaces.org* has a seven-step guide titled *How To Start A Hackerspace* (2012), which is cited as the impetus for American hackerspaces. This digital guidebook touches on everything from spatial design considerations to funding suggestions and equipment guides. The guide also acknowledges that forming a hackerspace is a social activity, requiring a “core crew”, a fair delegation of tasks, and decision-making models. As such, the guide provides three general governance structures that have been used to form these communities: 1) a primary decision maker model (one person makes all of the decisions); 2) an open vote democratic structure (majority rules); or 3) a Board of Directors model (a small group of core members make decisions). Rather than dictate what type of model a hackerspace should implement the guidebook recommends that organizers select a structure that works best for their community. American hackerspace researcher Sarah R. Davies writes that within hackerspaces, formal organizational structures are often resisted in favour of ad hoc “bottom-up organization” that is “about avoiding structures. The hackerspace shouldn’t be defined, or governed, through some kind of rigid set of rules or a fixed and specific mission statement or a tight governance structure. It was always emergent, and as such could be anything its members wanted” (2017, p. 50). Yet, this resistance to formal

structures tends to collapse in practice. For example, Davies writes that to be granted non-profit organization status, American hackerspaces are required to submit legal documents that name the Board of Directors, President, and Secretary of the organization.

Davies writes that:

[...] once those individuals were named on the paperwork—either because they were the founder members or because they’d been voted into the positions—they often found it hard to share responsibility for the space in the way that they wanted. [...] Often, we were told, it was simply easier for the rest of the membership to sit back a little and let the ‘officials’ bear the brunt of hackerspace administration” (2017, p. 50).

Therefore, while ideologically hackerspaces tend to view themselves as ad hoc, grassroots, non-hierarchical collectives, wider social, economic, and legal structures often require more formal governance structures.

Within the seven Canadian makerspaces I selected for this study, only two of the sites reflected a formal organizational hierarchy, with clear rankings (e.g., Director, Community Manager, Staff Member), responsibilities, and salaries. One site classified itself as a nonhierarchical collective—all fifteen members equally shared financial costs and decisions were made unanimously. Two of the sites represented the primary decision maker model described in the *hackerspace.org* guide—they were volunteer run, with two or three founding members serving as sole decision-makers. One site implemented the Board of Directors model, where core members were provided with voting privileges. And one site represented a hybrid organizational model that had both a Board that directed future planning for the makerspace (e.g., programming decisions, funding allocation) and paid staff, each with specific roles (e.g., Community Engagement Coordinator, Web Developer). However, although members of the Board and staff had

titles and roles, organizers informed me that these two groups worked horizontally and that no one had more decision-making authority than anyone else.

2.2.3 Accessibility

Although diverse in site, size, and structure, ‘openness’ is often emphasized as a key principle upheld across both individual makerspaces and the wider Maker Culture scene. Within hackerspace guides, openness is demonstrated through ‘open-door’ policies, where anyone who wants to join the community is provided with unfettered 24/7 access. For example, during a TEDx Talk in Brussels, American hackerspace co-founder Mitch Altman proudly states that “you don’t even have to be a member of Noisebridge to have a key [to] Noisebridge!” (Altman, 2012, around 17:45). To affirm this statement, Altman pours a small pouch of metal keys onto the stage floor, informing the audience that anyone who wants to access Noisebridge can have a key (see Illustration 2).⁴⁰

Illustration 2: Mitch Altman Provides Free Keys to Noisebridge



Source: [The Hackerspace Movement \(Mitch Altman at TEDxBrussels\)](https://www.youtube.com/watch?v=WkiX7R1-kaY) [-17:45-18:08]

⁴⁰ Altman, Mitch. (14 November 2012). “The Hackerspace Movement: Mitch Altman at TEDxBrussels”. *YouTube* (<https://www.youtube.com/watch?v=WkiX7R1-kaY>).

However, across the sites I visited, concerns over balancing openness with community safety emerged as salient for both feminist *and* non-feminist makerspaces. For example, during some of my makerspace site visits, openness and open-door policies tended to be reflected through subtle visual cues, such as leaving doors open or ajar during public ‘open house’ nights. On the other hand, some of the spaces I visited had locked doors with intercom systems. Furthermore, within the sites I selected for this study, total openness on a day-to-day basis was recognized as a difficult or undesirable concept to uphold. For example, during its earlier years, one of the permanent non-feminist makerspaces I visited used to provide keys and 24/7 access to anyone willing to pay for a membership—these new keyholders were not vetted, nor did they need to be supervised by core members. However, this open-door policy led to numerous issues within the community, including harassment, partying, and tool damage, that resulted in many core members quitting the makerspace. This problem became so substantial that core members changed their membership structure to a tier system that limited the degree of access new members had to the space. As such, none of the makerspaces I visited during my field research could be classified as fully ‘open’ spaces. Instead, I classified most of these sites as ‘semi-open’: although ideologically these spaces were founded on commitments to openness, diversity, and inclusion, in practice these principles were tempered by limiting their degree of access to the general public, or new members, and/or memberships were granted through community vetting processes and Codes of Conduct. This semi-open approach seems to signal a shift in Maker Culture—even Noisebridge now restricts full access to members-only and has created more formal community standards, including Anti-Harassment and ‘Ask To Leave’ policies (Noisebridge wiki

page, 8 July 2020). Furthermore, I included one ‘closed membership’ makerspace in this study because it was founded by some former members of another site from my sample—the site that formerly had unrestricted access to new members. Therefore, while my original intention was to only study publicly open makerspaces, once in the research field I quickly discovered that true open-door makerspaces were uncommon, and in fact many makerspaces I visited viewed this model as counter-productive to their community-building initiatives.

2.3 Locating Feminism

In designing this project—one influenced by feminist praxis and DIY plurality—I thought that it was vitally important to leave its two main analytical concepts—feminism and Maker Culture—undefined. From my previous research experiences, I knew that feminism manifests through numerous intersecting goals, subjectivities, and practices. Within the context of this project, it is important to acknowledge that *who* and *what* represent ‘feminist making’ can widely differ—e.g., it can take the form of ‘hardcore’ coding and hacking, to validating more traditionally feminine practices of crafting and socializing, to queering this binary altogether by offering a blend of both. This plurality of feminist makerspaces is represented in the four feminist sites I selected for this study—one is a feminist hacker collective, one is a digital media/arts studio, one is an annual feminist crafter event, and one is a small, private, maker workroom. All four of these sites were selected because, despite these differences in form, they all intersect with the general feminist experiences and ideologies expressed in both the Introduction and Chapter One of this dissertation. In three of the four sites, feminism was *explicitly*

foregrounded, appearing within the makerspace's name and/or logos. However, more importantly, within these sites, feminism was also *explicitly defined* within each of these sites' public messaging—such as in their 'about us' or 'our mandate' tabs on their website, social media, or event pages. Within these public feminist discourses, common concepts that frequently emerged to define these makerspaces as feminist include intersectionality, inclusion and diversity, anti-oppression activism, and collaboration. On the other hand, one of my feminist sites was more *implicitly* feminist—while 'feminism' did not appear in the group's name, or even in the group's mandate, feminist makerspaces ideals appeared in "the bones" (interview with Jo, Toronto, 26 July 2017) of the group's formation and organization. As such, in not explicitly defining what a feminist makerspace is, I was able to analyze both the explicit and subtle manifestations of feminist organizing within Maker Culture.

While not explicitly defining 'feminist makerspaces' allowed for me to demonstrate the multiplicity of these communities, thereby enhancing the analytical potential of these concepts, this openness presented some challenges in recruiting *individual* feminist makers. For example, some of my participants equated 'feminism' as 'women-only', or that feminist politics were only centered on essentialist definitions of womanhood. Therefore, while my intention was to create an interview sample that reflected the same plurality as the sites I selected, in failing to emphasize that this project is interested in *intersectional* feminism, I accidentally provided a platform for these essentialist definitions of 'feminism'.

This oversight in assuming that feminism was widely understood as intersectional may explain the lack of diversity in the demographics of my participant sample. While I

was more successful in accounting for gender diversity—with three out of eight participants⁴¹ identifying themselves using pronouns or as non-binary—other key identity categories including age, education level and race/ethnicity were less diverse. Only two participants identified as people of colour—the remaining eight participants identified as White, Jewish, or Québécoise. Furthermore, at least seven of my respondents held either a college diploma or university undergraduate degree, and at least a quarter of my participants were currently enrolled in a graduate program (two at the Master level and one in a PhD). Furthermore, none of my participants were over the age of fifty, and only two were over the age of 35. Therefore, although my intention was to recruit a diverse group of feminist participants, a key shortcoming of this research is that the people who agreed to participate in this study overwhelmingly reflect my own subjectivity as a White, formally educated, young(ish), femme person.

2.4 Data Sources and Analysis

In the Introduction chapter, I explained that this project is built upon ‘discourse’—which I described as both knowledge *about* Maker Culture and knowledge produced *within* these communities. Within the context of this research, the source for this knowledge stems from four key outlets: 1) hegemonic sources; 2) non-hegemonic sources; 3) experiential data; and 4) interviews. In this section, I provide more details on the methods I used to collect and sort through these four sources.

⁴¹ Four of my participants did not provide demographic information.

2.4.1 Data Collection and Sampling

To locate data that represents discourses ‘about’ Maker Culture, I largely relied on my inventory of hegemonic and non-hegemonic sources.^{42,43} Overall, this inventory is mostly comprised of written texts—like academic publications, conference proceedings, ‘Maker’ books,⁴⁴ *Make*: magazine, websites, and other online articles. However, it also contains other discursive formats, including informational videos (e.g., TedTalks, conference presentations, panel discussions) and images (e.g., Google Image results, *Make*: magazine covers, promotional event materials). As such, I am purposefully avoiding labelling these sources solely as ‘literature’, since they appear in textual, audio, and visual forms—and at times blending these formats simultaneously (e.g., slides are shown during TedTalks; posters have text and images). Furthermore, this list contains both hegemonic discourses—those that influence and/or uphold the general public’s understanding of Maker Culture—and non-hegemonic sources—those that critique and/or resist these hegemonic representations. However, as I indicated in the Introduction and discuss further in Chapter Three, it would be inaccurate to view these sources as entirely separate—in practice they often overlap with one another, simultaneously absorbing and rejecting one another’s claims.

While I did not ‘officially’ begin my field research until 2017—when I conducted my first interview—2015 is when I first began *experiencing* Maker Culture first-hand by

⁴² I described this inventory in more detail in the “Defining Research as Praxis” section of this chapter.

⁴³ This inventory has since transformed into the Reference list for this dissertation.

⁴⁴ These are books that mainly focus on describing Maker Culture, Making, or The Maker Movement. I did not include ‘project guides’ –e.g., “How To ...” books—because I was more interested in the discourses *about* Maker Culture rather than learning how to make individual projects.

attending some of its events. These experiences took various forms—including conferences, panel discussions, open-house nights, workshops, site visits, markets, and ‘fares’. Additionally, I attended both domestic and international (US and Portugal) events and was able to witness how Maker Culture varies across cultural contexts. During each of these events I brought along my researcher journal—that took the form of a silver sparkly notebook⁴⁵— and noted the overall ‘feel’ of these spaces—e.g., the general attendance demographic, the topics covered, if it felt ‘welcoming’, the spatial layout, and so forth. After each event, I wrote a ‘reflection’ entry summarizing my overall experience, and if any key moments emerged that might be salient for this dissertation. Furthermore, in my journal I reflected upon whether I thought my external characteristics—e.g., being a White, femme-presenting, young(ish), Anglophone—seemed to impact my affective relationship to the space. For example, I noted whether I received special attention—or no attention at all—and who was performing the ‘welcoming work’ (if anyone). I used the entries from this researcher journal to generate my research questions, interview guide, and to update my inventory of sources.

However, to understand Canadian feminist experiences of Maker Culture more fully, I thought it important to include impressions of this scene from other Canadian feminists. After receiving ethics clearance, I began recruitment for interview participants in May 2017 and held my first interview in July 2017. To be eligible for an interview, all participants were: 1) 18 years old or older; 2) self-identified as females, women, or

⁴⁵ Since I was crossing international borders (especially the US-Canada border during the beginning of Trump’s travel ban orders) and had heard of stories of foreign researchers (especially those attending ‘critical scholar’ events, like feminist gatherings) being required to surrender their technology (e.g., tablets/smartphones/laptops) for border inspection, I intentionally choose a pen-and-paper research method to protect some of my data.

femme⁴⁶ folks; 3) were engaged in making/hacking/crafting/tinkering *and* feminist politics; and 4) were located in either Toronto, Ottawa, or Montréal from April 2017 to April 2019. During the recruitment phase—1 May 2017 to 29 April 2019—I officially invited twenty-five individuals to participate in an interview, of which twelve accepted. All the participants selected for an interview were either organizers or members of at least one of the seven groups profiled for this project. All the participants from the three ‘non-feminist’ sites, performed an ‘organizer’ role for their group. Furthermore, two participants were active in more than one group profiled for the study—one was a feminist site, and the other was a non-feminist one. I mostly found participants by attending Maker Culture events and getting to know other attendees. However, some of the participants I interviewed were contacted through referrals from others (e.g., “you should interview this person too”). Of my twelve participants, an equal number of participants were from Ottawa and Montréal (5 participants each), and Toronto had the fewest participants (2 participants). This under-representation of Toronto participants likely reflects my inability to attend many Maker Culture events in this city due to its longer travel time,⁴⁷ higher costs, and scheduling conflicts (many events were in the fall when I had classes/work commitments). Additionally, although the option to withdraw from this project was made explicitly available to all individuals involved,⁴⁸ no participants withdrew from this project.

⁴⁶ As explained by Jaime Lee Kirtz (2018): “while traditionally used to describe feminine lesbians, the term *femme* also describes the performance of *femme* identity through feminine-associated behaviors [sic], aesthetics, speech patterns and other aspects of identity formation, regardless of an individual’s sexual or gender orientation” (p. 5).

⁴⁷ For reference, a one-way trip to Toronto is approximately a 6-hour train ride from Ottawa, where Montréal is a 2-hour bus ride.

⁴⁸ To see the official Withdraw Form, see A.5 in Appendix A.

To demonstrate the diversity of both gender and feminist identity, I thought it was important that neither of these qualifying terms were explicitly defined within the recruitment material.⁴⁹ As such, to collect basic demographic information, I asked participants to voluntarily fill in the blank spaces on their interview form.⁵⁰ However, a third of my participants provided no basic demographic information. Five participants identified as women/female, and two elected to provide only pronouns (she/her/their). Furthermore, one participant (Nesryn) disclosed that they identify as non-binary but also viewed themselves as ‘femme’. As such, when referring to Nesryn I purposefully use either their pseudonym or their preferred pronouns of ‘they/them’.

Additionally, since makerspaces have been critiqued for not only being male dominated, but also heavily populated by educated White makers, I also asked participants to voluntarily provide race/ethnicity, age, and education information. Like gender, race/ethnicity was a blank space that participants filled in themselves, where age and education was collected as a range.⁵¹ Although some participants provided more specific racial/ethnic identities (e.g., mixed, Filipina, Jewish, Québécoise), I synthesized this data into more general categories of ‘White’ (which includes Jewish and Québécoise) and person of colour in order to compare the demographics of my study with similar race/ethnic categories established in other research. Although I chose to group Jewish, Québécoise and White participants together, participants I grouped as people of colour expressed identifying with this general category at some point in our interview.

⁴⁹ See Appendix A to view my Recruitment Poster (A.1) and Recruitment Email (A.2).

⁵⁰ See “Demographic Information” in my Interview Question Guide in Appendix A, A.5.

⁵¹ See “Demographic Information” in my Interview Question Guide in Appendix A, A.5.

Initially, I intended to conduct all the interviews one-on-one and in-person. However, Jehanne was not available for an in-person interview during my site visits, so she provided me with written answers from the Interview Guide questions for organizers.⁵² Additionally, Yvette and Samira elected to be interviewed together. All my other interviews were all held separately, either in the participant's makerspace, in a coffee shop, at a campus pub, or in a public park. All in-person interviews were audio-recorded using my personal Samsung Galaxy S7 smartphone. Immediately following the interview, I copied the audio file onto an encrypted USB key and deleted the audio file from the smartphone. On average, the interviews lasted over an hour (78 minutes), with the shortest interview lasting 48 minutes and the longest being 1 hour and 50mins. During the interview, I also took detailed notes of responses that resonated with me, which I used to form additional questions not covered in my interview guide. These field notes were not transcribed but were used during analysis to develop my coding scheme and to provide relevant contextual meta-data, such as pauses, gestures, or other actions to provide a more detailed picture of each interview dynamic. In recognition of their time, after the interview I gifted each participant with a small gift I handcrafted.⁵³

To protect the anonymity of my participants, all identifying features that appeared in the interview, including other individuals' names, were not used in my field notes, and were deleted from the written transcript. However, since praxis was a guiding principle for this research, it was important to me that each voice was attached to a 'real name' rather than number code (e.g., Participant 1 or Participant A), or physical descriptor (e.g.,

⁵² See "Questions for Organizers" in my Interview Question Guide in Appendix A, A.5.

⁵³ See a sample of my handcrafted honorarium gifts in Appendix A, A.3.

Woman, Ottawa, aged 34). Therefore, I created a list of ‘real-life’ pseudonyms, all of which were inspired from my personal fandom of either real-life people or fictional characters that I view as aligning with a feminist ethic.⁵⁴ It is worth noting that each participant was provided the opportunity to create their own alias; however, none of my participants selected this option. In generating my list and assigning names, I was consciously aware that pseudonym creation is political. As such, I wanted to avoid relying solely on stereotypical White women names, while also recognizing that most of my sample should be read as ‘White’. Therefore, I intentionally selected some names or spellings that could be read as ‘non-White’ (e.g., Nesryn, Cam, Gabriela, Jehanne) and ‘non-binary’ (e.g., Cam, Jo) to purposefully disrupt this pattern. Additionally, given that at least three of my participants were Francophone or identified as Québécoise, it was important to me that I include some explicitly French names (e.g., Luce, Jehanne, Yvette). Furthermore, I also purposefully generated some names that could be read as ‘young’ (e.g., Becky, Maddie, Cam), while the rest are intended to be understood as more mature or ageless. However, to protect the identity of my participants, the pseudonyms I generated to represent ‘non-White’, ‘young’, and ‘non-binary’ respondents do not necessarily align to the real-world identities of the participants who were assigned these names.

After completing all the interviews, I manually transcribed each interview into a single text document. I used the free trial version of InqScribe to play the audio file and Microsoft Word for the transcription document. I chose to transcribe each interview by

⁵⁴ See A.6 Pseudonym Creation in Appendix A for a full list of each pseudonym used in this dissertation and each of their accompanying real-life or fictional role models.

hand for three reasons: 1) I wanted to ensure accuracy of the transcript by listening to the interviews myself; 2) I wanted to add pauses, laughs, or other vocal cues as they appeared to provide a richer description; and 3) I was able to apply a grounded theory approach and make notes of any common sentiments or key distinctions being made by each participant as they appeared. After finishing their transcript, I emailed the text file to each participant and informed them that they are permitted to make any changes, including additions or deletions, to the text. Each interviewee was provided fourteen days to make any necessary changes and to email the revised transcript back to me. Once returned—or if the fourteen days had lapsed with no response—the interview responses were considered final, and this document was used for data coding and analysis. I chose to provide interviewees with access to their transcripts before analysis to confirm that I did not make any mistakes in the transcription process, such as typographical errors or accidental omissions. Blake D. Poland (2003) states that providing interviewees with the transcripts and/or initial analysis results is one way to ensure that the account is accurate and to prevent accidental misrepresentation. The response rate of the follow-up email was almost split evenly: six participants responded to the email and edited their transcript (or approved it as is) and five participants provided no response.⁵⁵ Only one participant made significant changes to her transcript, deleting some commentary that she was uncomfortable releasing to the public. However, this change did not affect my analysis as this discussion was about an issue that was outside of the purview of this dissertation.

⁵⁵ Jehanne was excluded from this process since she provided written answers.

2.4.2 Data Analysis

Once the participants approved their transcripts, I coded their responses using a grounded theory (GT) approach. Originally developed by Barney Glasner and Anselm Strauss in the 1960s, GT has become a leading method in qualitative research (Clarke, 2012). Emerging from sociology, GT was conceived as an interdisciplinary approach that went against the “haute positivist quantitative sociological research” of the 1960s and 1970s (Clarke, 2012, p. 391). Therefore, unlike more abstract forms of theorizing, GT is deeply empirical; the reason why GT uses the term ‘grounded’ is to emphasize that the data is grounded to material, every day, real life social occurrences (Clarke, 2012). Given that this project is embedded in feminist praxis epistemologies, GT is an appropriate lens for analyzing its outcomes.

GT uses abductive reasoning to generate theory from observations, seeking the most plausible explanation for the thing being observed (Clarke, 2012). Fundamental to this approach is the use of ‘open coding’, where:

[...] data are open to multiple simultaneous readings or codes. Many different phenomena and many different properties can be named, tracked, and traced through reams of all different kinds of data. There is no one right reading. All readings are temporary, partial, provisional, and perspectival—themselves situated historically and geographically (Clarke, 2012, p. 392).

Clarke (2012) maintains that the strength GT offers qualitative research is that it requires that researchers “be open to new ways of seeing and knowing, to legitimate and promote epistemic diversity [...] and to work against epistemic violence that erases or silences minor voices and perspectives” (p. 389).

Logistically speaking, coding data using GT takes the form of creating theoretical codes and substantive theories (Strauss & Corbin, 1994). As explained by Anselm Strauss and

Juliet Corbin (1994), these theoretical codes “conceptualize how the substantive codes may relate to each other as hypotheses to be integrated into a theory” (p. 277). As such, the aim of this approach is to provide an empirical mode of analysis that creates several ‘working theories’ for a specific context. These substantive theories are transferrable to similar contexts, rather than generalizable or universal (Strauss & Corbin, 1994).

Typically, the theoretical codes are created using an open coding schematic where the researcher evaluates word by word, section by section, their data and assigns temporary labels to organize phenomena. Related labels that are recurring within the data are then condensed into more analytically robust categories. Ideally, these categories are linked together or integrated into a substantive theoretical analysis. In other words, where other qualitative approaches use pre-defined codes and apply them to data sets to “constitute proof for a given preposition” (Bryant & Charmaz, 2007, p. 193), GT coding involves noting relevant incidents *as they appear* in the data and constantly comparing these incidents to others that are not yet coded. This constant comparison method allows for the researcher to create multiple categories and identify the “theoretical properties” (Bryant & Charmaz, 2007, p. 194) of such categories. While a study that replicates GT methods requires specific sampling and coding procedures (Bryant & Charmaz, 2007), in this project I decided to use *elements* of GT analysis as a framework for identifying core themes and concepts *as they emerged* from the data. For example, inspired by GT’s constant comparison method and its usefulness for identifying emerging categories, during the interviews I made notes in my researcher’s journal anytime a participant said something similar or contrary to another participant’s, or my own, experience. Once the interviews were transcribed, I highlighted these incidents, using a different colour each

time a new theme/topic emerged. This process allowed for me to develop a colour coding scheme (see Table 3), which I used to identify what GT calls ‘categories’. I also applied this colour coding and comparison method to my other hegemonic/non-hegemonic sources (see section 2.4). I then inserted these highlighted passages into a separate Word document, with the general category (e.g., ‘Identity’, ‘Work/Labour’, or ‘Activism’) as the title and grouped similar passages together. I then re-read this categorized data and bolded recurring ‘key terms’ to signal a ‘sub-category’. For example, as shown in Table 3, under the pink ‘Maker identity’ category, ‘crafting’, the ‘little m / capital M’ distinction, and women’s crafting/making legacies were all recurring sub-categories that could be found within my researcher journal entries, the interviews, and the hegemonic/non-hegemonic sources. As such, in using this approach, I was able to ascertain that the theoretical properties of the ‘Maker identity’, including its hegemonic (e.g., ‘capital M’) and non-hegemonic (e.g., ‘little m’) representations, and connect these properties to established theoretical frameworks, such as boundary-work, boundary objects, and social theories of representation and identity (see Chapter Three). This colour coding and comparison approach was repeated for the two other core themes that emerged from this data: ‘work/labour’ (Chapter Four) and ‘activism’ (Chapter Five). As such, inspired by GT’s constant comparison framework, I used colour coding to develop a categorization and sub-categorization process. This process allowed for me to map separate individual experiences and connect them to wider theoretical frameworks and concepts.

Table 3: A Sample of Colour Coding Scheme, Categories & Sub-Categories

Theme	Examples
<p><i>"Maker" Identity</i></p>	Cam, Nesryn, Amelia talk about wanting more of a craft focus, less tech!
	Jo and Becky distinguished between ‘ little m ’ maker and ‘ capital M ’ Makers (Makers being Make Media influenced, more corporate)
	Cam, Molly, Jo, Becky, Nesryn, Luce all mention women's history of making (seen as different from "Making")
<p><i>Work/Labour</i></p>	“ Emotional labour ” and “ care work ” needed to run a makerspace mentioned by organizers (Amelia, Jo, Becky, Samira, Yvette, Luce)
	Balancing ‘ making a living ’ and making what you love (including making makerspaces) mentioned as a challenge by all
	Women in non-feminist spaces feel like they manage 'bad behaviour' and clean up after others more often
<p><i>Activism</i></p>	Jo and Becky: what Maker Media say and what they do are two different things
	Samira, Yvette, Gabriela, and Luce all mentioned reflexivity and praxis as key to feminism “ Empowerment ” mentioned by Molly, Cam, Luce, Samira, Yvette, Gabriela as a key goal for makerspaces
	Cis-male allies mentioned by most as a challenge for feminist makerspaces—simultaneously acknowledging ‘the good ones’ with a skepticism of others

2.5 Conclusion: Research Challenges and Limitations

In framing this chapter as a reflection of both the events leading up to this dissertation and the experiences of actually conducting the research, my aim is to demonstrate the ongoing entanglements of the ontological, epistemological, and theoretical assumptions that have shaped this project. To begin this chapter, I recounted my doctoral journey as a lens for understanding my ontological positionality as a researcher and the forces that pulled me into the world of Maker Culture. Stemming from this ontological position, intersectional feminism serves as the overarching epistemological frame for this project, premised on the understanding that lived experiences of oppression are complex, overlapping, and co-productive (e.g., when the

oppressed become oppressor) (Crenshaw, 1991; Hill Collins, 2000). This framing has influenced the theoretical framework that shaped both my research approaches and analysis of the data. To guide my research approach, I relied heavily on feminist conceptualizations of praxis and empowerment, both to justify the need for this work and to direct its development by rooting it to the actual lived experiences of those working within *and* against the hegemonic terrain of Maker Culture. To analyze the data collected, I relied on a grounded theory approach, which was developed as a tool for understanding data collected from lived experiences.

These theoretical, epistemological, and ontological frameworks are further enmeshed within the next three chapters (Chapters Three to Five), which discuss the outcomes of this research journey. In Chapter Three, I explore how both hegemonic *and* non-hegemonic discourses serve a role in shaping—and maintaining—limited representations of Maker Culture. In Chapter Four, I critique hegemonic Maker Culture discourses that forward neoliberal logics of individual entrepreneurialism and creative work but fail to consider the work/labour structures underlying both making as a profession and as a community-building practice. Furthermore, I apply feminist theories of emotional labour and care work to expose the invisible structural privileges underlying makerspaces and Maker Culture. Chapter Five re-centers the discourses of feminist making and makerspaces and explores how the feminist makers I met with simultaneously adopt and resist the hegemony of Maker Culture.

However, this chapter also serves as place to recognize the scope and limitations of this research. Although I made every effort to recruit a diverse group of participants, a key shortcoming of this research is that the participants recruited for this study

overwhelming reflect my own subjectivity as a White, formally educated, young(ish) person. This lack of diversity largely reflects my failures to anticipate the ways in which my own positionality—and the assumptions shaped by it—influence the recruitment process. First, in failing to articulate that this project is premised in *intersectional* feminist epistemology, I did not account for the persistence of essentialism, which strongly underpinned the term ‘feminism’. Second, since this project relies on my physical presence, I did not think about how my *physical body*, which reflects a White femme-presenting experience, serves to uphold the *assumption* that my project is centered on White womanhood. And third, these limitations highlight my own limited connections within Canadian maker communities. Since I do not identify as a ‘Maker’, nor am I actively involved in makerspaces or other maker communities, my recruitment pool was rather narrow and restricted to those groups that had a strong online presence (e.g., a website, Twitter account, Facebook page) and/or affiliation with well-promoted Maker Culture events. My lack of credibility as an established Maker and my association with academia may explain my low response rates from those who are not university/college students. As discussed in Chapter One, there is a shared sentiment of anti-intellectualism underlying many DIY and maker discourses. As such, it is understandable that non-students may feel put-off by, or not qualified for, participating in a dissertation project. Furthermore, given the legitimate distrust BIPOC communities have of White researchers, rooted to a long history of unethical research practices by White researchers, it is not surprising that my embodiment as a White femme researcher serves as a limitation for this study. For an example, I contacted a BIPOC maker community based in Toronto for this study but was informed that this group would only

respond to people who identify as BIPOC. Therefore, while this research is framed as providing some key findings and commentary about Canadian feminist engagements in Maker Culture, a caveat to these accounts is that this project is intended to provide a limited account of feminist maker communities in Canada. Additional research focused on those who are not well represented by my sample—especially BIPOC Canadian makers, non-student makers, and makers over the age of fifty—is needed to test the applicability of my analysis to a more diverse community of makers.

Chapter Three

Making Boundaries: Creating ‘Makers’ Through Symbolic and Rhetorical Boundary Work and Contested Boundary Objects

As I talked with Becky in her small Toronto makerspace, distinctions between Making, hacking, and crafting emerged throughout our conversation. When I asked her whether these terms are truly separable, she explained:

Maker Culture is definitely much more corporate, at least it is *now*. It’s much more branded. And I think that *Make*: [magazine] has a lot to do with that. Sort of like this branding of terminology and this branding of methodology for finding stuff out is very much outside of this ... sort of messy hacker mentality of, like, fucking it up until you get it right. And *that* is the distinction to me (Toronto, 26 July 2017).

I open this chapter with my conversation with Becky because it is demonstrative of the central argument of this chapter: various discursive representations of Maker Culture produce *symbolic* and *rhetorical boundaries* that define Makers and their Making. This means that, while at the individual-level, DIY practices like making, crafting, and hacking are dynamic activities that can look and feel different to each person, hegemonic Maker Culture discourses produce a bounded Maker identity that encompasses a narrow set of shared values. Maker Media Inc., along with its supporters, including Chris Anderson, Mark Hatch, Bob Parks, and David Lang, are widely accepted as key promoters of a particular *brand* of Maker Culture, Making, and Makers. And here, brand is meant literally—from their popular *Make*: magazine, which first appeared in 2005, to their online retail store (makershed.com), Maker Media Inc. serves as a one-stop-shop for all things Maker related.

But, just like any mainstream multimedia platform, Maker Media Inc. has many critics—both insiders and outsiders—who defy their overly narrow hegemonic

representations in favour of alternative versions. Thomas F. Gieryn (1983; 1999) describes this tension as *boundary-work* and maintains that rhetorical boundaries are produced during times of contestation, such as when one group is fighting for public authority or legitimacy over another. In this chapter, I examine the ongoing boundary-work that produces ‘Makers’ by examining some its hegemonic⁵⁶ and non-hegemonic⁵⁷ representations. I maintain that mainstream hegemonic Maker Culture representations certainly work to limit our imagination for what Making can look like, who engages in it, and their motivations for doing so. As such, while Maker Culture is meant to include everyone, I conclude that *self-alienation boundary-work* of non-hegemonic makers is a consequence of this boundary-work.

However, knowledge production, and the definitional boundaries it inherently produces, is not always adversarial. Susan Leigh Star and James R. Griesemer (1989) contend that scientific knowledge creation is heterogenous and collaborative—it involves ongoing negotiations between diverse groups of people who hold differing opinions and values. Therefore, for Star and Griesemer, a *boundary object*—an abstract or concrete object that, although malleable and open to various interpretations, serves as a shared site for meaning-making and understanding—facilitates inter-group communication, despite these core differences. However, where Star and Griesemer view boundary objects as sites for collaboration *across* boundaries, in my interviews with Canadian feminist makers, hegemonic Maker symbols and rhetoric were used as justification for maintaining boundaries, which I refer to as *strategic distancing boundary-work*.

⁵⁶ Comprised of select content produced by Maker Media Inc. (see Chapter Two).

⁵⁷ Stemming from my conversations with Canadian feminist makers (see Chapter Two).

Therefore, non-hegemonic makers legitimize the foils of Makers and Making to justify *their* making practices and communities.

3.1 Conceptualizing ‘Boundaries’ and their Communicative Significance

In his book, *Cultural Boundaries of Science: Credibility on the Line* (1999), Thomas F. Gieryn maps the cultural boundaries of science and examines how this discipline has been demarcated as distinct from (and superior to) other knowledge paradigms like religion, the humanities, and social sciences. To create this separation, Gieryn maintains that multiple actors and their discourses produce boundary-work: “the discursive attribution of selected qualities to scientists, scientific methods, and scientific claims for the purpose of drawing a *rhetorical boundary between science and some less authoritative residual non-science*” (emphasis mine; 1999, p. 4). This means that boundary-work involves producing persuasive claims that define a phenomenon (in this case science) as a set of shared practices, ideals, epistemologies, and actors, all of which combined illustrate that this phenomenon is somehow unique from, and superior to, other similar phenomena. Furthermore, Gieryn explains that although boundary-work is an ever-present and on-going process, it only becomes obvious during times of dispute over credibility (1999, p. 340). Gieryn maintains that it is important to understand that during these moments of contestation, there is no one ‘true’ science; rather, multiple representations of science become publicly debated and boundaries are rhetorically drawn around which types of science are credible and trustworthy and those that are ‘junk’ science or not ‘science’ at all.

However, not all scholars view ‘boundaries’ through the adversarial relationships established by Gieryn. For example, Susan Leigh Star and James R. Griesemer (1989) contend that scientific research is oftentimes heterogenous, requiring ongoing collaborative efforts, which are performed by diverse groups of both professionals and hobbyists, scientists and non-scientists. Using the example of the founding years of the Museum of Vertebrate Zoology at the University of California, Berkeley, Star and Griesemer maintain that the protocols of establishing the museum serve as a *boundary object*: a shared site that allows different groups—each with their own values, norms, or understandings—to work together to achieve the same goal (in this case: the creation of a functional museum). However, where boundary-work is viewed more through the lenses of contestation and domination—where an authoritative set of scientific methods are imposed by ‘true’ scientists—boundary objects are collaborative and negotiated. As explained by Star and Griesemer:

Boundary objects are objects which are plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. [...] These objects may be abstract or concrete. They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable, a means of translation. The creation and management of boundary objects is a key process in developing and maintaining coherence across intersecting social worlds (1989, p. 393).

For example, in the context of the museum, notions of what serves as an interesting ‘zoology specimen’ were hotly debated between natural historians, zoologists, biologists, museum directors, amateur collectors, academic administration, and museum benefactors. For natural historians, a specimen that can provide new knowledge about pre-historic landscapes are more exciting than more contemporary popular pieces. On the other hand, museum benefactors are looking to collect pieces that will entice the public to visit the

museum—but, while these specimens may be valued by the general public, they also may be less interesting to scientific researchers focused on discovery. However, despite these different goals, Star and Griesemer explain that, at the same time, there emerged a standardization of collection, preserving, and labelling methods which served as a key boundary object that allowed both amateurs and professional scientists to participate in the curation of the museum. Therefore, boundary objects are best understood as “negotiated bridges” (Riesch, 2010, p. 455) that allow *both* scientific and non-scientific work to co-exist within a shared site, like the museum.

As such, the role of rhetorical and symbolic boundaries within the creation and maintenance of authoritative scientific knowledge has been presented as both adversarial and domineering *and* collaborative and negotiated. As summarized by Hauke Riesch:

[Boundaries] can be erected and used as an interpretive strategy by groups to distance themselves from groups they perceive as conceptually threatening in some way. A group or a group member can draw a rhetorical boundary that excludes other groups’ claims to competence in their area, thus exerting or trying to exert some sort of control over their epistemic authority. In the other tradition, a boundary is seen as a given division between social groups that, while working together, view the world and the object of their collaboration in fundamentally different ways. In this view a boundary is not something created to establish epistemic authority, but rather something to overcome to create scientific cooperation” (2010, p. 456).

Therefore, there is some theoretical disagreement over the purposes of boundaries.

Riesch maintains that a key limitation to both ‘boundary-work’ and ‘boundary object’ is that neither consider how these two concepts intersect, writing:

But how exactly can the same objects be used in a divisive, demarcating way and at the same time as a tool to communicate across the boundary? Since the demarcating and communicative aspects of boundaries are developed by two rival accounts of boundaries whose unification has so far not received much theoretical attention, a pure boundary analysis will leave that question open (2010, p. 463).

In other words, while the theorization of boundary-work and boundary objects explains an observable pattern, both fail to consider *why* professionals form these epistemological boundaries in the first place—what do they gain from them? Riesch maintains that to gain a deeper understanding of these motivations for boundaries, we must also connect these concepts to other theoretical frameworks, such as social representation and identity theories.

According to Riesch, social representation theory provides a framework for understanding how social groups develop a shared representation of a new concept. Fundamentally, social representation theories are about uncovering the process that forwards a central understanding of a concept that contains multiple meanings. For example, representations of concepts as portrayed by the mass media serve as popular sites for studying social representation theory (Riesch, 2010). Riesch explains that to portray a concept to others, the abstract must become objectified, which allows audiences to anchor the unfamiliar concept to a familiar one. Quoting Serge Moscovici, the creator of social representation theory, Riesch uses the example of God as ‘father’ to explain this process more clearly:

To objectify is to discover the iconic quality of an imprecise idea to picture, to fill what is naturally empty with substance. We have only need to compare God to a father and what was invisible instantly becomes visible in our minds as a person we can respond to as such (2010, p. 458).

This means that social representations are dynamic—their relatability and meanings constantly shift as they are objectified through familiar anchoring. Therefore, while social representation theory does not explicitly apply to individual opinions, Riesch explains that this process of social representation influences people’s perception of things, and this influence gains traction when audiences are not familiar or experts on the phenomenon

being represented. In section 3.2, I demonstrate how hegemonic representations of Making are anchored to specific science and technology symbols and rhetoric that serve to limit the reach of Maker Culture politics and public understandings. In other words, these social representations produce concrete boundaries around an abstract concept, by narrowly portraying who Makers are and what Making is.

However, Riesch also maintains that to understand *why* people form these collective representations—or boundaries—in the first place we must also view this process as a form of social identity. Within this framework, the focal point shifts to understanding how individuals develop emotional connections to a social group of their choosing. As such, while physical features may assign you to a specific demographic group—e.g., through gender expression or skin tone—social identity theory is more interested in understanding why people feel like they belong to a group due to a deeper resonance, such as shared beliefs, goals, or passions. Henri Tajfel describes this process as “self-categorisation” (in Riesch, 2010, p. 459), and contends that members of these chosen groups “enhance their own self-esteem by conforming to the group identity and by positively evaluating their own and their group’s characteristics as opposed to outsiders” (in Riesch, 2010, p. 459). Riesch explains that this tendency to view outsiders negatively is exacerbated by an “*accentuation effect*”, where people are inclined to “overestimate the differing features and underestimate features that they have in common” (emphasis in original; Riesch, 2010, p. 460). Riesch contends that this accentuation effect explains how individuals not only bond with a particular group, but also explains how stereotyping, discrimination, and prejudice enact the collective process of drawing boundaries. Riesch explains:

Conceptualising [sic] boundary work as social identity building then explains the social discrimination and negative stereotyping that Gieryn observes in his examples, but which in his scheme could only be described as an accompanying characteristic of boundary work rather than a *demonstratively essential part and consequence of it* (emphasis added; 2010, p. 461).

Therefore, while social representations and social identity theories tend to study different levels of group formation—from macro-level mass media representations to individual identity formation—within the context of boundary-work and boundary objects, it is clear that these two concepts work together. As explained by Riesch, bringing these isolated concepts together “can provide not only an understanding of how the boundaries between groups are erected and maintained, but also how nevertheless communication between groups can occur” (2010, p. 468). Therefore, although the work of Gieryn, Star, and Griesemer are foundational for understanding the cultural significance of scientific discourses, these works tend to be siloed in science and technology scholarship, rarely travelling beyond studies related to *scientific* knowledge-production. However, Gieryn himself acknowledges that his conceptualization of boundary-work was inspired by other scholars who researched non-scientific sites, like: Howard Becker’s *Art World*, and other key works that studied architecture, morality, Catholicism, journalism, and home/work structures (1999, p. 34, footnote 39). Therefore, he hoped that boundary-work would be “useful for studying contested authority in other institutional and professional domains” (1999, p. 34), concluding his Introduction chapter with the line “Lots of work ahead” (1999, p. 35). Furthermore, the general premise that discourses produce symbolic and rhetorical ‘boundaries’ have appeared in wider sociological theories—including the foundational works of Émile Durkheim, Karl Marx, and Max Weber (Riesch, 2010).

Therefore, in this chapter, I also extend the concepts of boundary-work and boundary objects beyond STS as I consider their significance to Maker Culture. In section 3.2, I examine how hegemonic representations of Maker Culture produce symbolic and rhetorical boundary-work, resulting in the formation of the ‘Maker’ identity. However, where Gieryn and Reisch only investigate the influence of hegemonic representations, in section 3.3, I contend that non-hegemonic discourse communities—e.g., Canadian feminist makers—also play a role in shaping and maintaining these boundaries. Therefore, unlike Star and Griesemer’s boundary objects, which fostered collaboration, ‘Making’ discourses are *contested* boundary objects that maintain boundaries and justify alternative approaches.

3.2 Hackers, Makers, Tinkerers—We are all Makers

Maker Media Inc. has successfully transformed Making into a corporate brand, with their easily identifiable bright red *Make:* logo and robot mascot appearing on hundreds of products and publications relevant to Makers, including build kits, books and magazines, electronics, and Maker Faire merchandise, with price ranges from 99 cents to \$1100 (USD) (see Illustrations 3-6).⁵⁸ However, their intentional capitalization of Making and Makers has led me to question who really counts as a Maker, and how are they different from other DIY creatives? In this section, I consider how are Makers represented? What tools do they use and what are their interest areas? Through this analysis of Maker Media Inc. content, I discovered that these representations produce a hegemonic Maker profile. Of course, Maker Media Inc. is just *one* representational outlet

⁵⁸ These figures were taken in May 2019, prior to Maker Media Inc’s rebranding initiative.

of Making; however, in this section, I contend that the proliferation of this profile into mainstream public discourses produces boundary-work that construct a Maker identity that is viewed as separate from—and superior to—other similar creative types, like crafters, hackers, and artists.

Illustration 3: A Selection of *Make:* Magazine Covers⁵⁹



Illustration 4: A Selection of Maker Media Inc. Project Guides



⁵⁹ All images shown in Illustrations 3-6 are from Maker Media Inc.'s online retail store (<https://www.makershed.com>).

Illustration 5: An Assortment of Maker Media Inc. Merchandise



Illustration 6: Make: Branded Build Kits



When describing who is involved in Maker Culture, Maker Media Inc. always promotes the same message: *Making is for everyone!* For example, in their definition of the Maker Movement, Maker Media Inc. states that “[t]inkerers, educators, parents, and professionals are included because we are all Makers” (capitalization theirs, quoted in Grace-Flood, 16 April 2018, np). In his book *The Maker Movement Manifesto* (2014), Mark Hatch, frequent contributor to *Make:* magazine and former CEO of the makerspace-chain TechShop, expands this definition by simply stating that “Making is fundamental to what it means to be human” (2014, p. 1). Taking this argument one step further, in the preface for Bob Parks’ book *Makers: All Kinds of People Making Amazing Things in Garages, Basements, and Backyards* (2005) former editor-in-chief of *Make:* magazine Mark Frauenfelder asks the readers: “[a]re you a tool-using animal or an insect?” (p. 7). For context, he relies on two separate quotes, one from historian Thomas Carlyle—a major contributor to the theoretical foundations of the Arts and Craft Movement⁶⁰—and another from author Robert Heinlein, which taken together argue that humans are definable by their ability to use tools and to multi-task. Therefore, like Hatch, Frauenfelder defines a Maker simply as a human: someone who uses tools, has varied interests, and makes lots of different things. Chris Anderson, editor-in-chief of *Wired* and author of *Makers* (2012), also shares this notion that we all are *natural* Makers: “we are all Makers. We are born Makers (just watch a child’s fascination with drawing, blocks, Lego, or crafts)” (capitalization his; 2012, p. 13). And while he begins *Makers* (2012) by recounting the story of his grandfather—an engineer and inventor of automatic sprinkler systems—he also lists gardening, cooking, knitting, sewing, scrapbooking, beading, and

⁶⁰ See Chapter One for details on the Arts and Craft Movement.

cross-stitch as Making. As such, from these perspectives, Making is presented as innately human: it is something that everyone should be naturally interested in, is capable of doing, and can find joy from.

But, if everyone is a Maker, why do we need to foster a Maker Culture? While Makers argue that everyone is capable of Making, they also maintain that modern societies, which are premised on capitalist means of production, have changed humanity's relationship with Making: we have either forgotten how to Make, no longer prioritize Making, and/or we no longer have the time to Make (Parks, 2005; Anderson, 2012; Hatch 2014). As explained by Mark Frauenfelder:

Sadly, in these days, most people don't need to use tools. They don't need to use them, because buying new things or hiring specialists is usually cheaper (both money- and time-wise) than making, modifying, or fixing them yourself. What we've gained in terms of convenience is offset by a growing sense of discontentedness with the world and a diminished understanding of how things work (quoted in Parks, 2005, p. 7).

Therefore, everyone *can* Make, but given the modern-day convenience of capitalism mixed with the growing social and economic value of consumerism, these authors maintain that only a few of us are actually engaging in it. However, these authors also contend that those who do Make things are also creating easily accessible online and offline networks—websites, blogs, how-to-videos, magazines, books, maker stores, and meet-up groups—which are lowering the entry threshold into Making. This network of Makers is Maker Culture, and it has grown into a global phenomenon. As I outlined in Chapter Two, makerspaces—‘real-world’ community meet-up groups and workshops premised on sharing the knowledge and tools needed to Make things—are available on every continent (except Antarctica). For those who cannot access these offline resources, websites and blogs like Instructables.com, Pinterest, Etsy, wikiHow, YouTube, and more

offer free or affordable instructions on how to make just about anything. And, of course, there are numerous online retailers dedicated to selling art, craft, and Maker supplies and delivering them to your door. Therefore, taking the premise that engaging in Making has never been easier, the key message of Maker Culture is that the only thing holding you back from joining in is *you*.

Yet, despite these romantic notions that everyone is included in Maker Culture, upon closer examination I discovered that Making has a diversity problem. The practices, knowledge, tools, and objects that are given center stage in Maker Culture reflect a narrow set of interests involving a rather homogenous group of Makers who use ‘high tech’ Maker technologies. For example, popular Maker Culture technologies that proliferate throughout *Make:* magazine, and Maker Media Inc. websites, online store, project guides and book covers include digital fabrication tools like 3D printers, Computer Numerical Control (CNC) mills and laser cutters. Additionally, products from open-source computer hardware companies like Arduino, AdaFruit, and Raspberry Pi, and their plethora of open-source, freely (or cheaply) available software and digital tools are widely advertised and used. Projects frequently published in Maker Media Inc.’s project guides and magazine include DIYing robotics, automation, digital fabrication, vehicles, rockets, electronics, wet labs, microscopes, telescopes, and more. In his post for Maker Media Inc.’s *Open World* blog series, Liam Grace-Flood also noticed this trend in representations of Maker Culture, saying: “[n]owhere does it say that to be a maker you have to use an arduino, or a quadcopter, or a 3D printer, but for some reason, ‘Makers’ have certainly skewed hard in that direction” (capitalization his, 16 April 2018, np).

Furthermore, to really emphasize that *Making* is about using these *specific* technologies, Maker Media Inc. actually launched a separate magazine titled *Craft:*. Gracing the cover of this magazine are more ‘traditionally feminine’ creative pursuits including felting, knitting, crochet, weaving, holiday gift making, costume design, and baking. And, whereas *Make:*’s aesthetic uses a traditionally masculine colour palette of bright red and blue, *Craft:*’s aesthetic is feminized using softer pinks and pastels. To visualize these differences, see Illustration 7, which features the cover from *Craft:*’s last issue and the cover of a *Make:* issue that was released around the same time. Furthermore, of *Craft:*’s ten issues, half feature a human cover model. Of those models, all but one feature visibly White models,⁶¹ and four out of five covers depict feminine-presenting⁶² people (see Illustration 8).

Illustration 7: Comparing *Make:* and *Craft:* Covers⁶³



Make: Cover (Volume 12; Circa Nov/Dec 2008)

Cover of Last Issue of *Craft:* (Volume 10; Circa Jan/Feb 2009)

⁶¹ Here, I consider “visibly White models” to be people of the Anglo-Saxon phenotype.

⁶² People who externally present themselves as feminine by displaying Western cultural traits typically associated with women and girls.

⁶³ For more covers, see: <https://www.makershed.com/collections/books-magazines>.

Illustration 8: Cover Models Representing *Craft:*



However, unlike *Make:* magazine, *Craft:* was short-lived, with Maker Media Inc. cancelling the print version of the magazine in 2009 after their tenth issue citing a lack of interest from advertisers (Wired Staff, 2009). However, in an interview with *Wired*, Dale Dougherty editor and publisher of both *Make:* and *Craft:* promised his *Craft:* audience that the projects that they loved from this magazine would continue to appear in *Make:* and on Maker Media Inc.'s website and blogs. Yet, despite this promise, *Make:* magazine still caters to a high-tech Maker audience. For example, for her 2014 talk at the Eyeo Festival titled “Thinking about Making”, Leah Buechley performed a content analysis of *Make:* magazine covers, focusing on the magazine’s first nine years (2005-2014) and found that most of the people featured on *Make:*’s covers were masculine-presenting (she read 85% as “boys and men”) and overwhelming White. In fact, she argues that she could find no people of colour represented on any *Make:* cover.⁶⁴ Additionally, she counted and categorized all the featured projects illustrated on each cover and she found that most projects featured fell into one of three categories: electronics (56%), vehicles (31%), or

⁶⁴ Buechley clarifies that, for her, when counting “people of colour” she was specifically looking for visible race categories who are not traditionally represented in North American science and technology sectors. Therefore, she did not count models of “Asian” or “South Asian” descent as “people of colour” since this demographic is traditionally well represented in STEM.

robots (26%). Other present but less frequent categories featured included rockets (8%) and music (5%).

Curious about the content featured in more recent issues of *Make:* magazine, I performed a follow-up study in January 2019 and analyzed the last two full publishing years of *Make:*.⁶⁵ Although feminine-presenting people fared much better in these more recent volumes—67% of people featured could be read as feminine—people of colour⁶⁶ were still not visibly represented. Furthermore, electronics still led the project category, although less frequently (33%). However, my second-place category differed from Buechley’s original analysis: digital fabrication projects were 12% of projects featured during this time. This indicates that while tools like 3D printers, CNC mills and laser cutters are prevalent in Maker Culture representations now, this adoption was not immediate. Additionally, in 2017-2018 robots (11%) and vehicles (9%) are still featured on the magazine’s covers, but less often. Interestingly, ‘wearable technology’ pieces—projects that blend electronics with textiles—and other textile-based projects appeared almost as often as robots and vehicles at 8%. In fact, 37% of projects featured in more recent issues of *Make:* are projects that lie outside of Buechley’s original classifications. For example, there were issues that focused on tiny house building and automated gardening projects (Vol. 59), learning embroidery lingo (Vol. 58), stencil spray painting (Vol. 57), and learning screen printing (Vol. 56). However, aside from tiny houses, none of these other projects were the main project featured on the magazine’s cover.

⁶⁵ I analyzed *Make:* magazine covers published October/November 2017 to October/November 2018, for a total of 12 issues (Volumes 54-65, inclusive).

⁶⁶ Note: I was using Buechley’s definition of “people of colour” (see footnote 10).

It is important to acknowledge that a key limitation to content analysis, like that performed by Buechley and me, is that it requires researchers to ‘code’ data using their own learned assumptions about what a phenomenon looks or sounds like. For example, in Buechley’s analysis, she is assessing the identities of Makers based on what she thinks gender and race ‘look’ like. Problematically then, her categorizations uphold a cis-gender binary and assume that racial identity categories can be externally identified by a stranger. However, returning to Hauke Riesch’s (2010) explanation of objectification within social representations—the process of attaching a familiar understanding to an abstract concept—mass media outlets, like *Make*: magazine, assume that audiences share a common understanding of the content being delivered. Within the context of these covers, in objectifying ‘Makers’ as largely light skinned Makers showing off their robots, 3D printers, and electronic projects, the social representation of ‘Makers’ is constructed through a universalizing profile of Makers as White, affluent, and (most of the time) men. Therefore, despite the slight increase in diversity of people and projects selected to be featured in the magazine, social representations of the Maker identity are reduced to a group of privileged people with limited creative interests that center around modern ‘high-tech’ Maker Culture technologies. ‘Low-tech’ or ‘traditional’ DIY handicraft projects like textiles, woodworking, sculpting, and painting are very low on the Maker Culture radar and typically they only appear when used in conjunction with these ‘high tech’ Maker Culture tools (e.g., ‘wearable technology’).

However, while it may be tempting to dismiss the impact of this profile by stating that all magazines and books are tailored for a specific demographic, Reisch’s (2010) analysis of social identity formation demonstrates that social representations are integral

to shaping people's understandings of—and, importantly *resonance with*—new ideas or concepts. Building from this premise, I contend that the rhetorical and symbolic boundaries produced by Maker Media Inc. and its supporters impact the type of people identifying as Makers and drawn to Maker Culture. In fact, market research surveys conducted by Maker Media Inc., demonstrate that Makers are a rather homogenous group. For example, their 2012 *Maker Market Study* was premised on a cross section sample of 789 respondents who spanned “the ‘maker universe’” (p. 8).⁶⁷ The study found that the main demographic of this ‘maker universe’ were educated, middle-aged, affluent males: 80% of the sample identified as male, 97% attended College and 80% had postgraduate education, their median age was 44, and their average annual household income was \$106,000 USD (p. 24-25). Furthermore, this study found that most of these Makers were involved in hardware or software projects: 79% responded that they were involved in “any of these”, 70% specified hardware projects, and 66% specified software projects (p.13). When asked to breakdown their hardware projects, the top three responses related to using technologies that encapsulate the hegemonic symbolism of Maker Culture: 53% of respondents indicated they used microcontroller computers (e.g., Arduinos), 30% responded that they used 3D printers, and 13% responded that they used manufacturing tools like CNC mills (p. 13). And, perhaps unsurprisingly, after hardware/software, the next popular project category selected was electronics (~65% of responses). If we look to more recent data provided by Maker Media Inc., the 2015 Attendee Studies for the Bay Area Maker Faire and the World Maker Faire NY

⁶⁷ However, the study was limited to U.S. residents, and respondents were collected from three sources: Maker Faire exhibitors, *Make*: magazine subscribers, and *Make*: newsletter subscribers.

demonstrate that little has changed. For the Bay Area, most attendees still identified as male (68%), all were well educated (100% attended/graduated from college or better), their average age was 42, and their median annual household income was \$124,500 (USD) (p. 26). Moving to the other coast, the attendance demographics for the World Faire in New York were virtually the same as the Bay Area: 62% of respondents identified as male, 96% attended/graduated from college or better, and their median annual household income was \$124,500 (USD) (p. 6). Furthermore, unlike the *Maker Market Study*, both of the Attendee Studies collected race/ethnicity statistics, and both found that the majority of attendees to these Maker Faires identified as White (67% in New York and 68% in Bay Area), with Asian (12% in New York and 17% in Bay Area) representing the next largest group. Furthermore, the interests of these Maker Faire attendees also echo the 2012 study, with Bay Area respondents indicating hardware, software, and 3D printing as top interests, where the New York attendees were interested in the 3D Printer Village (75%), the Aerial Sport League (45%), and Game of Drones (42%). Of course, these three studies by no means capture all of Maker Culture participation. These studies are limited to the American Maker experience, and given the cities selected for the Maker Faire attendance studies, it is perhaps of no surprise that those attending these events are affluent. Therefore, although they boast having a worldwide reach, it is curious that Maker Media Inc. has not published any studies outside of the affluent American experience. In the next section, I explore how these hegemonic representations of Makers serve as *contested boundary objects* within Canadian feminist maker communities.

3.3 “Just a little bit different”: Making as a Contested Boundary Object

When Gieryn conceptualized boundary-work, he envisioned it as being performed by hegemonic practitioners who exclude and discredit other similar knowledges. For example, as I discussed in section 3.1, Gieryn explains how ‘real’ scientists produce boundary-work to demarcate and elevate their methods from ‘junk’ science and non-science. Therefore, boundary-work observes epistemological hierarchies, which privilege hegemonic knowledges and practices while marginalizing and dismissing others. While this framework is useful for understanding how certain knowledges are upheld as more reliable than others, it does not offer much consideration of the non-hegemonic experience of these boundaries. Do excluded groups also play a role in upholding these boundaries and hierarchies? On the other hand, while Star and Griesemer’s ‘boundary object’ concept does examine both hegemonic and non-hegemonic groups, this framework assumes that boundary objects foster a cooperative understanding between these different groups. In other words, boundary objects erode boundary-work as they form symbolic bridges between various groups. However, in my research, I found that boundary objects were entwined in boundary-work. While the hegemonic representations of Maker Culture explored in section 3.2 certainly produce symbolism and rhetoric that exemplify Gieryn’s hierarchical and exclusionary boundary-work, I also found that boundary-work was produced and maintained by *non-hegemonic* maker communities. For example, throughout my conversations with Canadian feminist makers, my participants referred to hegemonic Maker symbolism in their explanations of how their work was a bit (or a lot) different from mainstream Maker Culture—which I refer to as *self-alienation boundary-work*. Importantly, within these conversations, ‘outsiders’—in

this case, non-feminist Makers—tended to be viewed as completely different from ‘insiders’, even in cases where the makers I interviewed used similar technologies and approaches, which Riesch (2010) refers to an accentuation effect. Therefore, rather than establishing commonality between different Maker Culture communities, Making symbolism serves as a *contested* boundary object that allows non-hegemonic makers to also perform boundary-work as they demarcate—and elevate—other DIY practices, like crafting and hacking, over Making.

3.3.1 “So, I probably wouldn’t table there”: Self-Alienation as Boundary-Work

Some of my participants expressed to me that they saw themselves as ‘not belonging’ to Maker Culture. For example, Nesryn,⁶⁸ who classified themselves as a ‘newcomer’ to Maker Culture, relied on hegemonic Maker symbols when describing Maker Faire Ottawa⁶⁹—an event they had “heard of” but never attended—saying: “yeah, so, I think of that as being more hackers, and I know there are robots and it’s got more of a tech edge to it” (Ottawa, 14 November 2018). Given that Maker Faire’s branding and merchandise heavily relies on using images of ‘Makey’ The Maker Faire Robot, and other science and technology imagery (see Illustrations 5 and 9), it is not too surprising that Nesryn views Maker Faire—and, by extension Maker Culture—as having a more “tech edge”. They continued to say that, as someone who mostly creates canvas paintings and prints, they “probably wouldn’t table there” (Ottawa, 14 November 2018) because they saw themselves as outside of Making’s ‘techy’ purview.

⁶⁸ Note: Nesryn self-identifies as non-binary and uses they/them pronouns.

⁶⁹ Note: Maker Faire Ottawa is a Maker Media Inc. sponsored event.

Illustration 9: A Collection of Maker Faire Ottawa Promotional Material⁷⁰



Cam, a makerspace organizer in Ottawa, also relied on the same hegemonic symbolism when she told me that her makerspace is not your “traditional makerspace”, saying: “we still have *some* tech in this space, but we have definitely taken a shift to more of a ... it’s almost like a ... we like to refer to it as ‘the other start-up’. It’s more of a *craft* maker than a tech focus” (Ottawa, 2 October 2017). When I asked Cam to elaborate on what she meant by ‘craft maker’, she explained:

So, to me, it’s working without ... I mean, a lot of people in here they work with wood and there is a lot of carpentry. There’s a lot of DIY. There’s a lot of up-cycling. We have people who work with leather, and do more like ... *design*

⁷⁰ Note: All images are from Maker Faire Ottawa’s Facebook page (<https://www.facebook.com/MakerFaireOttawa/>).

focused stuff, you know? Yeah, yeah definitely like, we do have *some* of the quintessential makerspace equipment, like a CNC machine, lasers, 3D printers. But the *way* they are used is just a little bit different, especially with the CNC machines and lasers. They are used for more, kind of like, local business projects. And, kind of crafting *product* projects, you know? (Ottawa, 2 October 2017).

Maddie also referred to this same hegemonic symbolism and elaborated that these technologies are vital in forming Maker communities, stating: “Maker Culture is mostly about the community surrounding, I guess, ‘Maker’ [used air quotes] technology. Maker Culture tends to be very open and welcoming to lots of different people from different backgrounds who use all sorts of tech and things. And it *does* get segregated sometimes with like hard tech versus the more crafty things” (Ottawa, 7 February 2019). Nesryn, Cam, and Maddie’s comments illustrate what I refer to as *self-alienation boundary-work*. While no one has explicitly excluded these makers or their making practices from Maker Culture, the pervasiveness of hegemonic Maker Culture symbols—specifically high-tech ‘Maker’ technologies, like robots—act as *perceived* boundaries around what Maker Culture is and who can engage in it. This means that although the rhetoric of Making encompasses all kinds of crafting and making practices, the ‘high tech’ symbolism of Maker Culture produces exclusionary boundaries for people like Nesryn who does not identify as a technology enthusiast.

However, self-alienation boundary-work does not only appear at an individual-level. For example, during our conversation, Nesryn highlighted that this ‘high-tech’ symbolism of Maker Culture reproduces wider societal stereotypes regarding gender, race, and technology, saying:

I guess this is almost a bigger societal thing. Like, tech = masculinity. It sucks but that’s kind of how it is. And it’s not *true*. Like, obviously it is open to anyone. But it’s *gendered*, right? And it’s not that women *can’t* participate or can’t do it—or

people of colour—but it’s just there’s no draw and it’s not made available to them or it takes too much effort” (Ottawa, 14 November 2018).

Luce told me that her feminist technology workshops were mostly attended by women, trans*, and/or queer individuals that have adopted a “mental paradigm” (Montréal, 10 October 2017) that constantly tells people that “women and technology just don’t go together. That we’re scared of technology. That we’re unengaged. And it’s *not* true. We engage constantly, but differently!” (Montréal, 10 October 2017). These comments from Nesryn and Luce echo findings from an extensive body of academic feminist literature that has well established that women and girls are dramatically under-represented as both students and experts of science and technology (e.g., Harding, 1991; Wajcman, 1991, 2013; Turkle, 1995; Plant, 1997; Faulkner, 2001; Adam, 2004, 2005; Nagle, 2013; Toupin, 2013, 2014; Fox et al. 2015a, 2015b; Tanczer, 2015). Numerous recent reports from Statistics Canada confirms that Canadian women⁷¹ are under-represented in Canadian STEM education and industries (Hango, 2013; Dionne-Simard, Galarneau, & LaRochelle-Cote, 2016; Ferguson, 2016; Statistics Canada 2017; Wall, 2019). This data points to the uneven distribution of women in STEM classrooms and workplaces, which Katherine Wall refers to as “leaks in the STEM pipeline” (p. 2). For example, in 2016, women held 34% of STEM undergraduate degrees in Canada, but only accounted for 23% of the STEM workforce. A 2017 Statistics Canada *Census in Brief* report found that young men who hold a STEM undergraduate degree were twice as likely to work in a

⁷¹ Gender is not defined in these studies. However, the data for many of these studies are from various government-issued surveys, such as the Canadian Census and the Postsecondary Student Information System. Typically, ‘gender’ in these surveys is expressed with ‘Male’ or ‘Female’ self-identification checkboxes. Occasionally, ‘Other’ appears as an option, but it is unclear how these populations are factored into the reports listed here. As such, ‘women’ as expressed in these reports include self-identifying women/female identities. It is assumed by this researcher that gender queer or other non-binary expressions are not included in these numbers.

STEM occupation compared to young women who held the same degree. Additionally, while women and girls are generally under-represented throughout the STEM ‘pipeline’, Wall found that as women and girls progressed through their education, their representation sharply declines. As such, girls and boys tend to be more equally represented in elementary school STEM classrooms, but this equality steadily decreases as girls enter secondary school, throughout postsecondary and graduate degree programs, with the final drop off occurring at industry levels. Wall’s report also confirms that women’s representation varies depending on subject areas, with math, computer science, and engineering attracting and retaining more men than women. On the other hand, women tend to fare better in the ‘life sciences’, and as such are the majority of degree holders in biological science disciplines. Yet, the 2017 Statistics Canada *Census in Brief* report found that graduates from biological science disciplines were less likely to work in this field (with ‘nursing’ being a notable exception). Furthermore, those that do work in this area tend to be paid less than workers in other scientific fields. This lack of synergy between life science degrees and occupations may have something to do with Canadian job market trends. As noted by Wall, occupations that are in-demand and the highest-paying in Canada are engineering and computer science concentrated.

However, when race⁷² is accounted for, in comparison to other sectors, visible minority women fare much better in STEM education and industries in Canada (Hudon, 2016). According to Tamara Hudon’s report, in 2016 visible minority women accounted for “31.9% of women with postsecondary credentials in mathematics, and computer and

⁷² Here ‘race’ refers to ‘visible minority’ status, which is defined as “persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in colour” (Hudon, 3 March 2016, p. 3).

information sciences; and 31.1% of women with postsecondary credentials in architecture, engineering and related technologies” (Hudon, 2016, p. 22). In comparison, visible minority women only accounted for almost 12% of women who studied personal, protective and transportation services, and roughly 13% in education. Furthermore, Hudon reports that in 2016 visible minority women in Canada are more likely than other women to work in male-dominated occupations, including manufacturing and utilities—6% of visible minority women versus 2.3% of non-visible minority women—and natural and applied sciences (5.3% of visible minority women compared to 3.6% of non-visible minority women) (Hudon, 2016, p. 27). These figures suggest that, like other STEM areas, Maker Culture and makerspaces in Canada may be male dominated, but women, especially visible minority women, *should* be noticeably present.

However, the lack of diversity within Maker Culture emerged as a problem within Canadian makerspaces as well. Throughout my conversations with Canadian feminist makers, a recurring experience expressed was that Maker Culture and makerspaces were ‘boys clubs’. For example, Jo mentioned the lack of diversity in Maker Culture, telling me: “one thing that I think I’ve seen a lot and struggled with a lot in Maker Culture is that it is *really* White and it’s *really* male” (Toronto, 26 July 2017). Maddie, whose makerspace is located within a university, also acknowledged that diversity was an issue: “there’s definitely a majority of White males here. And, I want to say that that’s attributed to the fact that in Engineering that’s what the majority is. So, since we are in the Faculty of Engineering it would be the same type of percentage of people” (Ottawa, 7 February 2019). And, Luce also described makerspaces and hacker events as male dominated spaces, telling me that at crypto-parties “most of the people that were there

were men. And White men. Very few were women, very few were people of colour” (Montréal, 10 October 2017). Luce continued to tell me that her previous makerspace in Montréal had very few core women members, disclosing that at one point the space only had one female member. These experiences are consistent with academic research on hackerspace/makerspace demographics. For example, in conducting research for her book *Hackerspaces: Making the Maker Movement* (2017), Sarah R. Davies writes that “there were plenty of instances when I was the only woman present” (p. 94).

Sophie Toupin (2013) maintains: “hackerspaces are generally dominated by (White) men, where a particular ‘dudecore’ culture might be explicitly or implicitly foregrounded” (np). According to Toupin, this ‘dudecore culture’ produces an uncomfortable and at times hostile space for “women, queers and people of colour, demographics that are often largely missing from hackerspaces” (np).

Furthermore, Toupin argues that in hackerspaces, “feminists have found it particularly hard to discuss issues of privileges (such as sexism, patriarchy and racism)” (np) because they often encounter resistance and defensiveness from hacker men. Davies (2017) also notes that when she asked hackerspace members to reflect on the composition and culture of their space, she encountered a level of discomfort from her interviewees.

She writes:

[t]hey simply didn’t understand, often, how the space or the behaviors [sic] of those in it could be construed as unwelcoming or intimidating. Sometimes, there was a sense that those from under-represented groups—women, queer people, people of color [sic]—needed to step up and get involved [...] in order to change the culture themselves.” (2017, p. 94).

Liz Henry, co-creator of the U.S. feminist hackerspace Double Union, also expressed frustration with this attitude, referring to this post she saw on *hackerspace.org* as a prime

example: “If a hackerspace has one female and she wants more females in the hackerspace, then she should start a campaign to find more females. It could be that she host a class about e-textiles or whatever it is females like to talk about” (quoted in Henry, 2014, np). Jo echoed this exact same experience when she told me:

I think there’s also kind of ‘nerdy men’ who’ve, you know, struggled against not having a very high social standing in their lives and just not seeing privilege in their own lives. So, they think it’s stupid to ... they just think that [privilege is] a stupid concept and they don’t agree with it. [...] And people don’t necessarily see [this lack of diversity] as a problem because, well, anyone is welcome. But I think seeing people like you around has a lot to do with whether or not you want to stick around (Toronto, 26 July 2017).

Therefore, while the high-tech symbolism of hegemonic Maker Culture sends implicit messages for who can be (and should be) a Maker, it is important to acknowledge that there are more explicit actions that also drive women/femme, BIPOC, and queer makers from makerspaces. Therefore, non-hegemonic makers view hegemonic representations of Maker Culture symbolism as contributing to this larger exclusionary relationship between race, gender, and technology. As such, some Canadian feminists informed me that they *intentionally* maintain boundaries between Making and their own work, which in the next section I refer to as *strategic distancing boundary-work*.

3.3.2 “That’s not really a term to me”: Strategic Distancing Boundary-Work

My conversations with Canadian feminist makers affirmed that Maker, hacker, and crafter were highly contested terms. For example, when I asked Becky if feminist making falls somewhere in-between making and hacking, she replied, “That’s not really a term to me” (Toronto, 26 July 2017). She continued to explain that, for her: “feminist making is just an expansion of already established femme circles. [...] [And], it’s just sort of ... not weighing into this corporate identity to create something that was not there. It’s

sort of rejecting that because it was already there” (Toronto, 26 July 2017). Therefore, when I had asked Becky about feminist making, she interpreted my question as feminist *Making*. Later, Becky returns to this point, telling me: “and I think that’s the same when a lot of people sort of talk about, like, making ‘*new*’ makerspaces. Well, I mean, all of these things were already happening, people were already doing this. They just decided to not do it *your* way, because your way is kind of misogynistic and shitty” (Toronto, 26 July 2017). However, when I asked Nesryn what feminist making meant to them, they referred to broad digital maker cultures, telling me:

I think of maker with a ‘little m’, and I think of crafters and people at [the feminist event we met at]. *That* is what I think of. And it’s just like what we talked about in the beginning. It is *not new*. I’ve been ... even though I’ve been working on my own my whole life, I’ve always known there was a community of makers. I mean ever since the Internet I’ve always been going on blogs and websites to learn how to make things. And it’s always, well, it’s *usually women*. And they don’t call themselves ‘Makers’ maybe, but that’s the word that I would associate them with because it was broad. They aren’t just artists or crafters, right? Yeah, it is just *super* frustrating that [Makers are] taking a word that was used for something else. Is that just me? (Ottawa, 14 November 2018).

However, in contradiction to Becky and Nesryn, Jo told me that Maker Culture does *represent* itself as political and that, for her, this quality separates it from crafting and other making:

I mean, in a way, it’s mostly a semantic difference. But I think the ‘Maker Culture’ [her inflection here implied air quotes] thing is pretty different. Like, you know, most people who would identify as crafters I think largely work from private studios or their home, you know, maybe in like small collectives. But Maker Culture is definitely more about collaborating out in public and ... there’s sort of this revolutionary tact it takes” (Toronto, 26 July 2017).

So, for Jo, while the differences between crafting and Making *practices* are mostly “semantic differences”, on an *ideological* level, for her, crafting is more about personal satisfaction where Making is more grandiose and performative. However, while Jo admitted that while the revolutionary language underlying Maker Culture originally

seduced her into joining a makerspace and attending Maker Faires all around the world, over the years she has become “pretty jaded” (Toronto, 26 July 2017) about the revolutionary potential of Maker Culture. As such, while Jo separates crafting from Making, she does so more to separate crafting from the personal jadedness she feels toward hegemonic Maker Culture.

Furthermore, while Becky told me that feminism is more closely related to hacking and crafting, due to their anti-corporate and anti-establishment politics, in my conversation with Luce, she told me that the term ‘hacker’, is problematic in some feminist circles:

Me: So, you said that you identify more as a hacker than a maker, so for you, what’s the biggest difference there?

Luce: Yeah, uhmmmm ... [pauses to think] ... that’s a good question. I actually, like [in my experience being in hackerspaces] and feminist and hacker culture, I was fully aware that there were strong feelings against the ‘hacker’ term among many women/feminists that were involved, particularly in the security industry or work. And so, for *them*, they *refused* to be identified as a ‘hacker’ because, for them, that was ... this term was associated with a culture that they wanted nothing to do with. For them, it was important to be called a ‘maker’ or a ‘tinkerer’.

Therefore, while in Chapter One I argued that diverse DIY *practices*—such as making, crafting, and hacking—have historically overlapped with activism, in forming DIY communities—e.g., makerspaces, hackerspaces, co-labs—these practices transform into more rigid *identities*. As explained by Debbie Chachra, rather than being “someone who makes things” (2015, np), hegemonic discourses create Makers. But, as demonstrated by my conversations with Luce, Jo, Becky, and Nesryn, this same identity work is happening with ‘Hackers’ and ‘Crafters’. Therefore, one key challenge for feminist maker discourse is to untangle these diverse practices from these more rigid identities.

3.4 Conclusion: Breaking Down Boundaries

In this chapter, my aim was to substantiate the entanglements between boundary-work, boundary objects, social representation, and identity theories by examining the symbolic and rhetorical boundaries of ‘Making’. I discovered that specific hegemonic representations—such as those produced by Maker Media Inc.—resonate more strongly with specific groups of people (e.g., White, educated, affluent cis-men). As such, ‘Makers’ are those who identify with the hegemonic symbols and rhetoric of Maker Culture. However, these hegemonic representations also serve as boundary objects that allow non-hegemonic makers to communicate across *and* against these ‘Maker’ boundaries, through two boundary-work processes that I referred to as *self-alienation* and *strategic distancing*. Through these two processes, Canadian feminist makers that I met with mobilized stereotypical images of Making. For example, some feminist makers used the ‘high-tech symbolism’ commonly associated with Making—such as robots and computing—to explain to me why they ‘didn’t belong’ to Maker Culture. I referred to this practice as *self-alienating boundary-work* and demonstrated how this form of boundary-work connects to STEM’s long history of excluding certain knowledges and practices based on gender and race. Another, more intentional, form of boundary-work that I found in my research was what I termed *strategic distancing boundary-work*, where rhetorical signifiers of Maker Culture—including Maker, hacker, and crafter—were heavily debated within Canadian feminist maker communities. As such, Canadian feminist makers tended to rhetorically demarcate their making practices—e.g., referring to “little m” making, or promoting hacking and crafting instead of Making—in an effort

to further solidify the boundaries between hegemonic and non-hegemonic accounts of Maker Culture.

Although these hegemonic and non-hegemonic accounts of Maker Culture both produce boundary-work, in some cases, my participants told me that it is important that we work towards breaking down or blurring these boundaries. For example, Luce, told me about the tensions that emerge for feminists who feel trapped between multiple DIY cultures—in her case, making and hacking—saying:

For *me*, uhmmm ... it's ... I ...[sighs] like even though I am saying that at one point I was more identifying as a hacker, I think it's just because I was in a community where the term was used. So, it was not necessarily ... uhmmm ... I don't necessarily have a *preference*, and I think that's why I like that we use 'maker', 'hacker', 'tinkerer', and like maybe other terms in kind of one ... [makes a 'you know' hand gesture] ...

Me: Package?

Luce: Package! Yes. Because then it gives room for different identities. So that's ... so I don't want to try and distinguish too much between these terms, and I'm not sure I *can*, either. Because there are so many similarities. So, sometimes it's more a preference, a choice, because a word has an association with something (Montréal, 10 October 2017).

In my conversation with Maddie, she also discussed this conflict, which for her was between Making and crafting, telling me “it *does* get segregated sometimes with like ‘hard tech’ versus the more ‘crafty’ things” (Ottawa, 7 February 2019). At the time of meeting Maddie, she was a graduate student in the Faculty of Engineering. Interestingly, when I asked her what kind of things she likes to make, she told me: “the more I guess *personal* stuff I do is I like to crochet little stuffed animals” (Ottawa, 7 February 2019). After I responded that I found it refreshing that she was not making a distinction between making and crafting, Maddie exclaimed: “it's the same!” (Ottawa, 7 February 2019). Therefore, while distinguishing between Maker, hacker, and crafter emerged as salient in

both hegemonic and non-hegemonic understandings of Maker Culture, for many of my participants *feminist making* was defined as a practice, rather than through rigid identities. For example, Gabriela told me that: “I think it’s something that ... I don’t necessarily think that I *am*, but something that I *practice*” (Montréal, 25 October 2017). Jo echoed this quality by saying: “I think it’s kind of in the bones of what we do” (Toronto, 26 July 2017). And Luce told me that we must “change the narrative about what [these terms mean], or what engaging with technology is” (Montréal, 10 October 2017). Therefore, rather than viewing feminism as a *label* for makers, makerspaces, or maker events, many of the feminist makers I met with preferred to see feminist making as a *set of approaches*.

As such, throughout this research I have discovered that Maker Culture discourses are simultaneously stratified and contested (boundary-work) *and* negotiated, adapted, and shared (boundary objects). These contradictions also appear in Maker Culture work/labour structures (Chapter Four) and feminist community-building (Chapter Five). Therefore, within hegemonic and non-hegemonic discourse communities, ‘Making’ serves as a *contested boundary object* that simultaneously facilitates and prevents cross-network (what I refer to as ‘Maker Culture’) interaction and communication. As such, despite their limited use outside of STS, boundary-work and boundary objects help us to uncover and better understand the *communicative* complexities underlying subculture networks, like Maker Culture.

Chapter Four

Making It Work: Exposing Structural Privileges Through Invisible Work/Labour Structures

In Chapter Three, I demonstrated that through symbolic and rhetorical boundary-work, hegemonic Maker Culture discourses produce a White, affluent, cis-male Maker profile. This profile also appears in hegemonic Maker Culture discourses through Maker ‘success stories’. Typically, these narratives are delivered as linear progression stories, which begin with an individual discovering a new passion for Making that ultimately turns into a profitable business, or otherwise rewarding lifestyle. For example, in *Makers* (2012), Chris Anderson uses stories of successful Makers to affirm his position that Maker Culture will foster another Industrial Revolution. David Lang published his own successes as a Maker entrepreneur into a book (*Zero to Maker*, 2013).⁷³ John Baichtal also wrote a book (*Maker Pro*, 2014) filled with essays from successful Makers who shifted their making from a hobby to a profession—which, in some cases resulted in the formation of multi-million-dollar companies. In *The Maker Movement Manifesto* (2014), Mark Hatch also provides numerous examples of multi-million-dollar ideas to demonstrate that Maker Culture is imperative because it is “[l]owering the bar to entrepreneurialism [which] is the most liberating, democratizing, and just thing that can be done for those who are creative, bold, and daring enough to trust their talents and try” (Hatch, 2014, p. 110). Sarah R. Davies (2017) refers to these stories as “existing success

⁷³ His OpenROV Trident underwater drone raised \$815,000 (USD) on Kickstarter in 2018 (see: OpenROV Trident—An Underwater Drone for Everyone [<https://www.kickstarter.com/projects/openrov/openrov-trident-an-underwater-drone-for-everyone>]).

narratives” (p. 6), which work to encapsulate the “intense excitement about the potential of making and hacking” (p. 7). In other words, these Maker success stories present an idealized hegemonic narrative where creative problem-solving, innovative business strategies, and “the love of making” (Gauntlett, in Baichtal, 2014, Chapter 14), combine as key drivers for all Makers. As such, ‘traditional’ full-time work structures⁷⁴ are often viewed as impediments to Maker success (Baichtal, 2014).

But, as I sat with Luce in a quiet park in Montréal, she informed me that while she was *so* happy that her feminist encryption workshops were well received in the community—referring to this success as “a gift”—in the next breath she acknowledged that sometimes *maintaining* this success becomes “a burden”:

People are asking me to give *more*. So, it’s great to know that [people are liking my workshops]. But I need to keep updating myself. Constantly. Which sometimes, you know, [the technology] is changing every day. So sometimes it’s a ... it’s a ... a burden. And even though my [research] is on encryption, like, I’m not ... I’m not *that* interested in *all* these things that happen with regards to encryption. Like, the [surrounding discussion and controversies on] Facebook or Twitter. But, I need to [know about it], whenever I organize a workshop. So sometimes it’s a bit ... you know, it’s a bit *heavy* (Montreal, 10 October 2017).

Luce was not the only feminist maker who referred to their success as simultaneously ‘a gift’ and ‘a burden’. In fact, *all* of the Canadian feminist makers I met with unanimously expressed having conflicting feelings: while they all *love* making and makerspaces, they also felt frustrated at times by the *work*—paid making activities⁷⁵—and *labour*—on-going, reproductive efforts that maintain a space and community—these activities

⁷⁴ Working a 9-5 full-time office job, where you are only completing tasks as directed by your employer, is a common example of a ‘traditional’ work structure.

⁷⁵ Although the ‘physical work’ that goes into making objects has also been studied (e.g., Toombs et al., 2015; Davies, 2017; Jungnickel, 2018), my participants did not comment on the impact of this type of work.

required. For example, for the professional⁷⁶ feminist makers I met with, making-for-profit required striking a balance between love and money, telling me that they have to be strategic in building their inventory, which is not always filled with things they ‘love’ to make. On the other hand, feminist makers who were organizers of maker events and/or makerspaces simultaneously expressed their love for their makerspace community while also describing the high personal price of community-building ‘care work’, with an emphasis on its emotional labour.

These shared tensions between ‘love’ and ‘work/labour’ expressed by both professional makers and makerspace/maker event organizers led me to question how *invisible structural privileges*, which allow White, affluent, cis-male Makers to frame their work/labour as ‘love’, impact the work/labour structures of non-hegemonic maker cultures? In this chapter, I explore this question further by examining three overlapping work/labour layers found in Maker Culture discourses: 1) freedom through ‘passionate work’; 2) the logics of neoliberal entrepreneurialism; and 3) privilege and invisible labours in community-building. Although I examine each layer individually, I conclude that taken together these layers expose the complex and contradictory juggling act non-hegemonic makers and their communities perform to manage their conflicting feelings, including exhaustion, frustration, pleasure, and love.

⁷⁶ Here, when I refer to a ‘professional’ maker, I mean someone who has the intention to make profit from the objects or communities they create.

4.1 Making a Living: Pursuing Freedom and Finding Your Passion

Dividing and classifying the wide array of human activities or occupations into clear dichotomies is not a new concept. Common divisions that can be traced back to ancient times include work/labour, public/private, productive/unproductive, skilled/unskilled, visible/invisible, paid/unpaid, amongst others (Arendt, 1958). On the surface, it would seem logical that, like other dichotomies, these divisions also complement one another; so, activities defined as *work* are those that are also performed in public, and are productive, skilled, visible, paid activities. On the other hand, activities understood as *labour* are performed privately, are unproductive, unskilled, invisible, and unpaid tasks. Following this logic, one could conclude that *work* activities are all occupations associated with ‘making a living’, where profits are the main motivator of workers; on the other hand, *labourers* are focused on reproductive tasks that allow others to work, such as securing the necessities of life required by working bodies.

However, in *The Human Condition* (1958), Hannah Arendt argues that while these simple divisions were more relevant in ancient civilizations, in the modern era, work and labour activities have collapsed into one another, so that we now have a labouring workforce and a working labour force. Authors whose work focuses on creative industries, such as Michael Denning (1996), Bridget Conor, Rosalind Gill, and Stephanie Taylor (2015), Angela McRobbie (2016), and Brooke Erin Duffy (2017), demonstrate that contemporary work/labour practices in creative industries are complex hybrids of these previous dichotomies. However, within the creative industries, this entanglement of work/labour divisions is often rendered invisible by the notion that creative workers are internally motivated to ‘do what they love’. As such, the drudgery

associated with work, such as the ‘daily grind’ of working for others, is often viewed as detached from cultural work. The result is an idealized image of the ‘creative worker’ as someone who is *free* to pursue what they want, when they want to. Therefore, the effort, time, and difficulty that goes into creative labour, and the emotional toll it takes, is overshadowed by idealist discourses that shape the ‘creative lifestyle’.

Maker Culture, a world dedicated to fostering self-directed creative innovators, is not outside the purview of this ‘creative lifestyle’. When considering Making on a professional level—where the intention is to earn a living by selling what you Make—hegemonic Maker Culture tends to espouse a rather romantic image of the professional Maker as someone who has been freed from the shackles of ‘traditional’ employment so they can ‘do what they love’. For example, John Baichtal (2014) wrote an entire book (*Maker Pro*) capturing the stories of numerous professional Makers who left their previous employment to pursue Making full time. In one chapter, he interviews a Maker who quit his city job to move out to the country and start a farm, concluding that “this farm gives you the *freedom* to do the things that you *want to do* without having to be *slaving away* at jobs all the time” (emphasis mine, Chapter 13). Freedom also appears in an essay by Wendy Tremayne, where she explained that “Marissa’s freedom, like my own, is linked to an ever-shifting strategy that provides the little income a homesteader needs. We agreed that *reducing one’s cost of living is the first step to freedom*” (emphasis mine, Chapter 1). When taken together, many of the essays found in *Maker Pro* share an ‘existing success story’ pathway in common: Makers give up a stressful high-paying job and downsize their lifestyle, all to make enough money to get by while enjoying the freedom of developing their own work styles. Therefore, although each of these

successful professional Makers have different backgrounds and motivations, they all produce a shared hegemonic discourse that views the ‘Maker lifestyle’ as a more liberating and desirable way of living.

However, if you dive deeper into these *Maker Pro* stories, it becomes obvious that this pathway is not open to everyone in the same way. For example, both Wendy Tremayne and Mitch Altman disclose that they had large savings before quitting their full-time jobs. Mitch Altman claims that he saved up to a year’s expenses before quitting his job to start Noisebridge—one of America’s first hackerspaces (in Baichtal, 2014, Chapter 11). Tremayne disclosed that both she and her husband had high-paying jobs in New York City before selling everything and moving to a small, refurbished trailer in New Mexico (in Baichtal, 2014, Chapter 1). In all these accounts, it is clear that these individuals were in a position of class privilege, where they felt financially secure, albeit miserable, with large savings, assets, and connections that allowed them the freedom to leave their job by choice. Even in the introduction of *Maker Pro*, Baichtal suggests that this choice is inevitable for all Makers, stating: “[t]hen you *decide* to quit and become a Maker Pro” (emphasis mine; 2014, Introduction). In Chapter Three, I demonstrated that Makers tend to have a high annual household income (over \$100,000 USD/year). So, it is likely that the audience for this book sees themselves reflected in these *Maker Pro* narratives. As such, these essays leave the impression that, at some point, a Maker must choose between traditional paid employment or being a Maker professionally. As concluded by Mitch Altman:

[p]lease know that it is an option to make a living doing what you love. It really is. There are other options, of course. You can, if you like, make a living doing what you don’t like. A lot of people seem to choose this option. I’m not really

sure why. You can even, if you like, make a living doing what you hate. Many people actually choose this option (in Baichtal, 2014, Chapter 11).

But, nowhere in his essay does Altman acknowledge that what some people love to do can be done in a traditional workplace. Or, for others, the stability and benefits offered by traditional workplaces outweigh the risks of entrepreneurialism and self-employment. As such, within Maker Culture, traditional employment and Making professionally are on the opposite sides of the same coin. On the Maker side of the coin, people will find happiness and meaning in the work they do. On the traditional employment side, people will find a salary, but along with it comes drudgery, dissatisfaction, and stress.

This romantic notion of freeing yourself from permanent traditional employment to pursue what you love may seem antithetical to the notion of work as ‘making money’. For example, David Gauntlett explains that Makers are not “usually doing it for qualifications, status, or money—making stuff is not normally the quickest route to these things” (in Baichtal, 2014, Chapter 14). Tim Christiaens (2019) explains that since working in creative industries alone are unlikely to bring *most* people financial success, creative industry workers must employ a different cost/benefit system than the typical worker. He maintains that fundamental to this revised cost/benefit system is the added value of *joy*, arguing that “the joys of creative work exceed the costs of permanent insecurity” (Christiaens, 2019, p. 4). In her book, *Be Creative* (2016), Angela McRobbie argues that the creative industries are touted as sites to engage in “passionate work” (p. 36)—precarious and uncertain working environments where the primary reward is not traditional economic security and compensation, but rather the “personal reward of ‘being creative’” (2016; p. 36). Sarah R. Davies maintains that while Maker Culture touts noble ideals of revolution and emancipation, making things with your hands is also pleasurable.

She writes that there is “something joyful” (2017, p. 25) about overcoming the struggles associated with DIY making—whether that be working with challenging materials, having your solder not melt properly, or stretching out that familiar stiffness in your hands from crocheting.

In many ways, the freedom that working for oneself provides is viewed as a major benefit to creative work. Stephanie Taylor (2015) argues that this image of self-employment as ‘freeing’ is especially appealing for people who are employed but unsatisfied, and for the unemployed who cannot find steady paid work. Therefore, encouraging people to work for themselves is presented as a viable career pathway for people to either improve their financial situation or to resolve personal feelings of dissatisfaction or unhappiness. Taylor contends that what makes these notions of self-employment so appealing is that they seem to make sense. However, Taylor challenges this idealistic picture of self-employment by reminding her readers that, in the United Kingdom, on average the self-employed earn forty percent less than those employed by others. Within the Canadian context, according to Statistics Canada (2021), in 2019 the median after-tax income of Canadians was \$62,900.⁷⁷ By comparison, in 2020 the median income of unincorporated, self-employed individuals, with no additional reported income,⁷⁸ was \$45,000.⁷⁹ Taylor (2015) writes that self-employed people may have lower take-home income in part because of reduced working hours, but also because the effects of a recessive economy impact the earnings of the self-employed faster than those who

⁷⁷This figure encapsulates the earnings of both Canadian economic families and unattached individuals.

⁷⁸ This means that the self-employed person did not report T4 earnings during the same income tax period.

⁷⁹Statistics Canada notes that self-employed individuals with negative incomes are excluded from these calculations.

are not self-employed. Indeed, as demonstrated by the economic downturn related to the COVID-19 pandemic, many self-employed Canadians have been severely impacted, resulting in dire and sustained financial strain (Jeon & Ostrovsky, 2020). Additionally, self-employed workers are less likely to be contributing to a pension plan or health benefits. Indeed, as reported by Sung-Hee Jeon and Yuri Ostrovsky (2020), since self-employed Canadians are technically ‘unemployed’, they are ineligible for unemployment ‘cushion’ benefits, like the EI program.

Furthermore, Taylor (2015) points out that in many cases, the division between the self-employed and the employed is not a polar relationship. In fact, there are increasing numbers of self-employed people who *also* hold part-time or contract positions in traditional paid workplaces to offset the economic struggles of self-employment alone. Indeed, according to Jeon and Ostrovsky (2020), almost 46% of Canadian tax filers who reported self-employment income in 2020, also reported T4 earnings (wages and salaries earned by an employer). As such, Taylor concludes that “people working for themselves are not the potential drivers of future prosperity but are marginalized figures excluded from it” (2015, p. 185).

While *Maker Pro* largely presents Making using idealized self-employment discourses, there are a few stories that acknowledge the potential risks of financial instability associated with professional Making. For example, Rob Klingberg stated that he is uncertain if his Making alone can sustain his family of five without the help of his and his wife’s full-time jobs (in Baichtal, 2014, Chapter 7). In her essay, Sophi Kravitz was flabbergasted at the notion that someone can save up a whole year’s worth of wages before quitting their job, and that this advice is presented as a viable option for Makers

who want to become professionals. Instead, she writes: “[q]uitting without some kind of income was not going to work for me, and my guess is that it wouldn’t work for you either” (in Baichtal, 2014, Chapter 16). Instead of quitting your day job, Kravitz suggests other pathways that professional Makers can take, that involves blending traditional employment—either part-time or contract work—with professional Making. Whereas many professional Makers seem to chastise those who are “tempted by the lure of money” (Treyman, in Baichtal, 2014, Chapter 1), Kravitz acknowledges that due to the reality of capitalism, people *need* money to support themselves, their families, and their Making.

This need to balance making money with doing what you love also emerged as salient for professional Canadian feminist makers. Jo, Nesryn, and Gabriela were professional feminist makers at the time of our interviews, and each of them referred to the strategy involved when making-for-profit. The key to this strategy involved understanding the ‘business-side’ of creating profitable objects. For example, as I sat with Nesryn in a quiet Ottawa café, I asked them whether the way they approach their artwork has changed since making the decision to pursue art as a career. They replied:

I mean my overlying intention is to make stuff that will sell. But, I definitely ...[sighs]. A big thing I’ve been doing is to work small right now. So, I work with like 8x10, because I want something that will fit on my scanner so I can scan it and make reproductions. Because the prints are what people are most interested in. But my, sort of, *heart’s* desire is to work big. Like, I like big pieces, like 4 feet by ... [spans arms wide apart] ... yeah. So, I am trying to balance that. [...] Usually I have a larger piece that I am doing with the intent of having the original to sell but not for reproduction. And then the small ones are, sort of, more commercial in my mind. Which, I still enjoy doing but they’re ... it’s always considering the re-sale value. [Laughs]. It is so *businessy* and I don’t know anything about that stuff! (Ottawa, 14 November 2018).

Therefore, for Nesryn, becoming a professional maker means producing *profitable* artwork. As such, it is “re-sell value” (Nesryn, Ottawa, 14 November 2018) rather than pleasure that largely dictates Nesryn’s inventory. This need to produce profits also constrains what kind of objects are viewed as worth selling. For example, later in our conversation, Nesryn told me: “[it’s] like my mom with knitting right now. She just likes to do it. And I’m like you should sell them on Etsy! But then I know how long it took her and how much she spent on the wool alone. And she’s like I can’t charge \$500 for this! Especially knitting and crochet are the ones where the time doesn’t add up” (Ottawa, 14 November 2018). Jo also discussed the frustrations she experienced with trying to sell textiles at craft fairs:

I don’t actually do any, like, individual product selling these days. I actually did that a lot in university and I actually find it *really* depressing [sad inflection].

Me: Why?

Jo: [sad hitch in her voice] Because no one ever wants to pay you what your work is worth. (Toronto, 26 July 2017).

Therefore, *crafting* projects—like sewing, knitting, and crochet—are viewed as having more *hidden costs*—e.g., time expenditures—which make them not worth selling. Nesryn admits that this approach to making a living is “so businessy” (Ottawa, 14 November 2018), but a reality to making it as a professional.

Furthermore, this need to generate profits in professional making means that some of their making practices have become ‘work’, whereas others are ‘just for fun’. As explained by Jo:

One challenge with trying to professionalize one’s making practice is it kind of makes it less ... like, less fun *sounds* depressing, but sort of! Like, it’s not really, you know, just a chill thing to do at that point. So, I find now ... [shrugs and trails off].

Me: It becomes work?

Jo: Yeah! I find, like, sewing and electronics related stuff is work. And I've been doing, like, weird multi-media collage painting kind of stuff for fun. And, that's a lot of fun 'cause a lot of times we will get a bunch of people who work here and make some weird junk. [...] Some of these collages [gestures to the eclectic canvases lining the wall] are just, like, collaborative things that we've all just, you know, bought a bunch of snacks, had a bottle of wine, and listened to music and made stuff for the night. So that, yeah, that's a lot of fun! So, I think it's ... yeah, it's a balance. Like *this* [holds up the LED-lined ballerina tutu she is hand stitching during our conversation], is definitely media that I am best at. Like, you know, sewing and wearable tech stuff. But, just because of the nature of it being very work-like, I don't often make wearables for fun (Toronto, 26 July 2017).

In other words, by professionalizing her making, Jo's *affective* relationship with certain making practices has changed. Here Jo raises an interesting point that is not covered in *Maker Pro*: what happens when your passions change? By encouraging their readers to find what they love to Make and make a living doing it, hegemonic Maker Culture discourses present Making as a fixed practice that never grows old or boring over time. But, for Jo, her making practices have changed over the years: where sewing and wearable technology used to be her passion, she has now discovered other making practices that she finds more exciting. However, although Jo acknowledges that sewing and making wearables is less fun than it once was, she also recognizes that being commissioned to produce wearables allows her to buy and use materials that she herself cannot afford: "it's nice to have people pay me to make stuff because then I can buy all the expensive materials!" (Toronto, 26 July 2017). She comments that being able to use expensive materials is something she still finds pleasurable about commission work. As such, Jo told me in our conversation that makers need to find a balance between what they like to make for fun and what they make to sustain a maker lifestyle.

Gabriela also discussed her frustrations with engaging in paid work as a visual artist. For her, the joy of this work comes from creating work that resonates with her audience on an emotional level. However, oftentimes she finds that people want to pay her for ‘flashy’ or ‘cool’ visual projections rather than ones that make you think and feel. She commented that sometimes it is hard to not get caught up in doing these paid installations that do not necessarily bring you joy as a maker:

You can also get caught up in the ‘cool’ parts of tech that’s like, I don’t know, I’m getting offered to do like video projections for parties and stuff. But ... I mean I can also use it in a way that offers a bit more substance that’s not just so flashy. And, yeah, I can make cool projections and stuff. But, like what’s cooler is to *feel* the sensation of expanding yourself [...]. [...] You can get lost and get caught up with where society is pulling you (Montréal, 25 October 2017).

Therefore, for all three of these feminist makers once their making became a source of income, the types of things they made also shifted. And, all three of these feminist makers commented that this shift affected their making practices, as each of them outlined the kind of things they make to sell and the kinds of projects they pursue because it is what makes them happy. Therefore, all three of these professional makers present a more strategic approach to doing what they love, while also making enough money to sustain their practice. Additionally, as explained by Jo, sometimes what you initially loved to do grows tired and turns into the drudgery that you were trying to escape. Yet, this notion that making the same thing over and over again can grow tiresome is not considered in *Maker Pro* or other Maker ‘success narrative’ discourses. Therefore, rather than viewing passionate work as more joyful or less disciplinary than traditional work structures, Nesryn, Jo, and Gabriela’s experiences highlight underlying logics—such as profits—that govern creative workers’ self-conduct. Angela McRobbie (2016) argues that in order for creative work to retain its value as passionate work,

creative industry workers self-monitor and self-regulate how they are viewed as workers, hiding or downplaying any aspects of passionate work that echo the nine to five daily grind of office or routine work. In the next section I connect these underlying tensions of passionate work to the logics of neoliberal entrepreneurialism.

4.2 The Entrepreneurial Maker and the Logics of Neoliberalism

Today, entrepreneurial logics appear in countless contexts, from boardrooms to classrooms, and, as shown by Nesryn, Jo, and Gabriela, even the maker studio. Marnie Holborow states that:

Entrepreneur is an ill-defined concept but an instantly recognizable one [...]. It encapsulates a social imaginary in which individuals are centre stage, wealth is understood in individual terms and wealth-seeking individuals are the role models. *Entrepreneurs* are the social icons of our neoliberal age” (emphasis in original; Holborow, 2015, p. 72).

Wendy Larner (2000) describes neoliberalism as a governance strategy premised upon free market principles, often at the detriment of the welfare state system. For example, fundamental neoliberal beliefs, such as competition, economic efficiency, and individualism drive this entrepreneurial social imaginary. As such, entrepreneurialism serves as an expression of neoliberalism, transforming it into a necessary strategy for people to adopt to meet the demands of dynamic free-market economic structures (Woods, 2013). In this context, entrepreneurialism is typically packaged into a set of idealized individual traits, such as: creativity, self-reliance, self-empowerment, perseverance, and a ‘can-do’ positive attitude (Holborow, 2015). Holborow states that the entrepreneur is “now seen as the benign improver of society and the kind of person we should all aspire to being” (Holborow, 2015, p. 77). As such, entrepreneurialism is not

just relegated to the realms of business and economics, but also is more broadly applied as a source for individual inspiration.

There is a strong overlap between these entrepreneurial logics and hegemonic Maker Culture discourses. Perhaps most obvious is that Maker Culture is often described as entrepreneurial, and Makers are seen as creating new small-scale products, businesses, and practices that are revolutionizing and/or revitalizing global economies (e.g., Anderson, 2012; Hatch 2014; Baichtal, 2014; Dougherty, 2016). For example, throughout his book, *The Maker Movement Manifesto* (2014), Mark Hatch provides numerous success stories of everyday people who ‘make it’ as Makers. One of my personal favourites is Hatch’s story about Tim ‘the roadie’ Jahnigen:

Tim Jahnigen was one of the first entrepreneurs I met at TechShop. [...] I asked Tim about his background. “I’m in the music industry,” he said. “I’m a roadie for Sting, and I produce shows and write music for other musicians.” I was stunned. A self-professed professional roadie working on a medical device? “What is it going to cost you to get to a functional prototype?” I asked. “Actually, I am in short-run production now,” he replied. “And it only cost me three grand to get started. I can afford three grand” (p. 47).

Prior to telling Jahnigen’s story, Hatch explains that, typically, people use disposable income to consume rather than invest, and defines disposable income as “discretionary money otherwise used on lattes, movies, golf, or a vacation” (2014, p. 37). In his book, Hatch encourages his readers to shift how they use their disposable income so they can (and should) prioritize innovation through Making, writing:

this allows people to shift their disposable money into development money. The difference here is that development money might provide a return on investment, it might improve the human condition, it might save lives, increase productivity, even save money such that there is more discretionary income. Disposable money used to go to eat does none of this (2014, p. 37-38).

Therefore, Hatch views Jahnigen as an exemplar Maker, telling his readers: “Tim, the roadie, was able to use his personal ‘disposable income’ to innovate a new medical

device category. [...] [W]hat he did was shift some of his spending, likely from going to see a concert or taking an international flight to catch a rock band performance, and used it to innovate instead” (2014, p. 47). Hatch further explains that Jahnigen’s *choice* to invest in himself was a smart decision: The National Institute of Health uses his medical device around the world!

Crucially, Hatch continues, this success did not stop Tim from innovating further. Next, he worked on developing an indestructible soccer ball that could be sent to children in conflict zones so they can play together despite political, ethnic, or social divides. However, the material required for this soccer ball was quite expensive, and Jahnigen estimated that he needed \$30,000 to develop his product. Here, Hatch uses this roadblock in Jahnigen’s story to tell his readers about the value of (corporate/celebrity) partnerships: “[Jahnigen] described his dilemma to Sting (yes, the musician) over breakfast one day, and Sting agreed to fund the research. Sting’s disposable income is a little larger than most people’s. One World Futbol Project is now on track to distribute 1.5 million soccer balls around the globe with the help of Chevrolet and others” (2014, p. 48). Hatch concludes that, like Jahnigen, we could all do a little better with how we spend our “throwaway income. Frappuccino income, golf, travel, cruise ship money. A little money, time, effort, trial, failure, and then success that changes the world is now within the reach of the middle class” (2014, p. 49). Hatch’s celebration of Tim ‘the roadie’ Jahnigen is not unique. Echoing Hatch’s exultation, other hegemonic Maker Culture discourses, like those from Chris Anderson, John Baichtal, and Dale Dougherty, also claim that Making things with your hands allows for individuals to develop essential skills relevant to successful entrepreneurship, such as innovative thinking, creativity, and problem solving.

Empowerment is another concept that is shared by entrepreneurialism and Maker Culture. Within hegemonic Maker Culture, empowerment is often tied to hands-on, playful, maker pedagogies—also known as ‘tinkering’. Agency by Design, a maker education project from the Harvard Graduate School of Education, refers to these pedagogies when defining *maker empowerment*, describing it as “a sensitivity to the designed dimensions of objects and systems, along with the inclination and capacity to shape one’s world through building, tinkering, re/designing, or hacking” (2015, p. 5). Research on the value of tinkering also frames this practice as a site for empowerment. For example, research by Bronwyn Bevan and her co-authors (2014), and Joshua Gutwill and his colleagues (2015) explored how different ‘tinkering’ displays fostered valuable educational opportunities. Both groups found that these displays facilitated high levels of engagement from museum visitors, thereby enriching their overall experience. Gutwill et al. maintain that tinkering encourages learners to become emotionally invested in what they are doing, which results in the deepening of their interest. In their study they found that tinkering heightened visitors’ excitement, which they claim is fundamental to learning. Furthermore, tinkering displays also encourages initiative and intentionality: people were pursuing their own goals and were empowered to explore their motivations for wanting to learn a specific skill. The authors argue that initiative and intentionality are important to learning because they foster “*intellectual courage*” (emphasis in original, 2015, p. 158), where learners “continue to work and play despite a lack of confidence in their ideas or the skepticism of others toward their approaches” (2015, p. 158). Furthermore, tinkering was found to be beneficial for learning because it created social scaffolding, which encouraged “mutually supportive collaboration” (2015, p. 159).

According to the authors, this social scaffolding meant that people were more comfortable with requesting help and were inspired to try new ideas. Gutwill et al. contend that what is remarkable about tinkering environments is that they allow people with different backgrounds and ideas to work “across problems spaces” (2015, p. 159). This means that people are “helping one another despite having different goals for different creations” (Gutwill et al., 2015, p. 159).

Bevan et al. (2014) also found that tinkering fostered non-hierarchical knowledge communities where “novices, journeymen, and experts work side by side, assist one another, and continually shift roles depending on the task, goals, or tools at hand, throughout processes of investigation and invention” (p. 100). As such, tinkering disrupts traditional teacher/student, or expert/beginner hierarchies by empowering “learners to drive the experience, to conduct their own explorations, [and] draw their own inferences” (Gutwill et al., 2015, p. 164). Therefore, like entrepreneurialism, tinkering is understood as useful because of its ability to empower individuals to conduct their own experiments, pose their own questions, and solve their own problems.

However, many of the feminist makers I met with told me that many of these hands-on tinkering pedagogies were not easily implemented or well executed in makerspaces. For example, Jo told me that, in her experience, although experimental learning is great, it can also cause tool damage and stress:

“[d]espite everyone’s best efforts, it’s hard to have perfect tool use all the time. And I think there are always people who are willing to just try things ... and, trying things is great but it can damage tools. So, that can be stressful. Especially too, if like, you are trying to use that tool for professional stuff while it’s in a public space. Yeah. It can get intense. Yeah, it can get bad if something goes wrong” (Toronto, 26 July 2017).

Additionally, Maddie told me that one of the challenges of teaching a workshop using this kind of pedagogy is that there often is not enough time to learn through hands-on trial and error:

I mean you learn by failing. So, it goes along with Maker Culture too: you just kind of play around with things and try to figure it out. And, if you aren't sure you ask somebody. But, when you are doing a workshop, you typically have an hour and fifteen minutes to do the workshop. So, it's less about 'trial and error' and it's more about getting them to do the steps to complete the activity (Ottawa, 7 February 2019).

Becky also runs technology workshops, typically with children aged 6-10, and told me that she too has faced systematic restraints that prevent her from teaching using a more experimental approach:

So, lots of times, you are told, like "Just say words to them!" [...] like there are some things people specifically want their kids taught or to learn about. [...] [And] the systems of how many people are available to these children are *very* imbalanced in terms of like, how much care you can give to an individual child. 'Cause like, in a perfect world, you can stay with the child for an hour and go through each step until they understand it, no matter how many times it takes. But, like, you *can't* do that. And that's always going to be the disappointing thing about education [...]. You don't get to provide child engagement in that way (Toronto, 26 July 2017).

Luce also had problems with this experimental learning approach, telling me:

[...] at one of the crypto-parties that I went to, [the encryption software] just didn't work. And they were unable ... they didn't have *any* pedagogy. It was like, "Do this, do this, do this" And then, I did this, and this, and this, and it didn't work. And they were like, "Well, too bad. For you, it doesn't work but for others it works." It was just like, "Tough luck. You're on your own" (Montréal, 10 October 2017).

Luce went on to tell me that this led to a few months of her trying to learn encryption on her own, which she emphasized "was *not fun*" (Montréal, 10 October 2017). She told me that the only reason she stuck with it was because she had a vested interest in learning cryptography for her doctoral research. Learning from these negative experiences, Luce told me that she "crafted the type of workshop I wanted to have participated in"

(Montréal, 10 October 2017) that is premised on “Do-It Together” practices: “[...] well, mostly hacking, maybe a little less making, but it’s always about this ‘Do-It-Yourself’ approach. So, *you* can do it *by yourself*. And, yes! You can do it by yourself, lots of people do it that way. But what we try to emphasize is ‘Do-It-Together’, especially when you are ... I am going to say, like, a ‘new-comer’ [used air quotes].” (Montréal, 10 October 2017). Gabriela also told me that much of the learning she does in her makerspace is on her own:

Gabriela: So, [this space] was my mini alternative schooling, so like, when I come here, I still teach myself. [...] I’ve started their Virtual Reality workshop. So, it’s definitely a space where I can grow in a self-taught way.

Me: And so the tutorials are mostly self-taught then? Or, are they more like a workshop where you would work with a group?

Gabriela: No, it’s very individual. Like, it’s just me sitting on a computer. It’s pretty lonely (Montréal, 25 October 2017).

Later in our conversation, Gabriela told me that she wished her space had more collaborative creative flow, stating “I mean, I do see people. But, for the most part we are all doing our own thing” (Montréal, 25 October 2017).

So, while makerspaces are meant to be premised on hands-on experimental pedagogies, in reality, many of the workshops hosted by makerspaces reflect traditional STEM classroom practices, using established ‘tried and true’ methods for creation and design. For example, Maddie, who works in a university-sponsored makerspace, told me that wider social contexts or activism only tends to be discussed in specific workshops, and only at the request of the participants: “Our normal workshops though wouldn’t be talking about any of that. It’s just the tech and that’s it. So, I guess no, that’s not something that is *normally* addressed” (Ottawa, 7 February 2019). Therefore, we can see a central tension underlying Maker Culture politics: their hands-on and experimental

empowerment ideals are being undermined by makerspaces that emphasize technical skill practices and mastery. As such, many of the feminist makers I met with told me that *their* workshops and makerspaces attempt to bridge this gap between ideals and practice. In Chapter Five, I discuss how feminist makers incorporate intersectional feminist reflections on the power of privilege within making while also teaching pragmatic technical skills. In the next section, I examine how structural privileges and invisible work/labour structures within makerspaces further impact these empowerment logics.

4.3 Making Makerspaces: Community-Building, Emotional Labour, and Care Work

While many descriptions of makerspaces tend to focus on the various tools and materials on offer, these maker resources are only part of what these spaces have on offer. Makerspaces are communities, often described as friendly spaces where both established and new makers come together and learn new things from one another. For example, Susan Solarz argues that makerspaces offer a “strong community of support” and it “feels like other members want to see me succeed almost as much as I do” (in Baichtal, 2014, Chapter 6). Solarz continues to say that due to this strong and supportive community, she personally has received hundreds of hours of volunteer help on her project from more than a dozen other members. Yet, as I demonstrated in Chapter Two, in these hegemonic descriptions of makerspaces, rarely do they consider how adult-led makerspaces should be organized. Instead, these discourses privilege ad hoc organizational styles, which forward the assumption that managing makerspaces is an organic, ‘hands-off’ process. However, Sarah R. Davies emphasizes that creating makerspaces takes work, saying: “[t]hey don’t just happen, but are initiated and managed,

often in rather similar ways” (2017, p. 44). In this section, I explore these makerspace work/labour⁸⁰ structures further.

As I sat across from Amelia on the high bar stool of a campus graduate pub, I asked her about her experiences in organizing a large feminist maker event in Ottawa. She told me about the difficulties that she and her co-organizer have in setting boundaries around organizational work, attending graduate school full-time, *and* holding employment:

I thought having a website might help show that we are more doing this in our spare time, while we are eating our breakfast or on our lunch break or between classes. And so, hopefully, that will set healthy expectations too. Because it’s not like the government is paying us \$100,000 to put this event on. Like, no. We are doing this in our spare time. [...] [So,] you also need to let people know where you are at, and why I can’t respond to emails every 6 hours, or instantly. And then, how do you do that in a way that doesn’t offend or upset anyone? I don’t know. It’s a lot. [...] When you are arranging a lot of [organizational] stuff that people aren’t going to see, to them it looks like an event that just pops out of nowhere. And, that the money comes from the sky. And, that we pay ourselves, which we *don’t*. In past years we actually *lost* money personally because we didn’t pay ourselves (Ottawa, 15 November 2018).

As suggested by Amelia’s experiences above, and for many of the other organizers I met with, the work/labour involved in hosting a maker event or running a makerspace can be described as a ‘labour of love’. Throughout our conversation, Amelia emphasized that she organizes her event during her spare time and that she is not paid for the work/labour involved. Therefore, the notion of passionate work does not just apply to professional Makers. It also appears within the broader group context of makerspaces within the context of organizational work. The bulk of this work involves routine chores like

⁸⁰ While in the introduction of this chapter, I distinguished between work (paid activities) and labour (unpaid activities), since some of the makerspace organizers I met with were paid employees of their makerspace and others were volunteers, I use the slash here to represent both of these accounts.

scheduling regular cleaning, welcoming new members, collecting membership fees, and fundraising (Toombs et al., 2015; Davies, 2017). Molly told me that taking over her makerspace's Directorship was a massive undertaking because this routine work was not performed regularly by the former management team: "the space wasn't run well. [...] Like, money problems, and just, like, operational issues. Everything from figuring out how to manage the garbage situation [laughs], which actually was a *massive* challenge, which took over a *year* to solve. You know, to like difficult tenets, to finding our ... kind of groove" (Ottawa, 26 October 2017). In another account, Cam told me that in her makerspace the issue of bathroom cleanliness exposed many underlying sexist assumptions about who should be keeping the space clean. When I asked if people assumed that she would clean the bathroom because she was a woman organizer she replied:

Uh yes! One hundred percent! And because our space is managed by two women, it is ... it's oftentimes just even attempting to have a conversation around [cleanliness] would sometimes turn into having to discipline them, which was often sneered at or met with rolling eyes or a 'Whatever' attitude (Ottawa, 2 October 2017).

However, where Molly and Cam were paid organizers of their makerspace, many other makerspaces are governed through non-hierarchical collective sensibilities, where *all* members are expected to take ownership of the space. As such, it is typical for makerspaces to have very few formal rules or clear divisions of responsibilities (Toombs et al., 2015; Davies, 2017). And while the intention underlying this *lack* of organization is to liberate members, so they can do what they want, when they want to, when difficult decisions or boring maintenance and administrative work needs to be done it is often difficult to find members who will step up and help (Davies, 2017). As one of Davies' research participants aptly commented: "[w]hen it's everyone's responsibility, sometimes

it becomes no one's responsibility" (Davies, 2017, p. 88). Becky echoed this problem, telling me that in makerspaces with a large membership base and open-door policies, it is difficult to relate to the space because you "never really feel like that space is *yours*" (Toronto, 26 July 2017). As such, within makerspaces there is a general expectation that 'someone' will take care of the space, often resulting in the same few people constantly picking up the extra work required to keep a makerspace functional (Davies, 2017).

Therefore, within makerspaces, there is an expectation that things will be "taken care of" (Davies, 2017, p. 88). As Molly and Cam's experiences illustrate, this expectation carries gendered assumptions that can unfairly position women/femmes as makerspace custodians. Furthermore, these routine tasks, like taking out the garbage, cleaning the space, and fundraising, fall under the umbrella of 'care work'. As explained by Cecilia Benoit and Helga Kristín Hallgrímsdóttir, activities that commonly fall under the category of care work "are in some way or other connected with the social reproduction of human beings on a daily and generational basis" (2011, p. 3). However, they also maintain that care work is gendered and that these duties are more often carried out by women and girls in the private sphere (e.g., at home). Additionally, while care work does encompass various physical tasks, such as cooking, cleaning, and disciplining, care work also requires emotional labour. Referring to Arlie Hochschild's (1983) work on paid emotional labour, Benoit and Hallgrímsdóttir explain that emotional labour requires care workers to "manage their own and others' emotions [...] to exaggerate positive feelings towards clients, while suppressing negative ones" (2011, p. 4).

Across my interviews, emotional labour in the form of managing emotions often appeared in tandem with experiences of harassment. In fact, all but one of my participants

(who were involved in a makerspace) told me that she/they had experienced some level of discomfort and/or harassment in a makerspace. For example, Molly told me:

[...] in my experience, and this is truly experiential, this is not just commentary, but like often [this makerspace is] a boys' club. And there's language inside of that that makes me uncomfortable. And I saw that with the [space's director] before. He ran a podcast once, and I almost threw up when I heard it later. It was, like, the most disgusting misogyny ever, and I was like [whispering] 'Never agaaaaain'" (Ottawa, 26 October 2017).

While this incident of misogyny occurred outside of her makerspace and this individual was no longer involved in the community, when I asked Molly whether she had experienced sexism *inside* her makerspace, she replied:

As a female manager? Yes. Often. But it's like, it's so ... ugh! It's so like cliché too, but it's still true. Like, if you're too authoritative you're a bitch. [Laughs]. You know?! I've been told I am too emotional sometimes. Yeah, it happens. A lot. Now less, but ... oh yeah! I've had it all. Oh my God. You name it. Uhhmm, sometimes I'm not taken as seriously. Yeah. A lot. [...] My first year [in this makerspace], that's all I was going up against (Ottawa, October 26, 2017).

These more 'routine' experiences of sexism were echoed by most of my other participants as well. For example, Cam also told me about experiencing routine sexism in her makerspace:

[...] you know, nasty emails and maybe some like online harassment from people who have ... uhhmm ... you know sent some gossip stuff ... uhhmm ... then the basic like interrupting, not listening, eye rolling kind of reactions from some men here [...]. And I have had conversations with a few other women who were working in makerspaces where their experiences have been just *atrocious*, like we are very lucky in this space (Ottawa, 2 October 2017).

Interestingly, Cam considers herself lucky that she *only* experiences annoying or subtle micro-aggression forms of harassment. This comment intersects with wider experiences of 'friendly' or 'benevolent' sexism in the workplace. For example, in an article for *Forbes*, Sian Beilock (2020), a scientist who studies women's performance anxiety, writes that "benevolent sexism undercuts women's status in an organization" (np).

Indeed, research has found that when women receive subtly sexist feedback, they often display physiological fight-or-flight responses that negatively affect women's well-being (Beilock, 2020). Therefore, although more prevalent, subtle forms of sexism—like crude jokes or eye rolls from male colleagues—is often framed as less harmful or malicious compared to more extreme examples of gender-based violence.

Furthermore, due to gender inequality and sexism, Benoit and Hallgrímsdóttir maintain that “over time, caring activities came to be seen less and less as economic and more and more as if they were not work at all” (2011, p. 3). I contend that a similar devaluing applies to domestic and crafting skills, which are often viewed as ‘less impressive’. For example, Jo told me that in her experience of various makerspaces, she’s “really had to fight for credibility as a woman often” telling me that: “I definitely have experienced people ... men people ... seeming to doubt that I know what I’m talking about” (Toronto, 26 July 2017). When I asked her for an example, Jo told me of a time when she was contracted to work with a group of men and there was this ongoing “implicit bias” (Toronto, 26 July 2017) where the men of the group assumed that Jo knew less than they did. As such, Jo told me that this group of men would not listen to her suggestions, would interrupt her, and would step in and take over. This experience echoes Liz Henry’s account of American hackerspaces where women are “treated as intruders or imposters” (Henry, 2014, np). Furthermore, as someone who works with e-textiles, Jo told me that she has also experienced being dismissed in makerspaces because there is the assumption that “knowledge around things like textiles is less complex or valid knowledge” (Toronto, 26 July 2017). Similarly, Liz Henry explains that these practices are gender-coded and men tend to assume that women only care about making something

aesthetically pleasing but inconsequential. For example, e-textiles, the practice of making wearable technology, are often assumed to be women's domain of hacking/making (Henry, 2014). In labeling e-textiles as a practice done by women, Henry claims that this practice is considered trivial (2014). Yet, counter to this assumption that sewing is unskilled or easy, Jo told me: "I've had a few satisfying moments where I see all the CNC mill guys try to sew something and they get so frustrated because they don't understand things like thread tension. But, to them, something about it is just a less technical skill" (Toronto, 26 July 2017). Maddie was a notable exception to these experiences, being one of the only people I interviewed who said she had not personally experienced this kind of sexist behaviour. However, Maddie did tell me that "there are a lot of stereotypes still. And it happens subconsciously too, so even if you don't want to do it, you see people going to men assuming they know things because they are men" (Ottawa, 7 February 2019). In Chapter Six, I explain how interest in sewing and other undervalued 'feminine skills' has been renewed within the context of the global COVID-19 pandemic.

Within the public sphere, care work emerges in 'supportive roles', which largely tend to be held by women. Benoit and Hallgrímsdóttir list health care, teaching, food and retail industries, and social work as examples of careers that require care work and emotional labour. Given the gendered nature of this work—sometimes called women's work—it is not too surprising that these industries tend to be female-dominated. David Hesmondhalgh and Sarah Baker (in Conor et al., 2015) found that creative work is also gendered in a similar fashion. For example, they report that men often work as 'the creatives'—writers, composers, playwrights, directors—or work in technical or craft

jobs, such as camera operators, editors, technicians or road crews. On the other hand, jobs that are more commonly held by women—administrators, managers, planners—are not often considered ‘creative’ but rather supportive roles. As explained by Hesmondhalgh and Baker: “the core of these jobs is to organize and handle the creative outputs of others” (in Conor et al., 2015, p. 28).

Similarly, within my research of Canadian makerspaces, these ‘supporting roles’—which involve organizing, maintaining, and managing the makerspace/event—are mostly held by women/femme folk. In fact, 75% of the feminist makers I interviewed were organizers of at least one makerspace, and all of the non-feminist sites I visited were either primarily organized by women/femme, or they accounted for half of the team. In other words, no spaces that I visited for this research were primarily organized by men or masculine-presenting folks. It is in this organizational role that the terms ‘emotional labour’ and ‘care work’ appeared most often. However, for many of my participants, these two terms applied to different kinds of work/labour. For example, emotional labour was used as a negative term to describe the mental exhaustiveness of managing group conflict or poor behaviour. For example, Jo told me that one of the most stressful things about her former makerspace was their inability to formally deal with disagreements and poor behaviour:

Yeah ... there wasn't a very clear Code of Conduct at [my other makerspace] and there were definitely a few different times when that was a *huge* problem. We ended up trying to implement like an Ombudsman System, where there was an impartial party who would talk things through with people. But, yeah ... there was definitely ... uhmm ... you know, issues of major disagreements, of harassment, but it was never actually very clear how to resolve them. And, whose responsibility that was. [And], especially in a volunteer position, like, it's a *lot* ... It's a lot of emotional labour. It's so stressful! (Toronto, 26 July 2017).

Jo continued to tell me that the emotional toll of being a Board Member for this makerspace resulted in her resignation: “I stepped away from being on the Board after there was a huge fight where the whole Board yelled at each other and cried. It was really bad. [...] Yeah, there were a lot of weird emotions going on, strong personalities clashing, definitely a gender dynamic at play. It was all very bizarre and intense” (Toronto, 26 July 2017). When I asked Jo to elaborate on what she meant by a ‘gender dynamic’ being at play during these heated arguments, she explained that the Board was comprised of three men and three femme/women and at times there were clear sides taken on issues based on gender. She maintains that the emotional toll of dealing with these dynamics resulted in her stepping off the Board and starting her own smaller makerspace.

Becky also mentioned that managing a large makerspace requires significant emotional labour: “it is an exhausting amount of emotional labour to, like, uphold a sort of steady inflow of people coming to be a part of something” (Toronto, 26 July 2017). Becky later explained that for her, this emotional labour element is not unique to makerspaces themselves, but rather is something that happens once a group exceeds a certain number of people. She told me that as these groups grow, the ability to vet new members to ensure they align with the ethos of a community grows exceedingly difficult. The result is a clashing of personalities and/or politics that can make the surrounding makerspace environment tense and unpleasant to work in. Molly told me about a time where she actually had to evict a member from her makerspace, saying: “that was our *toughest* moment. [...] [He just had] a total complete disregard and largely because of that old-fashioned Maker mentality of like, ‘I do what I want when I want’” (Ottawa, 7

February 2019). What is interesting about Jo, Becky and Molly's experiences is that the emotional labour they experience largely stems from problems that arise from hegemonic Maker Culture ideals that emphasize non-hierarchical structures, open doors, and personal freedoms. In my conversation with Samira, she told me that in grassroots organizations, like makerspaces, 'non-hierarchical' or 'collective' approaches are always seen as inherently better than traditional hierarchies. However, in her experience, she has found that at times the work is *harder* and *slower* in collective organizations because you must form a consensus when solving problems or making decisions:

[...] [our] horizontal structure is not the *easiest* to work with, and it's not the fastest and it's not always the most 'productive' [used air quotes], in the sense of getting to a result really fast. [...] [O]ften there is the idea that the *collective* [approach] of people working together [is always egalitarian]. But, often one voice will take over. Like, there can be a very toxic energy within the collective. And, you need to re-invent the tools of working together, like systems of collaboration and exchange within a horizontal structure, in order to make sure everything works well. But, just saying: 'Oh we are a non-hierarchical structure and a collective' doesn't work. Like, it takes *extra work* that you need to be willing to do (Montreal, 25 October 2017).

Therefore, although many of the Maker Culture buzzwords—like, openness, democracy, sharing, and collaboration—are desirable on paper, in practice these ideals present an unclear mandate for operating a makerspace, especially in terms of leadership roles, acceptable behaviours, and consequences. When I asked my participants what they think could help resolve these issues they all provided the same solution: create a clear mandate and Code of Conduct for your makerspace. This solution had been implemented in all the makerspaces I visited. In most cases, new members are required to sign a Code of Conduct or Membership contract, which also contain the mandate of the space, as well as clear anti-harassment and/or anti-discrimination clauses. Many of my participants credited these clear Codes of Conduct for preventing toxic behaviour and providing clear

removal procedures for problem individuals, resulting in a more inviting and protected space to work in.

However, this turn towards legal contracts to help manage poor behaviour is not equally welcomed in all communities. For example, at the time of our meeting, Amelia had just finished hosting a one-day feminist maker event in which 1,000 people attended and \$3,100 was raised for a local charity (Ottawa, 15 November 2018). However, there was a major controversy that emerged during the event when a uniformed police officer worked as security. During our conversation, I asked Amelia to provide me with some insight for the decision to have him there:

Our *intentions* for having him in the first place was very important, and obviously we had *good* intentions. And, I know from a feminist perspective, well, not just a feminist perspective, but including intersectionality, like all the work I've done up to this point, when I saw him [in uniform] I knew it would be an issue. And, to be honest, it just caused a lot of panic and anxiety, is what happened. And, it's not a question of naivety, I *know* based off of where I work that it would have a negative effect on people, and that is definitely an issue for a lot of people of colour, for example. And trans* people, sex trade workers, and there are a lot of communities that are disproportionately affected by police presence. But our intentions for having him were two-fold: 1) there is an underground MRA—Men's Rights Activists—in Ottawa, and just anti-feminist groups in general. They don't even have to be classified as MRAs. And we were fearful that they would, not necessarily *attack*, but that they would come in and take over or try to shut it down. And maybe be violent, like we don't know. So, we were afraid and we didn't want to put people in danger, we didn't want to put our volunteers in danger. So, how do you keep that from escalating and how do you remove them if you are just a civilian? [...] And, the other thing was that people who were planning on attending, and vendors alike, were both concerned and saying: 'I'd like to attend, *but* I'm scared to be there. I have a stalker, I have people in my life that I am scared if they show up I won't be safe, I've been threatened with violence by these people, or by this person.' And, we took it very seriously. And, it wasn't *just one* person, it was from *multiple* people. And, again, if someone were to bring a weapon, I don't think it's fair to ask volunteers who *might* be trained in de-escalating conflict to like Yeah. It's very dangerous and I feel like very real-life potentially dangerous things. And I'm not sure if everyone really knew that. We had people asking us if we *really needed* police for 1,000 people, or an event that size? And I think *maybe* ... maybe not ... it was a very

‘maybe’ type of situation. And, I think my biggest regret was having the officer not change [out of his uniform]” (Ottawa, November 15, 2018).

Therefore, although all the feminist makers I met with told me that they felt more comfortable in their makerspaces since the Codes of Conduct were introduced—citing it as a source for authoritative control and protection—Amelia’s experience raises key questions about *who benefits* from these legal responses and who is placed in harm’s way? Reflecting on her experience of writing anti-racism policies for a university, Sara Ahmed states that the problem with creating documents or policies as a response to widespread inequality is that these documents can “conceal the very inequalities the documents are written to reveal” (2012, p. 100). Ahmed explains that creating these documents can produce a “‘marshmallow feeling’, a feeling that we are doing enough, or doing well enough, or even that there is nothing left to do” (p.101).

However, as acknowledged by Amelia and supported by queer and BIPOC researchers (e.g., Warner, 2002; Cassin et al., 2007; Dwyer, 2008; Maynard, 2017; Bristow, 2020) policing and other legal responses are not universally beneficial. Instead, these systems maintain hegemonic power systems, including White supremacy and heteronormativity. Indeed, when I asked Nesryn—a non-binary feminist maker of colour—about their experiences at this event, their first reaction was “I loved it!” (14 November 2018). However, when we started talking about “the cop thing” (Nesryn, 14 November 2018), our conversation shifted slightly as Nesryn acknowledged that “when I saw him, I had that same thought that some people may not want [him here]. I was fine, but I knew that other people obviously might be triggered by someone in uniform” (14 November 2018). Therefore, while Nesryn was not personally affected by police presence, they recognize that seeing a uniformed officer can trigger negative feelings

through a “collective consciousness” (14 November 2018). However, Nesryn also had conflicting feelings about this specific incident, and told me that this police officer was also a person of colour who is known in the Ottawa feminist community as an ally. They told me that in this context, “there is a bit of a grey area: does that improve the situation? Or, is it still just the uniform that is the big problem?” (14 November 2018).

However, Nesryn also pointed out that this whole situation was made even worse by the follow-up comments posted on the event’s social media pages [details intentionally withheld to maintain confidentiality]. Nesryn and I talked about how we both noticed a disturbing trend of members who we read as ‘White feminists’ celebrating police presence at the event, providing comments like: “It was great having police involved! My daughter needs to see that police are allies for feminism” and “My child thought it was so cool to talk to a police officer!”.⁸¹ Furthermore, many of these posts received numerous positive ‘love’ or ‘like’ reactions, which suggests that a good proportion of attendees engaging in this online debate supported having uniformed police presence. Therefore, within this online ‘after-event’ space, White feminist voices worked together to actively discredit and silence the triggering experience police presence had on a significant portion of the BIPOC and queer/trans* attendees. During our conversation, Nesryn informed me that she felt disappointed by these comments, referring to them as “narrow minded” (14 November 2017). Furthermore, some BIPOC and queer/trans* members called out these pro-police posts, describing them as self-absorbed, tone-deaf, and a clear demonstration of White power and privilege within feminist spaces. As one

⁸¹ Note: These are not direct quotes, but rather a paraphrasing of the comments provided. To protect the anonymity of all involved, I intentionally avoided using direct quotes.

member aptly stated: the fact that these White parents do not have to have ‘the talk’ with their kids about their increased chances of experiencing police violence, racial profiling, and death due to their skin-tone, serves as a clear example of how police presence can have different affectual responses from White and non-White people.

Although this situation of involving uniformed police in Maker Culture is not common—indeed, from my experience this was the only instance of seeing a uniformed officer at an event—in her book, *On Being Included*, Sara Ahmed writes that these “little encounters” (2012, p. 155) have “very big effects” (2012, p. 155). This example, and its aftermath, demonstrates how “describing the problem of racism can mean being treated as if you have created the problem, as if the very talk about divisions is what is divisive” (Ahmed, 2012, p. 152). Indeed, these White feminist ‘after-event’ comments that welcome police as ‘allies’, work to frame BIPOC and queer/trans* members as causing ‘the problem’ by dismissing their concerns about involving uniformed police at a feminist event as over-reactive or too sensitive. Even Nesryn, who viewed police presence as a problem, and criticized these White feminist posts as narrow minded, also described taking steps to mitigate this situation as potential “pandering” (14 November 2018). This contradictory logic displayed by Nesryn is not an individual failure on their end, but rather evidence of how White ideals—like liberalism and meritocracy, which I discussed in the Introduction—construes non-White bodies as being ‘more difficult’ or ‘more problematic’ when including them into a community that was not designed for or by them. As explained by Ahmed (2012), “feminists of color [sic] know very well the trouble it can cause to bring racism up. If we talk about how racism affects us, then we are getting in the way of reconciliation, as if our talk is what prevents us all from ‘just’

getting along” (p. 161). Therefore, while in Chapter Five I argue that a goal of feminist making is to create inclusive makerspaces and events, ‘inclusion’ can also work as a tool of governance (Ahmed 2012), which requires those who are being included to willingly “consent to the terms of this inclusion” (Ahmed, 2012, p. 163). Ahmed explains being included is typically framed as “folding in” (Ahmed, 2012, p. 164) previously excluded members into the existing hegemonic norms, cultures, and expectations of the dominant group. Fundamentally, in order to remain included, these new members must learn how to ‘play the game’, ‘get along’, and ‘not rock the boat’ (Ahmed, 2012). In the case of Amelia’s event, this would mean silently accepting the presence of uniformed police because it is a ‘good educational tool’ for White children and their parents. Ahmed contends that “it is hard to get whiteness recognized by those whose political agency benefits from it not being recognized” (2012, p. 152). Indeed, as I noted in the Introduction, Maker Culture and makerspaces uphold a possessive investment in Whiteness by not recognizing that their ‘general’ community ethics uphold White norms and perspectives. However, whereas feminist makers critique hegemonic Maker Culture for not recognizing the contradictions between their activist ideals and practices, this example of relying on legal authorities—such as uniformed police or formal contracts—while building inclusive communities, emerges as a key contradictory logic within feminist organizing. In Chapter Five, I provide additional commentary on how feminist spaces can simultaneously disrupt some sites of oppressions (e.g., patriarchy) while maintaining others (e.g., White supremacy).

Amelia also told me that since this incident, she has experienced “lateral violence” (Ottawa, 15 November 2018) from some members of the feminist community:

[...] people [were] just angry emailing and they [were] not coming from a solution-based or collaborative approach. Instead, it's like 'I didn't like your event! You guys are the fucking blah blah blah. You're the *worst*.' [...] And, then you know what happens? Some people are like, 'People are ungrateful, it's too much work, people just get mad at me, I am not going to put on this event again'. And then, bit by bit, you get less events because people feel like they are being yelled at all the time" (Ottawa, 15 November 2018).

From this negative experience, Amelia discussed the emotional toll she felt afterwards, telling me: "I understand where people were coming from and I felt like I let people down [sad inflection]. And I felt like people weren't going to trust [us] or [our initiative]" (Ottawa, 15 November 2018). To rectify this situation, Amelia posted an in-depth explanation to her social media page and website, which outlined these justifications for police presence. Furthermore, she told me that she was in the process of creating a survey to solicit more solution-based recommendations from the community to prevent this issue from arising at future events. Therefore, rather than dismissing these concerns as 'over-reactive' or providing a useless 'lip service' apology, Amelia accepted ownership of this mistake, and used it as a site for collective reflection with the community to ensure this situation does not happen again.

Another issue underlying Codes of Conduct is the amount of work/labour that goes into actually creating them. For many of the organizers I met with, there was a shared sentiment that creating rules through group consensus is not an easy undertaking in Maker Culture. For example, Cam told me:

I think because you just start and you look at everyone as an adult with a business, with a project, with a *reason* to be here. And, you are like, everyone gets it. Everyone has common sense. Everyone wants the same thing: a clean, safe, secure, happy space. But, yeah, sometimes other people's versions of that are different (Ottawa, 2 October 2017).

In trying to create a cohesive policy, Cam told me that the biggest lesson she learned was that “common sense is not common” (Ottawa, 2 October 2017). Jo, who was an organizer of a much smaller makerspace than Cam, also told me that she is having difficulty creating certain policies that everyone can agree upon:

[...] uhhh, that’s one thing that in terms of full on ‘official’ [used air quotes] that’s kind of stall out on our Slack. So we have some provisional policies that are in place, but they’ve never been super fleshed out to be honest. Uhhmm, which at different times have been contentious. And then we try to make them more official and it stalls out again” (Toronto, 26 July 2017).

What is interesting in comparing Jo and Cam’s experiences is that even though they both run very different spaces—Cam is a paid, full-time manager of a fairly large makerspace where Jo’s space is shared with fifteen of her friends—they have both faced similar difficulties in creating official policies for their makerspaces.

However, feminist makerspaces and events also face challenges when making policy decisions. For example, Yvette, told me that creating a clear mandate for her feminist community was controversial. She told me that there were disagreements among the members and organizers about whether their space was an art gallery/studio or an activist collective:

I remember that we had a discussion at some point asking: ‘Are we focusing on art or on activism?’ Or more social projects? Because we had a lot of people asking for projects that were bigger than us. So, at some point, because we were founded by an *art* organization, we focused on art. And now, it’s more accepted that activism is a part of art. But, at that time, it was not so clear. And I remember some tensions between members and members of the team [escalated to the point] that at some [people] left because we were not *radical* enough in our actions, or there wasn’t enough *activism*. It was more about art (Montréal, 25 October 2017).

These accounts from Jo, Amelia and Yvette further highlight the challenges in managing a space through group consensus and confirm that this remains a salient challenge for feminist and non-feminist makerspaces alike.

Furthermore, establishing a clear Code of Conduct does not absolutely prevent negative behaviour or issues from emerging. For example, Cam told me that oftentimes she needs to re-post and remind members of the Code of Conduct through their various communication channels: “[w]e will often re-post the Code of Conduct as a reminder. But oftentimes it is in *response* to something. And, it gets emailed, and again, oftentimes in response to something happening in the space that was negative, and we just need a reminder” (Ottawa, 2 October 2017). Additionally, Cam explained to me that removing someone from the space through the Code of Conduct can be a lengthy process: “[...] the process took a little while because you want to make sure you do things properly, and you want to give the opportunity for improvement, if there could be some” (Ottawa, 2 October 2017). As such, enforcing Codes of Conduct are another form of emotional labour that makerspace organizers are routinely performing.

Another instance where emotional labour was mentioned was in describing the effort it took to create an *inviting* makerspace environment. For example, as explained by Jo:

And like, you know, it is a lot of *work* to host people and to be welcoming. I can see why people don’t necessarily do it. [...] [A friend of mine] is pretty dedicated to finding people [...] following up with them, contacting them, reaching out, asking them to come back. Like there is a lot of actual work that goes into that. And a lot of friendships and relationships that exist very much due to their work of reaching out again and again [...] (Toronto, 26 July 2017).

Maddie also acknowledged that creating an inviting makerspace requires a conscious effort, telling me that when training new makerspace staff members, new employees are told that greeting makerspace attendees is “*the most important thing you do*” (Ottawa, 7 February 2019). Referring to this work as “customer service”, Maddie informed me that “it is intimidating to walk into this space, and if the person doesn’t feel welcome then

they feel like they can't do things here and they will walk away and never come back” (Ottawa, 7 February 2019). Luce affirmed Maddie's position about the importance of greeting newcomers, telling me about her uncomfortable experience when attending a crypto-party event:

You know, for instance I entered the space [...] and no one welcomed me, and I was like deet-dee-dee [drumming fingers on table]. [...] [A]nd then there were a few guys that kind of pointed to the woman educator and me and were like 'Go and talk to her'. And so, that was a bit *awkward* because I didn't necessarily *want* to be 'greeted' or 'welcomed' by a woman just because I was one too (Montreal, 10 October 2017).

As pointed out by Jo, Maddie, and Luce creating an inviting makerspace takes much more effort than simply opening the door—it requires active engagement, follow-up, and relationship building. Austin L. Toombs, Shaowen Bardzell, and Jeffrey Bardzell (2015) refer to this kind of welcoming work as “over-implicit care-in-action” (p. 633), explaining:

These overt-implicit acts of care are often used to solidify a feeling of belonging or a welcoming atmosphere. They are recognizable as caring situations, but if they were made more explicit they would be less effective. It would feel insincere, or even creepy, if a member approached a visitor and told them “I am going to show you around the space so that you will feel comfortable here” (p. 634).

In their nineteen-month ethnography of a “Midwestern U.S. college town hackerspace” (2015, p 631), Toombs et al. concluded that “the member's abilities to *care* for one another is also a central aspect of the continued success of these communities” (2015, p. 636). However, while these researchers acknowledge that hackerspaces generally—and the one selected for their study included—are premised on a “well-intentioned blindness to gender, race, social class and so forth” (2015, p. 636), they did not provide much insight into whether the types of care work they discovered in hackerspaces are reflective of these blind spots.

On the other hand, many of my participants told me that in non-feminist makerspaces—e.g., spaces that are not reserved for women/femme folks—‘welcoming work’ was usually done by women/femme folk. Like Luce above, feminist makers told me that there is almost an expectation that women/femme folks *only* want to socialize with other women/femme folks. However, this welcoming work was also viewed as a part of feminist activism work. For example, Jo explained that welcoming work is used to recruit more women/femme makers into non-feminist makerspaces:

[...] one of the founders of [my old makerspace] [...] definitely worked very hard to make sure I came back when I was coming just the first few times. And, like, reaching out to me to make sure that there were times when I felt comfortable and, kind of bugging me on the Internet. So, she did a lot of that kind of work too, I think, to keep femme people around (Toronto, 26 July 2017).

Therefore, it is perhaps of no surprise that almost all my participants who were currently a part of a makerspace recounted a similar story of being recruited by a fellow woman/femme member.

These experiences of the routine care work and emotional labour required to govern a makerspace challenges the picture often presented by hegemonic Maker Culture. Whereas hegemonic Maker Culture aims to have as large of a makerspace as possible, my interviewees maintain that unfettered growth oftentimes leads to clashing personalities or politics, in-group arguments, tense environments, frequent cleaning, and frustration. Therefore, to function well, makerspaces require some mundane administrative and custodial work, routine governance, as well as more tolling emotional labour to resolve disputes. And, like other hegemonic depictions of creative industries, these more routine tasks and the emotional labour that is required to run a successful

makerspace is either non-existent or minimized as a labour of love that is “totally worth it” (Altman, in Baichtal, 2014, Chapter 11).

However, whereas in-fighting, managing poor behaviour, and welcoming work highlights the emotional labour required to run a makerspace, feminist makers also pointed to *care work* as a strategy to support one another and prevent burnout. For example, Cam told me that she is working towards implementing an ‘80-20 rule’ in her makerspace: “80% of the time in this space is *your* time. You work and you do whatever want. But, since this is a community, 20% of your time has to be given back in some way” (Ottawa, 2 October 2017). She goes on to explain that by creating this balance, *all* makers share in the responsibility of caring for the community, while also creating a clear division in makerspace responsibilities. Samira and Yvette told me that their makerspace had a rough period where staff members were burning out and leaving the organization. To resolve this issue, Samira explained that the staff in her makerspace all employ informal care work strategies: “[e]veryone is kind of aware of checking in [and] being like: “Okay, you have worked a lot today, you should finish up.” [...] Like, it’s okay to not be 100% productive. And when I talk to other friends working in the cultural sector it’s *definitely not* the same experience” (Montreal, 25 October 2017). Yvette told me that, for her, this attention to care work is integral to the feminist approach of her makerspace saying that it makes the space accessible for staff and members who have families or other responsibilities (Montreal, 25 October 2017). Therefore, within this context, care work is seen as a tool to foster a supportive feminist community.

This conceptualization of care work as a tool to create healthy communities is not limited to the feminist makerspaces I visited. Indeed, Carol Gilligan’s influential book, *In*

A Different Voice (1982) theorized that care is a fundamental aspect of the human condition, and as such is vital for human survival. However, while care is vital to life, Gilligan argues that within patriarchal societies, the work associated with ‘care’—such as active listening, paying attention, and nurturing connections—are viewed as less important to public life than democratic ‘masculine’ values of rationality and independence. In a 2011 interview with the international research network, the *Foundation Critical Ethics of Care*, Gilligan states, “since humans are hard-wired for cooperation and empathy, the question is not why do we care, but why do we *not* care?” (np). Therefore, for Gilligan:

[forwarding a] feminist ethic of care is a form of resistance to the injustices inherent in patriarchy (that associate care and caring with women rather than with humans, the feminization of care work, [and] the rendering of care as subsidiary to justice [...]). A feminist ethic of care guides the historic struggle to free democracy from patriarchy; it is the ethic of a democratic society [...].” (Ethics of Care, 2011, np).

In other words, building a community around an ethic of care—such as what some of my participants are doing in their makerspaces—serves two key purposes: first, ‘care’ is an important instrument for creating and sustaining healthy communities. Second, prioritizing *collective care approaches* in public-facing organizations is an act of feminist resistance to patriarchy. In Chapter Six, I return to this instrumental and political ‘care’ framework as I consider how COVID-19 pandemic discourses have re-shaped makerspaces as sites for establishing collective care.

In acknowledging the role of both emotional labour and care work within Canadian makerspaces, feminist makers highlight the complex ways in which making is both pleasurable—such as in its feminist community-building potential—and laborious. In recognizing that making and makerspaces bring both personal joy and struggle, in this

chapter, my central point is that fully participating in Maker Culture takes time, effort, planning, and support.

4.4 Conclusion: Making It Work

Although ‘passionate work’ and the logics of entrepreneurialism were analyzed separately here, Maker Culture brings them together in such a way that they mutually constitute each other. For example, in hegemonic Maker ‘success narratives’ these two logics work together through Makers’ dual existence as both archetypical neoliberal entrepreneurs and passionate creative workers. Within these narratives, Makers are heroized in mainstream discourses as innovative, self-empowered, risk-taking ‘go getters’ who are passionate about making and are free to ‘do what they love’. And while these stories are about real people, the way they are told involves constructing a careful linear progression story that resoundingly mimics an ‘entrepreneurial cure’.

However, non-hegemonic makers also struggle with this duality. In many ways, the feminist makers I met echoed Maker Culture success narratives and emphasized the positive impacts that making and makerspaces have brought each of them personally. However, unlike most Maker Culture success stories, these same Canadian feminist makers also tempered these successes by describing them as a constant ‘juggling act’, that involved managing a complicated relationship between the love and joy of making with moments of stress, frustration, and exhaustion. Therefore, in many ways, the Canadian feminist makers I met with simultaneously adopted and resisted the neoliberal logics of Maker Culture. However, rather than viewing this fraught relationship between

feminism and neoliberalism as a full-out failure of feminism, I contend that this ‘juggling act’ reaffirms that dislodging these deeply ingrained neoliberal logics is difficult.

Furthermore, through the concepts of emotional labour and care work, my conversations with feminist makers also unveiled some of the structural privileges underlying the invisible labours involved in maintaining a makerspace. Across these accounts, gender played a significant role in shaping who performed the organizational labour underlying each maker community or event. Most of the feminist makers I interviewed (75%) served as organizers for at least one makerspace or maker event. This is significant when we consider that some of these spaces are described as male dominated—in that most members are masculine presenting. Furthermore, as pointed out by Cam and Molly, intersecting gender expectations with ‘organizer’ roles highlights the sexist assumptions that circulate within some makerspaces. For Molly, she told me that some members of her space attempted to discredit her authority by referring to her as too emotional or “a bitch”. And Cam explained that asking some members to clean—especially the bathroom—was met with eye-rolls and a “whatever attitude”. Both organizers told me that at times they felt like they were expected to do all of the routine chores a makerspace requires, including cleaning up, organizing events, and disciplining poor behaviour.

Another way that invisible labours are gendered in makerspaces is through ‘welcome work’. All my participants who were active in a makerspace shared one key experience in common: each of them was ‘recruited’ by another established woman/femme makerspace member. Unanimously my participants cited this recruitment work as the reason for why they kept coming back to that makerspace. For some, this

welcoming work was viewed as an integral aspect of feminist politics, and feminist makers took it upon themselves to reach out and recruit more diverse makers for their makerspace. But others told me that, within makerspace culture, there is an assumption that women/femme newcomers only want to interact with fellow women/ femme members. For example, Luce told me about awkwardly standing around at an event and having a male attendee point her to the only other woman in the room. Therefore, misconceptions about who should welcome whom into a makerspace often place an unfair burden on marginalized identities—including women, queer folks, and people of colour—who tend to be less well represented in these communities. As such, while theoretically this recruitment work performed by marginalized makers *should* result in more diverse makerspace demographics, my participants informed me that due to the burdens of welcoming work and other sites of emotional labour, non-hegemonic makers tend to ‘burn out’ and leave makerspaces at a faster rate than cis-male members. To redress this trend, care work was forwarded as a key solution. Examples of this care work include having organizers ‘check in’ with one another or developing new community standards that distribute organizational labour more equitably.

Although hegemonic Maker Culture discourses focus heavily on successes, the stories I was told by Canadian feminist makers troubled this public image, highlighting how structural privileges—especially those grounded in gender—create inequitable makerspace experiences. Although this research focused on feminist women/femme’s experiences and gender was referred to as a key site for inequality, it is important to emphasize that structural privileges are premised upon various intersecting sites of oppression. Therefore, additional studies exploring the experiences from other non-

hegemonic makers—including BIPOC makers, gay/lesbian/queer makers, trans* makers, poor makers, and elder makers—are needed to understand these additional barriers. In the next chapter, I examine how feminist makers have adapted hegemonic Maker Culture to address some of these issues caused by structural privilege.

Chapter Five

Re-Tooling the Sisterhood: Using Adaptive Strategies to Frame Feminist Maker Cultures in Canada

In Chapters Three and Four of this dissertation, I primarily focused on defining Maker Culture through its hegemonic representations, analyzing both Maker identity-formation and examining the communities they build. From this exploration, I discovered that hegemonic Maker Culture is largely shaped by privilege. For example, in Chapter Three, I demonstrated that Makers and Making are largely rooted in an educated, White, affluent, cis-male, American experience. Furthermore, in Chapter Four, I demonstrated that Maker professions and communities are built by, and maintained through, structural privileges that place unequal work/labour burdens on non-hegemonic makers. Therefore, a key shortcoming of hegemonic Maker Culture highlighted by this research is that Maker Culture's defining ideals of openness, diversity, and collaboration do not align with the *actual everyday practices* of Makers. To re-iterate a point made by Jo in the Introduction of this dissertation: "[...] the *words* they say are [revolutionary], but then the way they approach the *actual work* isn't so much" (Toronto, 26 July 2017).

Yet, despite these critiques and negative experiences, elements of hegemonic Maker Culture still hold appeal for Canadian feminist makers. Across the interviews, my participants emphasized the positive impacts that being a part of a makerspace or maker event had on them personally. Common sentiments expressed all describe making as a useful site for feminist community-building, citing these spaces as a place to re-connect with feminist politics. Philip A. Woods (2013) developed the term "adaptive strategies" to explain how people can hold contradictory acceptance *and* resistance positions while

working within neoliberal systems. He argues that by using adaptive strategies, instrumental neoliberal logics—such as empowerment—are imbued with “deeper sensibilities” (2013, p. 235). In other words, adaptive strategies “acknowledge the co-existence of instrumental and values-based logics, and the tensions between them, and create possibilities for deeper educational values to be achieved by working sometimes with, sometimes against, the instrumental logic” (Woods, 2013, p. 234-5).

In this chapter, I ask: how do Canadian feminist makers use adaptive strategies to simultaneously *work with* and *against* the hegemony of Maker Culture and its neoliberal logics? In the first section of this chapter, I examine how feminist politics intersect with embodied materialist discourse through a discussion about the value of creating separate, explicitly-feminist, physical, public spaces. In this section, I unpack the challenges and shortcomings of creating feminist communities, both historically and within the current feminist makerspace moment. In the second section, I consider how the *language* associated with feminism serves as another site for contradiction, as it serves as both a helpful boundary for curating an explicitly-feminist makerspace community, and an exclusionary practice that is viewed as harmful to cis-male allies. Therefore, ideologically speaking, hegemonic Maker Culture and Canadian feminist makers seem to share many of the same goals and practices.

However, in the third section of this chapter, I explain how feminist making practices and ideologies were also framed as substantially different from hegemonic Maker Culture, with some of my participants emphasizing ‘little m’ making or crafting and viewing feminist making as a set of *approaches* rather than a rigid identity. Using the example of ‘empowerment’—a term I contend is shared by both feminist activism and

neoliberalism—I contend that the value of feminist making and feminist makerspaces, lies in their ability to work together and serve as supportive sites to grapple with these contradictions between feminist ideals, practices, teaching, and community-building, and co-create collaborative solutions.

5.1 “Where we can *breathe*”: Explaining the Value of Feminist Space

Across scholarly feminist research and personal experiences—including the conversations I held with Canadian feminist makers—the same narrative about ‘the lack of women in makerspaces’ is consistently repeated: women’s interest, access, and/or expertise in STEM is *not* the underlying problem; instead, women avoid these spaces because of hostile and sexist/racist/homophobic/transphobic work environments (Nagle, 2013; Toupin, 2013; Greenfield, 2014; Davies, 2017). As explained by Rebecca Greenfield (2014), “[b]oth at their jobs and at [San Francisco]’s other hackerspaces, women at best feel out of place, and at worst are harassed out of participating in activities related to their profession” (np). In her book on American hackerspaces, Sarah R. Davies (2017) dedicates a whole chapter to feminist hackerspaces, which she aptly titles ‘Exclusion’. After interviewing numerous women involved in creating U.S. feminist hackerspaces, Davies contends that the need for these spaces arose from “bad experiences with mainstream hackerspaces, coupled with a desire to make some kind of difference in society or the world. People spoke about visiting hackerspaces and being the only woman or person of colour present; they wanted, they told us, to create a different hackerspace, one where this wouldn’t be the case” (2017, p. 102). Therefore, feminist makerspaces were largely created by feminists who were tired of constantly being excluded, silenced, and/or harassed.

In many ways, recognizing and addressing sexism within Maker Culture and makerspaces was the *raison d'être* for the Canadian feminist makers I interviewed. For example, as I sat with Gabriela in the quiet workroom, I asked her why she thought creating *feminist* makerspaces was important. Perking up on her chair, Gabriela told me:

I think a beautiful part of feminism and the people who are trying to create these spaces is that they are *trying* to make these moments happen where we can *breathe*, and feel at *ease*, and like, feel *heard* and feel *welcomed*. It's not often enough that we have those spaces and I think that people who are practicing feminism have such a beautiful spirit, you know?! They're doing something *good* for people (Montréal, 25 October 2017).

Echoing this need for space, both Cam and Molly informed me that their makerspace conducted market surveys in Ottawa which showed “a huge gap” (Cam, Ottawa, 2 October 2017) for women-centered makerspaces and maker events. As such, both informed me that their space is working towards creating a more “women-friendly” space (Cam, Ottawa, 2 October 2017) that encourages “more diversity” (Molly, Ottawa, 26 October 2017). Cam went on to explain that although her space has been very successful in creating ‘one-off’ events that focus on feminist issues that bring more women into the space, day-to-day the space takes on a different, more masculine, form. Maddie also reported that her makerspace is trying to increase female representation by having at least half of the staff be women. Additionally, she informed me that this effort seems to be (at least modestly) working, telling me that “we did some stats at some point and I think we have a slightly higher percentage of females than the Faculty [of Engineering]’s percentage, so ... I guess it’s helping?!” (Ottawa, 7 February 2019). Therefore, due to the success of these efforts to increase women/femme representation, some of my participants reported a noticeable shift happening in their makerspace demographics and culture. For example, Cam told me that the notion that makerspaces are “mostly

dominated by men” is an “old-school way of looking at things” (Ottawa, 2 October 2017). In fact, at the time of meeting with Cam, her makerspace was run entirely by an all-women-identifying management team. Jo and Becky also praised their former makerspace in Toronto for hosting a LGBTQ+Women⁸² weekly open house night.

However, not all my participants experienced success in incorporating feminism into established makerspaces. For example, Luce told me that the notion of starting a ‘feminist’ night in her old makerspace was dismissed by the cis-male members on the basis that it was contrary to the principle of ‘open doors’:

I went to [the makerspace] a couple of times, and we tried to organize conversations about potentially having women-only nights or feminist-only nights, queer/trans*-only nights. And then ... it was just not accepted. This was just, for them, this was an *open* space, and putting a boundary in terms of gender or identity was counter to the openness principle. And it was sacrosanct, this openness principle (Montréal, 10 October 2017).

In Chapter Three, I explained that key sites of oppression that are central concerns for feminist activists—like privilege, sexism, racism, transphobia, and heteronormativity—are often met with resistance or denial within non-feminist makerspaces. However, Gabriela told me that even in so-called ‘progressive’ or ‘left-wing’ activist spaces these dismissals still happen, telling me:

I *hate* it where I say something obviously feminist and then I feel like I have to *defend* myself. Like, I hate being put into those spaces. And I can actually map those spaces in my head, and like certain spaces, certain friends’ houses, friends of friends’ houses, where I am like I can’t talk about these certain issues because [makes a ‘you know’ hand gesture].

Me: It’ll start a fight?

Gabriela: Yes! Exactly! And all of the sudden I have to defend my values. [...] I mean, obviously there is a healthy part where you have to challenge yourself and

⁸² LGBTQ here refers to Lesbian, Gay, Trans*, Bi- and Queer people.

challenge your values, for sure. But, not in that way where it's [...] just *not* a productive conversation (Montréal, 25 October 2017).

Therefore, for Gabriela, feminists need their *own* space where “we can *breathe*, and feel at *ease*, and like, feel *heard* and feel *welcomed*” (Montréal, 25 October 2017).

One way that feminist makerspaces create a different, more diverse, culture is by disrupting ‘open-door’ policies. For example, Double Union—an established American feminist hackerspace—allows established members to invite guests of any gender but does not provide memberships to cis-men. (Double Union, 2015). This invite-only model was also used by Gabriela’s feminist makerspace, as she told me that while the space is mostly occupied by women/femme folk, “there are men that pass through and stuff” (Montréal, 25 October 2017). She told me that having mostly women/femmes in the space at all times is “kind of expected in a feminist technology space” (Montréal, 25 October 2017) and that it would be “weird” (Montréal, 25 October 2017) otherwise. As such, Gabriela told me that she is very protective of her feminist makerspace: “I’ve mentioned this [feminist] space to a variety of people and it’s weird because sometimes I will hesitate when around a certain person. And I’m wondering where that comes from. And if that is coming from a place that wants to *protect* this space because ... yeah, it’s very tricky” (Montréal, 25 October 2017).

Becky also discussed the need to create a safe makerspace when she disclosed to me that she is someone who suffers from chronic pain, and at times she uses the couch in her space to nap or manage her pain levels. She told me there has been a few times while she was out running errands and her pain flared up so badly that she had to nap on the couch in her makerspace because she could not make it home (Toronto, 26 July 2017).

Therefore, for makers like her, makerspaces are not just cool shared spaces where people work on things, but also refuges for them to rest and recover.

However, these strategies for creating ‘comfortable space’ are not unique to feminist makers. Indeed, creating space has been a long on-going desire for feminist activists (Frye 1978/2010). Beginning with the ‘first wave’⁸³ of feminism in the late nineteenth and early twentieth centuries, the issue of space tended to be more narrowly defined. During this time in the women’s movement, spatial issues were limited to physical, public spaces, and the right to access them. Issues including suffrage, legal rights, access to education and professional training, and the right to own property all centered on the desire to enter specific male dominated physical public spaces, such as: government institutions, workplaces, and universities. As such, barring women from participating in public life was understood as fundamental to the oppression of women (Kolmar & Bartkowski, 2010). Therefore, rather than seeking to create new, separate, women-only spaces, early feminist activists focused more on assimilating public spaces to the basic needs of women as persons (Kinser, 2004).

Feminist *separatism* is usually associated with Lesbian Feminism and radical feminism of the 1960s and 1970s (Kinser, 2004). However, separatism as imagined by these tenets of feminism can also be found in multiple feminist fiction novels from the late nineteenth and early twentieth centuries, which depict a desirable connection between autonomous feminist spaces and utopianism. For example, in Elizabeth Burgoyne Corbett’s 1889 novel *New Amazonia*, following a successful suffragette movement and a major war, women become the central political figures of Amazonia,

⁸³ See footnote 24 for a reminder on why I use scare quotes when describing feminist ‘waves’.

and form a utopian socialist-inspired society. In Rokeya Sakhawat Hussain's 1908 novel,⁸⁴ *Sultana's Dream*, women run the utopian society Lady Land, where men are isolated from women, resulting in a crime-free society. Charlotte Perkins Gilman's *Herland*, which first appeared in *The Forerunner* in 1915,⁸⁵ also depicts an autonomous women-only nation, in which an ideal social order is created. Although typically described as non-fiction, Virginia Woolf's *A Room of One's Own* (1929) follows a fictional female narrator who contends that in order to flourish, women writers need their own spaces—both literally, such as forming women-only classes at universities, and figuratively in finding room within the male dominated tradition of writing. From these feminist utopian novels, it is clear that separatism was a desirable fantasy for feminism long before the 'second wave' it is commonly associated with. In isolating, or eliminating, men from these fictional societies, women were not only capable of governing nations, but they thrived in creating utopian social orders from the rubble left by men.

The value of separatism can also be found in real-world organizing during the 'first wave' of feminism. Roberta Hamilton (2004) reminds us that women often organized separately from men within trade unions and political parties. For example, the Women's Trade Union League (WTUL) formed in the United States in 1903 and worked to eliminate sweatshop conditions (Amsterdam, 1982). Furthermore, WTUL was actively involved in feminist activism of the time, particularly with campaigning for women's

⁸⁴ Note: This story was originally published in 1905 in *The Indian Ladies' Magazine*, but became a separate book in 1908.

⁸⁵ Note: *Herland* became a separate book in 1979.

suffrage (Amsterdam, 1982). However, although these separate, women-run branches of trade unions were often instrumental in organizing fundraising initiatives and providing administrative support, this work was devalued as ‘women’s work’ and was usually invisible or was only acknowledged in perfunctory remarks (e.g., “Thanks Ladies!”) (Hamilton, 2004). This casting off of women’s value to various activism initiatives, from early labour movements to later civil rights, socialist, anti-nuclear, anti-Vietnam and student campaigns, meant women who attempted to work within male driven activism were often silenced, ignored, or pushed out (Hartmann, 1981/2010; Murray, 1999; Hamilton, 2004). This undervaluing of women’s experiences was even more pronounced if the woman was also homosexual/queer/lesbian (Rich, 1980/2010), a person with a disability (Chouinard, 1999) and/or racialized (Moraga & Anzaldúa, 1981; Yamada, 1981/2010; Hill Collins, 1990/2010; Crenshaw, 1991; Feldman et al., 1998).

With the devaluing and silencing of women in activist spaces continuing, the importance of creating separate feminist spaces—physical and symbolical—has intensified since ‘first wave’ feminism. Marilyn Frye (1978/2010) distinguishes between what she calls feminist separatism and masculinist separatism. The key difference here is that feminist separatism is “initiated or maintained, at will, *by women*” (emphasis in original; p. 276) and is fundamental to disrupting patriarchy and male privilege, the two key ingredients in the “alchemy of power” (p. 280). Therefore, the creation of women-only meetings, groups, and spaces directly challenges the barriers to access that maintain the structures of patriarchal power. As explained by Frye:

[w]hen those who control access have made you totally accessible, your first act of taking control must be denying access or must have denial of access as one of its aspects. [...] When we start from a position of total accessibility, there *must* be an aspect of no-saying (which is the beginning of control) in *every effective* act of

strategy, the effective ones being precisely those which shift power [...] (emphasis in original; p. 279).

Therefore, in controlling access by refusing men entry, women-only spaces upset patriarchal power relations, which dictate that women, and the space they occupy, must always be available to men.

Furthermore, creating women-only spaces also allows women to draw their own boundaries, providing them with the control to define what a 'woman' is. Frye maintains that under patriarchy, this power to define is typically allocated to men: "[a]nd generally, when the renegade women call something one thing and patriarchal loyalists call it another, the loyalists get their way" (p. 280). Therefore, the right to provide your own definition—and have it accepted—is another facet of power. Frye concludes that separatism is not just about safety or community, but also has the potential to shift oppressive power relations:

[...] when women separate (withdraw, break out, regroup, transcend, shove aside, step outside, migrate, say *no*), we are simultaneously controlling access and defining. We are doubly insubordinate, since neither of these is permitted. And access and definition are fundamental ingredients in the alchemy of power, so we are doubly, and radically insubordinate (1978/2010; emphasis in original; p. 280).

Therefore, because separatism negatively affects male privilege and power, it often "inspires the greatest hostility, disparagement, insult and confrontation" (Frye, 1978/2010; p. 276). When women refuse to work with (or for) men, reactions are generally defensive, hostile, anxious, and guilt inducing (Frye, 1978/2010). According to Frye, these negative reactions from 'patriarchal loyalists' (both men and women), further indicates the political importance of separatism: "if you are doing something that is so strictly forbidden by the patriarchs, you must be doing something right" (p. 277).

Therefore, creating separate feminist spaces is considered important for feminist activists because of their symbolical ability to transgress established boundaries (Lamecha, 2000). One way this is accomplished is by challenging the gendered binary associated with ‘public’ and ‘private’ spaces, and the assumptions that dictate who is empowered to do what in these spaces (Lamecha, 2000). Rachel Pain (1999) contends that since public spaces are understood as male dominated and controlled spaces, women are socialized to be afraid while occupying these areas. She maintains that there is a rhetorical emphasis on women and girls to keep physically safe while in public spaces, which results in “self-imposed spatial constraints, social genderedness and [a] careful regulation of body appearance becom[ing] part of female identity” (p. 131). This means that creating separate, women-only public spaces is a way for feminists to reclaim public spaces. In their study of women organizing in Chicago Public Housing communities, Roberta M. Feldman, Susan Stall and Patricia A. Wright (1998) maintain that creating women-run communal spaces in low-income communities, like a Laundromat or daycare centre, allowed women of colour to separate from the elite social (patriarchal) definitions of who they are, what they should be doing, and where they should be doing it. Woman-run public spaces, especially those that operate outside of the family, allowed these women of colour to develop a growing sense that they have the right to access, create, and influence public spaces (Feldman et al., 1998). Additionally, having public spaces appropriated by low-income women of colour brings attention to not only the gendered, but also raced and classed power dynamics underlying public spaces. In her chapter concerning the experiences of women with disabilities in ableist spaces, Vera Chouinard (1999) maintains that making space for people with disabilities is all about “disrupting

spaces of power and privilege to the point where those who dominate such spaces are forced to recognize the difference that disabling differences make, and are confronted with the roles they play in sustaining such cultural oppression” (p. 146).

While creating physical feminist public spaces has been integral to feminist politics, it is important to note that within these feminist spaces, exclusions based in White privilege, gender essentialism, and ableism can still occur. Indeed, BIPOC women, LGBTQQ,⁸⁶ and people with disabilities have long critiqued women-only spaces, like shelters and other activist organizations, for perpetuating the same power structures and exclusions found in male dominated spaces (e.g., Rich, 1980/2010; Moraga & Anzaldúa, 1981; Yamada, 1981/2010; Crenshaw, 1991; Davis, 1991/2010; Lyon, 1995; Chouinard, 1999; Enke, 2007; Nicolazzo & Harris, 2014). In her exploration of battered women shelters, Kimberle Crenshaw (1991) found that women of colour are less likely to have their needs met than White women. She contends that this is because women of colour experience intersectional forms of oppression including racism, poverty, and sexism. Therefore, as explained by Crenshaw (1991) the problem with creating spaces based on essentialism means that privileged women: “[...] frequently have the power to determine, either through material or rhetorical resources, whether the intersectional differences of women of color [sic] will be incorporated at all into the basic formation of policy” (p. 1265). Furthermore, heteronormativity also shapes the agenda for spaces designed for violence survivors and community health clinics, which results in the needs of lesbians often being missed (Enke, 2007).

⁸⁶ Lesbian, Gay, Bi-, Trans*, Queer, and Questioning.

Another critique of women-only spaces is that they rely on gender essentialist definitions, which ultimately privileges cis-gender women. In her Master's thesis, Catherine Lyon (1995) found that organizers of the Michigan Womyn's Music Festival have struggled with defining who can be a 'womyn', and thus enter the event. As such, non-cis-gender individuals have critiqued their exclusion from the event due to perceptions about their physical body characteristics (e.g., lacking breasts or having a penis). Since the 2000s, gender essentialism and trans* exclusion have become so prominent in contemporary global feminist communities that the term 'TERF'—trans* exclusionary radical feminism (or feminist)—has become mainstream. Generally, the term TERF is more commonly associated with late-2000s online spaces, and as a form of public critique (or slur, depending on your perspective) of mainstream feminist authors like J.K. Rowling (*Harry Potter* series) (Ennis, 2019) and Meghan Murphy (founder of *Feminist Current*) (BBC News, 2019). However, the term has roots in 1970s radical feminist and Lesbian Separatism, where trans* or non-binary folks were blocked from participating in women-only or lesbian spaces through threats and acts of violence (Burns, 2019). This TERF hostility largely stems from both real and assumed concerns of cis-women's safety, especially in vulnerable spaces like change rooms, bathrooms, and prisons (Earles, 2019; Pearce et al., 2020; Vajjala, 2020). Therefore, in many instances women-only feminist spaces are only read as safe and beneficial by an already privileged group of women. This means that male dominated public spaces are not the only domains responsible for establishing and maintaining oppressive power relations—including sexism, White privilege, ableism, classism, and heteronormativity—because many feminist spaces have also faced the same charge. Indeed, although most of the feminist

spaces and events I visited emphasized intersectionality in their mandates, people of colour, Indigenous, and queer/trans* folks are still noticeably under-represented in many of these spaces. In Chapter Four, I highlighted how the contradictory logics of equating safety with legal approaches serves as a prime example of how ‘inclusive’ feminist spaces can still uphold and maintain White norms and privileges. As such, unlike the fantasy lands found in some feminist fiction writing, creating feminist-only space does not provide a guarantee of universal equity, safety, or utopia. Indeed, for some of my participants, the very *language* associated with feminism was viewed as exclusionary or apolitical. In the next section, I explore these critiques further and discuss some of their solutions.

5.2 “You don’t give the opportunity for men to come in”: Adapting Language in Feminist Politics

When I asked Canadian feminist makers about creating feminist makerspaces or events, it became evident to me that understandings of the term ‘feminism’ were diverse. Whereas Jo, Becky, and Amelia explicitly acknowledged that when they were referring to feminism, they meant *intersectional* feminism—where feminist led social justice is framed using multiple sites of oppression—for others, this distinction was less clear. For example, Molly was extremely skeptical of creating an explicitly ‘feminist’—which she envisioned as ‘women’s only’—makerspace or maker meet-up night, saying:

[...] you know, I *hate* things that say like, ‘Women’s tinkering’, you know. I really don’t like that. [...] I just think it gets overused. And like, [my other female colleague] and I are so tired of seeing ‘Women in Business’ [...] and I am *really* tired of seeing things titled ‘Women and Entrepreneurship’, ‘Women and Business’ [...] it’s not a distinction that I think works anymore (Ottawa, 26 October 2017).

When I asked Maddie whether her makerspace has ever hosted a feminist event, she also framed feminism as ‘for women’, telling me that her space hosts monthly women-only meet ups that focus on supporting women in STEM industries. Referred to the ‘add women and stir’ approach, as I outlined in the previous section, the challenge with creating ‘women-only’ events is that *women’s* issues tend to become isolated from other intersectional sites of oppression, like racism, transphobia, and heteronormativity. For example, when I asked Maddie whether her makerspace had ever hosted events for queer makers, she replied “I don’t think we’ve ever done anything focused on LGBTQ. Which, actually, now that I’m thinking about it, that’s interesting. I don’t know why we haven’t. Yeah ... that’s a bit weird!” (Ottawa, 7 February 2019). Therefore, the challenge with using ‘feminism’ to curate a maker community is that makers who perhaps are feminist in spirit but are unfamiliar with this language, or are misinformed about the goals of intersectional feminism, may view this label as alienating or contrary to their personal beliefs.

However, unlike the examples I provided in the previous section, within the context of my interviews, often the concern over explicitly naming a space or event as *feminist* revolved around concern for cis-male allies. For example, Molly said:

[...] if you are segregating it too much, then you don’t give the opportunity for men to come in and say I want to support you. And that happens just naturally in our space, so ... yeah. I find [feminism] quite controversial sometimes, right? Depending on how you practice it, like how you present it. [...] I think that the discussion needs to be clear for *everybody* [...]. [...] if [men] are not a part of the discussion then it’s just a ginormous disservice anyway. [...] [And] remembering inclusivity—if we are using the word ‘community’ it’s about inclusivity. So, the second you pop ‘feminist’ on the door ... you know, as an example, you’ve already told like half of your community that they don— ... you know?

Me: I think what you are saying is that people need to recognize that using certain terms, even like ‘hackerspace’ rather than ‘makerspace’, will send a certain signal to the community.

Molly: Yeah! That’s it. (Ottawa, 26 October 2017).

Similarly, Gabriela told me that at times she feels uncomfortable telling her cis-male friends that she is a member of a feminist makerspace, saying:

[...] there’s a lot of assumed ‘man hating’ still. It makes me a little sad to hear their comments like that. They’re my friends for a reason and I think they could also benefit from what [this feminist makerspace] has to offer and it sucks that they are kind of stopping themselves from entering the space and seeing what it *actually* does. Because, to me, if they were comfortable enough to be in that space and see what kind of things that are happening they would have a different idea of what feminism is. That it’s not just a bunch of man hating lesbians. [Laughs]. (Montréal, 25 October 2017).

Therefore, the term ‘feminism’ was sometimes described as exclusionary or controversial within the context of defining a ‘feminist makerspace’. As such, just as in Chapter Three, where I argued that hegemonic representations of Making produces boundary-work that alienate non-hegemonic makers, feminism is seen as alienating to men.

In a few cases, some of my participants told me that they *strategically* use feminism *because* it produces these boundaries. For example, Luce told me that she defines intersectional feminism on her group’s website and mandate to demarcate who this group is meant to serve:

There’s a delimitation from the start so people will not ... men will not show up. They will not. And often, like men that we would *expect* to show up, that *say* they are feminist, and that they are involved in technology, sometimes they are like, you know, we are going to let them do their thing. And it’s not ... it’s just they are cautious in their approach. Which is something we appreciate. *Very much* appreciate. [...] But then, if we approach them and say we would like you to come, they come. Which is great! (Montréal, 10 October 2017).

From this perspective, feminism is used to constitute a ‘good’ cis-male ally. Becky and Jo also discussed the concept of ‘good allyship’ within the context of having respect. For

example, Becky explained that, for her, a good cis-male ally is someone who respects the principles of feminism without taking up space for recognition:

it's just sort of the idea that allyship—and especially intersectional allyship—an ally is someone who exhibits all of the things that you *want* to be respected for, but without taking up space to talk about it. So, there isn't this performance and there isn't this sort of: 'Oh well, you know I *didn't* treat you like garbage today. You should pat me on the back!'. And you're like, that's a bare minimum human right! (Toronto, 26 July 2017).

Jo also told me that respect is fundamental to being a good cis-male ally within feminist makerspaces:

I think one thing with [my other makerspace], is that often sometimes dudes are like 'Well, like can I come to Tuesdays [which are Women+LGBTQ night]? And it's like, so long as you are going to be respectful, no one is *banned* from the space. It's just intended to actively encourage femme, queer, trans* people to be around. But like, you know, if you want to see your friend or stop by, you can do that! Just like, don't then, you know, step in front of someone and explain their project to them. [...] But like, you know, sometimes [names a male friend] comes by and catches up because he's a good friend who knows he'll find his friends there. And he's just not a dick, so it's fine! (Toronto, 26 July 2017).

As such, by defining good allyship within the context of respect, Jo clarified that the intention of creating feminist makerspaces or maker nights is to continue fostering an environment that is respectful of feminist goals. Therefore, rather than viewing feminism as a hard boundary that excludes 'all men', for Luce, Becky, and Jo feminism gives feminist makers control over who meets the standard of respect they are working towards.

Another way that feminist makers re-center feminism is through the prioritization of intersectional identities. For instance, Jehanne told me that her feminist makerspace always "prioritize facilitators who identify as women, queer, trans, and gender fluid" (Montréal, 25 October 2017). This focus on intersectional identities and their knowledge

also appeared during my conversation with Jo, as she described an anti-fascist street art workshop she co-hosted:

[...] that was something that [another member] and I hosted that was with an artist who goes by ‘Swarm’, who is a street artist and it was an anti-fascist street art workshop. And they’re an Indigenous person who is really involved in like anti-colonial, de-colonization work through street art. So their perspective on fascism is really, quite a bit broader than like really contemporary anti-FOS stuff (Toronto, 26 July 2017).

Gabriela also told me that, in her experience, feminist-run workshops emphasize “that multiple perspectives exist in a space” (Montréal, 25 October 2017). In organizing her feminist maker event, Amelia told me that while the event prioritized women- and queer-led businesses, a key concern for her was: “what would happen if everyone who applied to be a vendor were all White? So, what do you do? How can you overcome that?” (Ottawa, 15 November 2018). To reserve room for non-White women- and queer-led businesses, Amelia told me that she “had to say no to a bunch of people” (Ottawa, 15 November 2018). Nesryn, a non-binary feminist maker of colour, was a vendor at Amelia’s event. When I asked them how they felt about the event, they replied:

I *loved* it. I just couldn’t get over it! Just looking at the group of people that were there, and seeing the world I want to live in. It was just so beautiful! Just, the diversity and especially the energy. [The organizers] did *so much* to make it as inclusive as possible. And you could *feel* it. You know? It was very, like, everyone is welcome. We are all family. We are all here to support each other (Ottawa, 14 November 2018).

However, as I explained in Chapter Four, although Amelia’s event reserved space for non-White women- and queer-led businesses, many of these attendees later criticized the event for maintaining White privilege through the presence of a uniformed officer. This tension between this event’s intentions and major mistakes demonstrates the challenges involved in curating an intersectional feminist community, which often hold different perspectives on key organizational issues, like ensuring safety.

Furthermore, although there are many feminist and non-feminist makerspaces, it is important to note that there are other identity-based makerspaces in Canada. For example, as noted by Jo, in Toronto there is a BIPOC-only makerspace that may serve as a better suited environment for feminist makers of colour. While it may be tempting to view all these different spaces as a sign that Canada has fragmented maker cultures, Luce explained to me that all these spaces are *complementary* to one another:

[Even though we created a separate feminist makerspace] we didn't want an antagonism with [the people from our other makerspace]. So, we wanted to be more, in a sense, complementary. That's how we wanted to frame us because we didn't want to be completely ... like, despised by them. [Laughs]. And it was not the point to completely, like cut ties. But *we* decided that we wanted to organize something *different*. And we were passionate about it and it excited us. And we hoped that it would excite them as well that we were creating this multiplicity in Montréal of different types of ways of understanding hacking/making/tinkering, you know? (Montréal, 10 October 2017).

Yvette also told me that, while her Montréal makerspace is an explicitly feminist space, their overall goals are also framed in terms of collaborating with existing makerspaces and other similar offerings in the city:

we are more focusing on [...] workshops with other centres to offer things that are complementary. And that works really well because we can share our [membership bases] that are interested in [similar] workshops, and we can say: "Okay, go to this centre. They are doing that". And so, we collaborate with other organizations. I think it's a way more feminist approach too, to work with others (Montréal, 25 October 2017).

Yvette further explained that collaboration is not only in line with their “feminist approach” but also is necessary in terms of sustainability. By being complementary rather than competitive, Yvette told me that they can focus on running smaller, more intimate, workshops and not have to worry about constant expansion or competing with other spaces.

As such, while separate feminist makerspaces and maker events exist, to view them as entities that are entirely removed from the wider hegemonic Maker Culture network is inaccurate. As stated by Luce, the point of these spaces is not to ‘cut ties’ but rather to create plurality around what makerspaces are, who participates in them, and what they seek to achieve. As such, in creating feminist-only makerspaces, feminism is not always a hard boundary that demarcates who is ‘in’ or ‘out’; in some cases, a simple lexicon serves as the key vetting tool that close ‘open-doors’ and limits poor behaviour including the types of harassment and violence many feminists report experiencing in non-feminist spaces. Another intersection between feminist making and the wider hegemonic Maker Culture network also appeared when some of my participants re-circulated neoliberal logics of empowerment when explaining the value of feminist making. In the next section, I explore this tension further by unpacking how feminist empowerment can also work to simultaneously disrupt *and* uphold oppressive logics, like neoliberalism.

5.3 “It’s about empowering people”: Feminist Empowerment as a Neoliberal Logic

During my conversations with Canadian feminist makers there emerged a fraught relationship between feminism and neoliberalism. On the one hand, many of the feminist makers I interviewed were critical of Maker Culture’s corporate aims and practices. For instance, Becky strongly admonished the “corporate identity as DIYer” (Toronto, 26 July 2017), which embodies the logics of neoliberal entrepreneurialism and passionate work. Luce was also skeptical of the emancipatory value of generic skill-building computer coding bootcamps that focus on ‘empowering’ women through re-skilling for future

employment in technology (Montreal, 10 October 2017). To clarify, the concern here lies not with individual DIYers who are making money or that bootcamps are teaching women technical skills; instead, the issue is that the continual perpetuation of neoliberal logics that view these specific kinds of knowledge and skills as ‘empowering’ operate to mold individuals into ideal neoliberal citizens who are adaptable to uncertain economic futures.

Yet, at the same time, other Canadian feminist makers continued to circulate neoliberal logics when explaining why making and makerspaces are important for Canadian feminist politics. Specifically, the concept of ‘empowerment’ operates as both a logic of neoliberalism and feminism. For instance, Jehanne, an organizer of a feminist makerspace in Montréal told me that her group “encourage[s] more women to take part in emerging forms of creative expression” (Montréal, 25 October 2017). She continued to explain:

In a context where only a few women used new technologies, [my space’s] founders wanted to establish a support system for feminist engagement in the burgeoning world of ‘cyberspace’ and in the emerging field of media arts. [Our space] empowers women to become ‘creators’ rather than ‘spectators’ by supporting active participation in the production of art and knowledge (Montréal, 25 October 2017).

In the realm of technology, the logics of empowerment are usually deployed as a mechanism to recruit marginalized people—like women, Indigenous and First Nations, trans*, and queer folks—into science, technology, engineering and mathematics (STEM) classrooms and industries. As such, for some of my participants empowering women/femme folks through STEM skill development and knowledge-building were demonstrative of successful social change. For example, Samira, who works as an organizer for a feminist makerspace, told me:

Yeah, there is this ideology of ‘change’, like as a concept. But the way you make that happen is by planting seeds in people and for them to develop their own skills and take the initiative. Because [our space] can only do so much. Like, you know, it’s like a space [organized by] five people so there’s limitations. So, it’s about empowering people and, yeah, have them do whatever they want to do (Montréal, 25 October 2017).

Therefore, many of the feminist makers I met with echoed some of the logics of neoliberal entrepreneurialism that underlie the ethos of hegemonic Maker Culture—especially democratization, resilience, and empowerment. Yet, empowerment within the logics of neoliberal entrepreneurialism is often considered to be short-sighted solutionism. While this empowerment logic may increase *some* women’s presence in STEM environments, it is unlikely that their mere presence will foster more radical cultural and institutional change. Therefore, a conundrum emerges for feminist makers: while their politics seek to defunct oppressive power structures and institutions, economic realities require them to remain beholden to those same structures. Of course, this ‘neoliberal conundrum’ is not unique to the Canadian feminist maker experience, but rather represents an extension of existing feminist conversations. Indeed, the fraught relationship feminism has shared with neoliberal logics has been a central concern in broader feminist scholarship, including research on contemporary motherhood (Rottenberg, 2018; Archer, 2019; Timmins, 2019), work/labour structures (Goodman, 2013; Adamson, 2017; Rottenberg, 2018), activism (Baer, 2016; Ready, 2016; Manguashca & Eschle, 2018) and popular culture (James, 2015; Hopkins, 2018; Spiers 2018).

However, rather than ignore these conundrums, many of my participants told me that feminism is about engaging with them through critical reflection and dialogue. For

example, Gabriela told me that critical dialogue was a fundamental principle for her mini art gallery that she runs out of her apartment in Montréal:

“[my gallery’s] mandate is to have a critical dialogue portion where there is an hour with the artist who talks about their work and also for people to have a conversation about the theme. And, for me, feminism is about taking ideas, themes, and conversations to a deeper level. And to be critical and have dialogue and to make sure that that *actually* happens, not just see objects and have that be the end of it. But, to like really dive *deeper* into what is being created (Montréal, 25 October 2017).

Gabriela explained that engaging in critical reflection “kinda keeps you sharp and makes you more focused on what *really* matters” (Montréal, 25 October 2017). Luce also told me that she structures her workshops using a critical holistic framework, telling me:

[...] we need to be *very* clear about the materiality of technology. So, we always bring it up. [...] So, from the beginning we point out that we have access to great devices, we have access to computers, but where do *all* the elements to build the technology come from? They often come from, you know, if it’s the DRC, it’s in Africa. So it’s linked to resource extraction. So, who assembled this technology? Mostly in China. So, who are the people who are in the assembly line? Chinese women who are often exploited. So, you have, like, labour issues that come up. You have extraction issues that come up. So, it’s more than *just* the technology. We really try to embed what we do in a holistic kind of framework. Because, if we care about violence [...], then we cannot differentiate between [different] types of violence (Montréal, 10 October 2017).

So, for Luce, in addition to teaching encryption skill-building, she also dedicates time and space during her workshops to emphasize “some form of political visibility” (Montréal, 10 October 2017). She explained that:

[w]e make things visible. Like, whether it’s the lack of women or people of colour in the hacker world. Or, whether it’s about these controversial life experiences, issues like our role in the Anthropocene. [...] [Our workshops are] not only practical workshops. Like we’re embedding our practical workshop in something *larger*. Because you *need* to understand the meta-level and to inscribe your practice in the meta-level. And be aware of all the ... the milieu, you know? (Montréal, 10 October 2017).

Yvette also told me that considering broader contexts or situating one’s maker practice is fundamental to the workshops hosted at her feminist makerspace, telling me:

[...] we will have a part that is more on theory or concepts, and then a more practical approach. Sometimes that happens in two different workshops or as discussion and a workshop, and it will be around the same artist and practice. [...] [F]or me, that's *really* important, to know what we are doing and *why* we are doing it is always a part of the process (Montréal, 25 October 2017).

Jo also emphasized the importance of having critical dialogue, telling me that she co-created a conference that brings together a diverse group of makers that use making as a way to foster social change: “[w]e kind of have a critical perspective on some of the rhetoric around Maker Culture, and we try to find people who have projects that, you know, we think are actually making a difference. And sometimes they are full on projects, or just conversations. But yeah, we are trying to actually live up to some of those things in a way that isn’t the same old stories that get told” (Toronto, 26 July 2017).

Therefore, while structural privileges and neoliberal logics are two ongoing tensions underlying feminist making in Canada, incorporating more holistic understandings of the social, political, economic, legal, and environmental impacts of making allows for these communities to critically engage with these tensions. In fostering a community premised on critical reflection and dialogue, feminist makers work towards disrupting the short-sighted economic and technical solutionism of Maker Culture to make room for more radical approaches and ideas.

5.4 Conclusion: Re-Tooling Up

The aim of this chapter is to understand the uneasy and contradictory relationship between non-hegemonic makers—in this case, Canadian feminist makers—and hegemonic Maker Culture. As demonstrated in Chapters Three and Four, hegemonic Making has been dismissed as an apolitical corporate brand that ignores the impacts of

structural privilege. As such, its makerspaces are described as toxic ‘boys-clubs’ that are hostile towards women, queer and trans* folks, and BIPOC individuals. Yet, despite these ongoing critiques and negative experiences, the Canadian feminist makers I met with shared a common appreciation for makerspaces, referring to them as sites to re-engage with feminist politics. Relying on Woods’ notion of *adaptive strategies*, throughout this chapter, I demonstrated how Canadian feminist makers simultaneously accept *and* resist the hegemony of Maker Culture. For example, some of my participants provided a narrow understanding of feminist politics—framing it as ‘only for women’. Additionally, like hegemonic Maker Cultures, many of the feminist makerspaces I visited lacked diversity, as they tended to be populated by White and cis-gender women. Furthermore, at times these feminist makers re-circulated neoliberal logics of empowerment when explaining the political significance of feminist making and makerspaces. Therefore, like hegemonic Maker Culture, there are moments in Canadian feminist makerspaces when feminist ideals—like diversity, anti-oppression, and intersectionality—are not always reflected in practice. However, rather than viewing this as a failure of feminism, I contend that these tensions demonstrate the difficulties in implementing activist ideals. Therefore, these shortcomings are not just symptomatic of hegemonic Maker Culture, but rather are widespread challenges found within all sorts of activist communities.

However, rather than rendering these tensions invisible or viewing them as a ‘non-issue’, feminist makers recognize these challenges and are *actively* working towards developing solutions within their communities. A key solution forwarded by my participants was to move away from the static Maker identity and instead focus on

creating communities based on *holistic making approaches*. Therefore, although many things are called ‘feminist’, for my participants this label was not the defining feature of *feminist making* or *feminist makerspaces*. Instead, it was about using specific language, engaging in meaningful conversations about complicated issues, and being mindful about your role in using and producing technology.

Conclusion

Makerspaces Are Dead, Long Live Maker Culture: Re-Visiting the Shifting Discursive Terrains of ‘Making-as-Activism’

In setting out to study Maker Culture as a dissertation project, one of my aims was to understand more deeply how DIY practices—such as making, crafting, hacking, and tinkering—have been transformed from simple personal pastimes to meaningful activist engagements. As such, two broad questions that I developed for this work are: 1) how does the act of making something yourself (or with others) constitute a form of meaningful activism; and 2) what institutions and/or sites of power are being challenged by this sort of activism? In Chapter One, I explained that within established academic philosophies of making, certain DIY practices are conceptualized as meaningful through three discursive terrains, which I referred to as *embodied materialist*, *critical making*, and *making as communication*. While these three terrains tend to be presented as separate perspectives on ‘meaningful’ making, I argued that all three of these terrains overlap through shared values pertaining to the political, social, and economic impacts of DIY practices. Some examples that I used in this dissertation to represent this overlap include research about the Arts and Craft Movement, early hacker clubs, feminist craftivism, hackerspaces, and makerspaces. Therefore, while these examples differ in aims and approaches, the same core assertion underlies all of them: learning new DIY skills, working with certain materials, and building creative communities are meaningful activist undertakings. Within this context, making and sharing objects and knowledge are inherently political acts that disrupt the status quo of various sites of oppression, such as consumer capitalism, patriarchy, colonialism, and environmental degradation.

As my research journey progressed, I uncovered another way to conceptualize DIY politics and making-as-activism. Rather than identifying DIY politics through its communities of practice, I discovered that DIY *becomes* making-as-activism when it is situated within one of these three ‘meaningful making’ discursive terrains. To demonstrate how this transformation occurs, I re-conceptualized both makerspaces and the wider Maker Culture network as *discourse communities*, which I claim re-produce these three ‘meaningful’ discursive terrains to justify their significance and demonstrate their broad impacts. Therefore, I contend that Maker Culture and makerspaces do not form a ‘new’ movement, but rather are a re-packaging and re-circulation of these existing making-as-activism ideologies, which I traced to early Greek philosophical debates of *technē*, *epistēmē*, *poiesis* and *praxis*. However, within these discourse communities, and across the wider network, embodied materialism, critical making, and making as communication discourses do not circulate evenly or equally. Indeed, after visiting various makerspaces, attending Maker Culture events, and talking with different people involved, I have concluded that these three discursive terrains create contradictory—and at times contested—intersections between activist ideologies and making-as-activism practices.

However, up to this point, this dissertation has focused on Maker Culture discourses that were largely circulating between 2013 and 2018. During this time, Maker Culture was often celebrated, as authors enthused about the rising popularity of DIY politics and the widespread creation of makerspaces within schools, libraries, and activist communities around the world. As I conclude this project in 2021, I would be remiss in leaving the impression that such enthusiasm continues steadily. Indeed, since late 2017,

Maker Culture has been noticeably struggling, leading some to declare that it is dying or dead (Sohi, 2019; Y Combiner, 2019). Yet, at the same time, since the unanticipated arrival of the global COVID-19 pandemic in 2020, there has been an explosion of DIY activity, especially that related to ‘homesteading’, like gardening, baking, food preservation, and textile work, like sewing, knitting, and crochet (McColl, 2020; VanDerWerff, 2020). What I find interesting about this more recent flurry of DIY activity is that it is largely concentrated in skills and practices that I argued in Chapter Three are typically marginalized from hegemonic Maker Culture. As such, since 2020, another ‘meaningful’ DIY discursive context has emerged within popular public narratives, which I refer to as ‘pandemic discourse’. What I find significant about this emerging context is how it re-claims previously non-hegemonic crafting and homesteading practices—and their emphasis on DIYing food, clothing, and shelter—as not only meaningful but *necessary* to basic survival. Therefore, I decided to finish this dissertation project by re-visiting embodied materialist, critical maker, and making as communication terrains to explore how some aspects of making-as-activism has died, while others have been revived and transformed since 2018.

6.1 Makerspaces are Dead? The Problem with Embodied Materialism

In Chapter One, I explained that embodied materialism often appeared in ‘meaningful’ making discourse through the value of *physicality*—in the forms of ‘hands-on’ making, objectivity, and offline community-building. Indeed, throughout this dissertation, physicality consistently re-emerged as a salient underlying concept. For

example, in Chapter Three, in the creation of the hegemonic ‘Maker’ identity,⁸⁷ mainstream images of Making often focus on Makers’ hands as they manipulate physical materials to create tangible objects. Furthermore, as I explained in Chapter Two, popular descriptions of makerspaces tend to define them spatially, emphasizing them as *physical* ‘real-world’ workshops with open floor plans, large workbenches, machinery, and shelves filled with hand tools and materials. Indeed, the physicality of makerspaces—e.g., they operate offline, foster real-world connections, and make physical objects—typically justifies their value as important sites for activism. This perhaps was made most apparent in Chapter Five, where I described feminist makerspaces as both safe havens where feminists “can breathe” (Gabriela, Montréal, 25 October 2017) and political spaces where marginalized folk ‘take up space’ and disrupt patriarchal power in public domains. Therefore, across both hegemonic and non-hegemonic perspectives, embodied materialist discourse serves as the bedrock for conceptualizing Making and makerspaces as sites for activism.

However, physicality was not always viewed as beneficial. Indeed, as shown in Chapter Four, the fact that makerspaces required physical space was cited as a key challenge for creating and maintaining these kinds of communities. For example, routine ‘housekeeping’ like taking out the trash, cleaning bathrooms and kitchens, and organizing supplies were viewed as *labours of love*. I argued that conceptualizing these tasks as *care work* helps us to understand why certain chores are tinged with unconscious gendered assumptions that results in women/femme members performing this extra work

⁸⁷ As a reminder, I am intentionally capitalizing ‘Maker’ as reference to hegemonic representations of Making and Makers, which I argued in Chapter Three is viewed as distinct from other types of creative DIY practices, like crafting.

more often. Furthermore, connecting these experiences to broader care work research affirms that this is not just a ‘Maker Culture’ problem, but one that is rooted in deeply entrenched heteronormative gender roles and expectations found in patriarchal societies. Chapter Four also demonstrated the dark side of physical space, with some feminists recounting experiences of harassment and other off-putting behaviours that turned their makerspaces into unsafe and potentially dangerous physical environments. The *emotional labour* of dealing with these poor behaviours and navigating risky real-world situations were cited as key reasons for burn out and feminist exit from makerspaces. As such, one of my central critiques of hegemonic Maker Culture discourse is that it unintentionally reproduces *invisible structures of privilege* through its failure to acknowledge and address the substantial challenges that comes with building on embodied materialist terrain, including inequitable barriers of access, gendered work/labour assumptions, and creating potentially dangerous physical environments.

However, since 2018, there has been a notable shift in mainstream makerspace discourse as many sites that were once heralded as pillars for Maker Culture began to fail. For example, despite its early success in raising nearly \$11 million USD in investment and having a solid paying-membership base in the hundreds, Mark Hatch’s chain of American makerspaces—TechShop—once viewed as a cornerstone of the Maker Movement (Hatch, 2014), filed for bankruptcy and closed all ten of their locations in November 2017 (Cole, 2017). Similarly, Mitch Altman’s Noisebridge has encountered financial hardships as their operating costs—especially those related to two substantial rent increases over two years—are eclipsing their monthly donation budget (Noisebridge, 2020). In many ways the success of these makerspaces has led to their downfall—in

transforming derelict warehouses into profitable spaces, landlords and property managers have leapt at the opportunity to re-designate these spaces as “boutique loft workspaces” (Applin, 2019, np) thereby leasing new makerspaces—or re-signing existing ones—under premium rent prices. With this increase in property value, many makerspaces are being priced out of their cities (Applin, 2019). While some of these ‘makerspaces are dead’ authors are writing about Silicon Valley and San Francisco makerspaces (Applin, 2019; Y Combiner 2019), I contend that this trend extends well beyond California. For example, both Toronto makerspaces that I visited in 2018 for this dissertation, have since posted notices on their websites or social media stating similar hardships. In fact, once their lease expired, one space decided to close permanently because they could not locate another affordable space for a small maker collective in Toronto. The other Toronto space has launched a public fundraiser, stating on their website that they need to raise \$25,000 to cover their rising costs or they too will have to permanently close (source withheld for confidentiality; last accessed March 9, 2021). Furthermore, two of my Montréal feminist makerspaces have combined: a move that Luce predicted might happen during our interview in 2018 due to the lack of affordable spaces in Montréal.

On top of these individual makerspace hardships, in June 2019 Maker Media Inc. shocked the entire Maker Culture network when they abruptly announced that they were in a state of insolvency (Nardi, 2019). In an interview with *TechCrunch*, CEO Dale Dougherty explained that due to a lack of corporate sponsorship—Autodesk and Microsoft being key sponsors who pulled their support in 2019—he was forced to immediately cease Maker Media Inc. operations (Constine, 2019). In an *EdSurge* article, Dougherty explained that “maybe it’s a sign of the times” (Corcoran, 2019, np) stating

that “Corporate America is not supporting things like this” (Corcoran, 2019, np) despite spending millions on branding that associate their companies with Making and makerspaces. However, Dougherty’s pessimism was short lived as new corporate sponsors—such as Oculus co-founder Palmer Luckey—and a successful GoFundMe page allowed Maker Media Inc. to re-launch as Make: Community LLC in July 2019 (Constine, 2019), thereby re-establishing *Make:* magazine, Maker Faire, and the *makezine.com* website.

Therefore, with this growing public acknowledgement from key hegemonic Makers—such as Dale Dougherty, Mitch Altman, and Mark Hatch—about the difficulties in sustaining Maker lifestyles and physical communities without corporate support, these post-2017 ‘death of makerspaces’ narratives have generated a more somber and restrained public discourse about the realities and challenges of building embodied materialist spaces. As such, after re-visiting hegemonic Maker Culture discourses in 2021, there emerges a notable rift between current and earlier contexts. Whereas as previous hegemonic representations over-emphasized ‘*success narratives*’ and ‘*passionate work*’ discourses, post-2018 narratives have largely silenced these overly optimistic perspectives, by recognizing that makerspaces run on more than love and passion, but also steady capital and/or corporate interest. Therefore, whereas earlier Maker identities were largely shaped by an allegedly unfaltering ‘entrepreneurial spirit’ fueled solely by the love of Making, more contemporary narratives reposition the Maker as one who sometimes fails as they attempt to navigate their complex entanglements within neoliberal capitalist society.

Although these struggles and failures of makerspaces and Maker Media Inc. may lead some to conclude that this scene is ‘dead’, I contend that rather than perishing, Maker Culture is in a state of transformation, as previously hegemonic and non-hegemonic discourses morph together to create a re-shaped discursive terrain. This blended terrain is perhaps most notable within the current context of the COVID-19 global pandemic. As the constant demand for personal preventative equipment—like masks, face shields, and hand sanitizer—overwhelmed the outputs of manufacturers, there emerged numerous stories of local makerspaces being ‘revived’ to crowd-source medical equipment production for front-line workers in their communities. What I find most interesting about this emerging pandemic Maker Culture discourse is the way that Maker identities and makerspace purposes have been re-defined to include crafting and homesteading practices. In Chapter Three I critiqued hegemonic Maker Culture discourses and makerspaces for their prioritization of ‘cool’ and ‘techy’ projects and practices, which I argued produced exclusionary *boundary-work* that marginalized alternative DIY engagements, such as crafting. However, through this ‘revival’ discourse, makerspaces have re-formed around these previously excluded DIY undertakings. Therefore, re-visiting the definitional borders of Making in 2021 demonstrates that these discursive boundaries are not rigid or permanent, but rather are constantly in flux as they bend and flex with ever-changing social and discursive contexts. However, embodied materialism was not the only terrain to change by these emerging pandemic narratives. In the next section, I explore how critical making frameworks have also shifted within the context of COVID-19.

6.2 The Critical Making Revival? Flattening the Curve & Building Resiliency

Critical making was another discursive terrain that I argued in Chapter One imbued various DIY activities—like making, hacking, and crafting—with activist ‘meaning’. I argued that Aristotle’s notion of *praxis*—which involves using knowledge to guide ethical or virtuous action—is a key theoretical framework that transforms ‘making’ into ‘critical making’. From this perspective, *praxis* is used to guide critical making practices, with the aim to further understand and intervene in complex systems of power and authority. However, *praxis* or critical knowledge/theory is not often apparent in the construction of Maker identities or the performance of Making practices. Therefore, while critical making has gained traction in some academic makerspaces, these holistic *praxis*-based approaches were not frequently represented in pre-pandemic discussions of Making or makerspaces.

However, within the context of the COVID-19 pandemic, ‘critical making’ was a strong theme in mainstream discourse as the collective responses found in ‘revived’ makerspaces were viewed as both politically significant and noble. For example, Open Works—a Baltimore makerspace—created an open call for 3D printed face shields and sent it around to other printers in the city. With more than 250 printers in Baltimore responding to the call, some members of Open Works created an online tool called “We the Builders” to help orchestrate the community’s printing projects (Capps, 2020). As of April 15, 2020, this local crowd-source approach resulted in the creation of 7,625 face shields in twenty-one days (We the Builders, 2020). According to a message on We the Builders (2020), these shields are being sold at cost to first responders and healthcare

workers. Writing about the response from United Kingdom Maker⁸⁸ communities, Corsini et al. (2020) found that makerspaces “significantly contributed” (p. 12) to the UK’s COVID-19 response through the production of hundreds of thousands of masks, face shields and other essential items. And, in Italy, when commercial manufacturers became overwhelmed by demand, a group of volunteer makers created life-saving 3D-printed valves for respiratory machines (Richterich, 2020). Annika Richterich writes that “these DIY projects were thus ‘critical’ in several ways: first, they assessed, responded to, and further exposed politicised [sic] healthcare equipment shortages. Second, in drawing on open source and collaborative approaches, they countered proprietary, profit-driven healthcare innovation” (2020, p. 163). Echoing this position in a *Bloomberg* article, Kriston Capps writes that “the coronavirus represents an opportunity to demonstrate exactly why making stuff can be so powerful. [...] makers are rising up to play a life-saving role in this global struggle” (2020, np). Therefore, whereas pre-pandemic Maker Culture had been heavily criticized for its blind enthusiasm for ‘making more stuff’—especially through 3D printing—within critical making pandemic discourse, making becomes a more focused undertaking that is tailored to supporting the needs of frontline workers and at-risk communities.

Of course, I must note here that using DIY to produce affordable medical equipment and assistive devices also existed within pre-pandemic makerspaces and hegemonic Maker Culture discourses. For example, e-NABLE is a volunteer maker network that uses 3D printing to create inexpensive prosthetics (Richterich, 2020). Other examples include Ainsling Ann O’Kane’s (2013) research on maker communities who

⁸⁸ Capitalization was used in the original article.

were creating DIY insulin pumps for people with Type-1 Diabetes and Sánchez Criado et al.'s (2016) project that analyzed how Spanish makers were addressing the health austerity crisis by creating affordable accessibility devices and services. However, these pre-pandemic medical DIY discourses were at the margins of hegemonic Maker Culture. As explained by Corsini et al. (2020), “these initiatives have been relatively small-scaled and isolated from mainstream production activity” (p. 4). However, within the context of COVID-19, these previous DIY health discourses exploded as DIY became a vital tool for ‘flattening the curve’. For example, local distilleries shifted their focus from making whiskey to hand sanitizer (Applin, 2020) and textile artists, designers and retailers pivoted to meet the demand for non-medical grade face masks (Capps, 2020; Corsini et al., 2020) and medical skull caps (Darrell Thomas Textiles, 2020).

However, these DIY responses to the medical supply crisis have received pushback from medical supply companies. For example, the Italian group who 3D printed respirator valves were threatened with patent violation litigation from manufacturers, and others have raised questions about the ethics of distributing non-certified medical equipment to medical professionals (Feldman, 2020; Richterich 2020). However, rather than deter these ‘critical’ DIY responses, these legal and ethical pushbacks have reinvigorated original hegemonic discourses that view Maker Culture as a noble undertaking. For example, volume 73 of *Make*: magazine is dedicated to these “DIY heroes”, as “makers step up to combat Covid-19”.⁸⁹

While I do not doubt that these collective responses from individual makerspaces, and the wider Maker Culture network, are indeed noble and worthy of accolades, I do

⁸⁹ Link to the cover: <https://www.makershed.com/products/make-magazine-volume-73-pdf>.

find myself questioning whether these actions represent critical making or making-as-activism? While COVID-19 threatens the stability of key social, political, and economic institutions—with mass casualties, spiraling global economies, work-life-play upheavals, and increased surveillance and policing—rather than forward a radical activist response, these revived ‘critical making’ discourses emphasize *survival*, *maintenance* and *resiliency* narratives. In other words, while these revived makerspaces have highlighted the politics of health care, this newly shaped critical making terrain does not further disrupt and challenge the root power structures that create these inequities. Instead, through mainstream co-optation, these pandemic narratives have de-politicized critical making, shifting it to become ‘critical to’—rather than its original ‘critical of’—the status quo. While this is a disappointing development for this current iteration of critical making discourse, it is not unexpected. Indeed, it is important that I emphasize here that such co-optation and de-politicization of critical making is not limited to the pandemic, as these concerns have long been a part of making-as-activism discourse and DIY practices have long been leveraged by both corporate and state discourses through neoliberal lifestyle and self-managerial practices (see: Callen, 1979; Crawford 1997; Wall, 1999; Ratto & Boler, 2014; Bogers & Chiappini, 2019).

However, despite this de-politicization of the critical making discursive terrain, this new pandemic discourse does contain some redeeming qualities. For instance, in framing DIY as critical to survival, these narratives place emphasis on the values of *care*, *support*, and *community* over individualism and economic growth. Therefore, unlike the pre-pandemic hegemonic discourses that I analyzed in Chapter Four—which I argued over-emphasized the potentials of Making using neoliberal logics of

entrepreneurialism—in this pandemic discourse, ‘meaningfulness’ is centered in non-economic terms through themes of wellness, supporting at-risk communities, and care. In other words, these more recent hegemonic DIY discourses and practices are more closely aligned to non-hegemonic feminist ‘little m’ making discourses that I analyzed in Chapters Four and Five.

Of course, in some ways, *certain* DIY practices—like crafting, homesteading, and art—have always intersected with wellness and care discourses to some degree. For example, homesteading practices (e.g., baking, gardening, food preservation) intersect with ‘caring’ discourses as they are understood as reproductive practices that provide healthy sustenance for oneself and one’s family. On the other hand, gifting friends and family homemade artwork or craft projects are viewed as a way to show someone that you care about them. In Chapter Three, I argued that crafting practices are intimately entangled in gender, race, and class stereotypes and assumptions; as such, it is perhaps of no surprise that these DIY practices—compared to, say, tinkering on the car in the garage—are more easily associated with assumptions about domesticity and care work. Indeed, as I argued in Chapter One, craftivism and DIY feminism discourses aim to politicize care work by transforming crafting skills from trivial pastimes to meaningful activist undertakings.

Furthermore, crafting, homesteading, and artmaking are often framed using ‘personal wellness’ rhetoric—describing such activities as bringing personal satisfaction, happiness, stress relief, and mood elevation. Mary Ann McColl (2020), a Professor of Rehabilitation Therapy at Queen’s University, writes that “meaningful activities [such as these] can be a source of healing and relief in stressful times” (np). Indeed, in March

2020—which in Canada marks the beginning of the COVID-19 lockdowns—the hashtag #stressbaking had over 26,000 posts on Instagram (Clifford, 2020). Therefore, knitting a sweater, doing yoga, or taking up an art project are all ‘meaningful’ care and wellness activities (Johnson, 2019; McColl, 2020). As such, it is perhaps of no real surprise that these ‘feel good’ DIY activities have escalated during the global COVID-19 pandemic. However, whereas these pre-pandemic discourses tend to frame these activities as personally gratifying, what I find compelling about the wellness and care narratives surrounding hegemonic pandemic discourses, is their emphasis on *collective care* approaches. Therefore, rather than applauding individual Makers for their savviness in DIYing their own personal preventive equipment, these discourses instead focus on the ways in which the Maker Culture network is working collectively towards identifying local needs and helping at-risk communities. This shift has left me wondering whether collective care could be conceptualized as a different way to think about the significance of making-as-activism. In the final section of this chapter, I explore this concept of collective care further and examine whether it could serve as an improved way to develop ‘meaningful’ activist discourse and build sustainable communities.

6.3 Caring is for Everyone: Towards an Ethic of Collective Care & Joint Responsibility

In the previous section, in explaining the discursive shift of critical making from being ‘critical of’ hegemonic institutions of power to ‘critical to’ their maintenance and resiliency, I tended to pit ‘care’ discourses against ‘activist’ ones. For example, I argued that pandemic critical making tends to favour themes of resiliency, maintenance, and

survival over political activism, disruption, and radical intervention. In creating this comparison, this first set of concepts—which more broadly could be defined as ‘care’—are presented as separate from those that are associated with radical politics and social justice activism. In other words, ‘care work’ is isolated from—and, in a sense, in opposition to—activism. However, just as the politics of ‘making-as-activism’ shifts and changes depending on its surrounding discursive contexts, I contend that care work can be conceptualized as both a form of neoliberal infrastructure and radical political activism, depending on its surrounding discursive contexts. For example, as I explained in Chapter Four, within the logics of neoliberal capitalism, ‘care’ is presented as ‘self-care’ strategies that build *individual* resiliency within oppressive hierarchical systems of power and authority. However, in Chapter Four I argued that intersectional feminist communities have relied on ‘care work’ strategies to build *collective* resiliency and prevent burnout within their communities. Therefore, to conclude this project, I theorize the value of *collective care work* for activist community-building.

To begin, it is important that I acknowledge that conceptualizing collective care work as vital to activism is not unique to this project. For example, the online collective space, Politics & Care, which formed in Montréal during the 2012 student strike, has been making links between collective well-being, care work, politics, and community organizing through online discussions and offline workshops (Politics & Care, 2020). In their article for *Briarpatch*, Rushdia Mehreen and David Gray-Donald (2018), define collective care as:

[...] seeing members’ well-being—particularly their emotional health—as a *shared responsibility of the group* rather than the lone task of an individual. It means that a group commits to addressing interlocking oppressions and reasons for deteriorating well-being within the group while also combatting oppression in

society at large. It places an emphasis on *joint accountability*, with the aim of collective empowerment (emphasis added; np).

Mehreen and Gray-Donald (2018) write that often within activist communities, those who contribute “at extreme levels” (np)—e.g., by working for days on end without sleep or rest—often “build more social capital, and claim more decision-making power” (np), which results in ‘non-hierarchical’ collective organizations re-producing “invisible hierarchies” (np). Echoing my concerns of the invisible structures of privilege that I found within makerspace organizing (Chapter Four), Mehreen and Gray-Donald contend that “some form of privilege related to race, class, ability, gender, and sexuality is typically what underlies hierarchies based on involvement and decision-making power” (np). Writing about human rights organizing, Alice M. Nah (2020) argues that these gendered rules of activist engagement means that care work—in the form of both self-care and collective care—are often viewed as detrimental to activist momentum, and frequently framed as self-indulgent or something people should feel guilty about doing.

Therefore, while I argued in Chapter Four that some feminist makers prioritize collective care approaches—such as ‘checking in’ with one another and developing 80/20 work policies—these strategies are not always prevalent in feminist activist communities. For example, in a Politics & Care post from November 2018, the writers claim that even in feminist organizing, care is often viewed as the “soft side” (Politics & Care, 2018, np) of activist organizing and rarely is it provided the same time and attention as other aspects of movement organization, like strategy and mobilization. This inattention to, and need for, collective care work within activism have been recurring themes within many facets of activism, such as: digital feminist activism (Mendes, Ringrose, & Keller, 2019), human rights organizing (Nah, 2020), and disability activism (e.g., Hande & Kelly,

2015). While each of these activist communities have different approaches and goals, from this research there emerges a shared concern over the gendered politics of care work and emotional labour which celebrates ‘masculinist’ values—such as bravery, sacrifice, and individual contributions—over ‘feminine’ collective care ones. Therefore, while Gilligan conceptualized a feminist ethic of care as being one that reclaims care as an innately human quality (Chapter Four)—e.g., caring and providing care is something we *all* should be compelled to do—patriarchal and neoliberal power structures continue to dictate *who* does caring work, even within feminist and other anti-oppression activist communities.

Within the context of makerspaces and making-as-activism, I contend a similar prioritization of ‘action’ or ‘doing’ results in an undervaluing and dismissal of collective care work. For example, making as communication discourses—which in Chapter One I categorized as the third discursive terrain that shapes ‘meaningful’ making—emphasizes that the value of ‘making’ lies in community-building potentials, resulting in active political engagement, networked citizenship, and interpersonal connections. In other words, unlike leisurely DIY hobbies, both hegemonic and non-hegemonic iterations of ‘meaningful’ making are often situated within active communities that are always ‘doing something’ meaningful. However, what if we shifted these views of making-as-activism as ‘caring for’ something rather than ‘doing’ something? How would our understandings of Maker Culture and makerspace politics change if we viewed their purpose as sites to spread an ethic of collective care? Borrowing from Mehreen and Gray-Donald’s definition above, I contend that collective care and joint responsibility serve as vital principles for building resilient, inclusive, and effective makerspace communities.

Fundamentally, building a makerspace from a collective care perspective de-centers ‘the individual’ by establishing joint responsibility. From this perspective, establishing and maintaining a healthy and safe community becomes the responsibility of all members equally. Examples from Chapter Four of practices that I contend align with a collective care approach include formal organizational strategies—such as establishing clear mandates and/or Codes of Conduct that uphold principles of care and safety, and implementing 80-20 rules—and informal organization work, like providing ‘check ins’ with other members of the community and performing ‘welcoming work’. The feminist makers that I interviewed for this project unanimously reported that these strategies have made their makerspaces more comfortable to work in. While there remained significant challenges in implementing these practices, I contend that many of these recurring issues emerged because this care work was still the responsibility of ‘the few’—in this case the feminist makers I interviewed—rather than a joint responsibility shared by the *entire* community.

Joint responsibility is also a necessary component of activist community building because it prevents insularity. While both hegemonic and non-hegemonic ‘meaningful making’ discourses emphasize the broad impacts of making-as-activism, critics of the ‘Maker Movement’ have shown that while makerspaces and Maker events do appear in poorer neighbourhoods, racialized communities, and developing countries, they typically only cater to a homogenous group of already privileged people. This has led some researchers to conclude that rather than empowering at-risk or in-need communities, Maker Culture is nothing more than re-packaged gentrification and neo-colonialism (Waldman-Brown et al., 2015; Wernimont & Losh, 2018; Gu & Shea, 2019). However,

recent pandemic discourses have shown that when makerspaces employ a collective care approach, they can (at least modestly) have positive impacts on local communities, while still fostering a creative and innovative ‘maker spirit’. Therefore, I maintain that replacing the broken logics of Maker Culture with collective care approaches is necessary to fully revive and sustain makerspaces as sites for ‘meaningful’ making-as-activism. As a start, I maintain that the hegemonic nodes of the Maker Culture network—popular outlets such as Make: Community LLC, *FabLab.io*, *hackerspaces.org*, and others—must develop a public-facing collective ownership over these issues plaguing their communities. In other words, rather than spouting empty rhetoric, like ‘Making is for everyone’, I contend that Maker Culture would be much more appealing, accessible, and effective if it shifted its ethics towards the collective care of, and responsibility for, others.

While I use makerspaces and the Maker Culture network as a site for conceptualizing the tensions between activist identity-formation premised in shared political ideologies and ‘real-world’ community-building, this dissertation contains numerous concepts that travel well beyond the borders of makerspaces, Maker Culture, and DIY politics. For example, in my Introduction, I explained how different *discourse communities* play both adversarial and mutualistic roles in co-defining an activist scene through hegemonic and non-hegemonic representations. In Chapter One, I built further on this argument and demonstrated that the philosophies and histories of activism can shift and change depending on the discursive terrain that surrounds them. As such, these first two chapters provide a theoretical framework for understanding how something *becomes political* and how hegemonic and non-hegemonic discourses co-create these

‘meaningful’ discursive terrains. In Chapter Two, I discussed the benefits and challenges of creating a research project that embraces a pluralistic approach to origins, definitions, recruitment, and analysis. I also reflected upon how my personal histories impacted the theoretical, epistemological, and ontological assumptions of this project. In this chapter, I also re-counted the importance of feminist research design principles, such as praxis, empowerment, self-disclosure, and validation. As such, this chapter builds on well-established intersectional feminist approaches to ‘doing’ research, and provides further insight into how working with non-hegemonic activists and communities can foster empowering effects, such as validating shared experiences of oppression.

In terms of analysis, in Chapter Three I explained how the concepts of boundary-work and boundary object appear in hegemonic and non-hegemonic representations. However, whereas previous conceptualizations of boundaries tend to assume that power lies within hegemonic representations, I argued that non-hegemonic communities *strategically* produce and maintain boundaries to justify how they are ‘different from’ the mainstream. Therefore, this chapter intersects with broader debates stemming from other counter-cultural scenes, communities, and representations as they too attempt to both strategically distance from, and become entangled in, popular culture. In Chapter Four, I analyzed how certain logics of neoliberalism—such as entrepreneurialism, ‘passionate work’, and empowerment—create ongoing tensions between activist ideologies and practices. In this chapter, I contribute to existing debates about ‘doing activism’ by highlighting how living an activist life is complicated by invisible structures of privilege and power dynamics. In Chapter Five, I focused on understanding the political and social value of creating separate feminist spaces, while also acknowledging the challenges that

emerge when using contested terms like ‘empowerment’, ‘feminism’ or ‘women’.

Furthermore, in this chapter I explained how some feminists have used ‘adaptive strategies’ to re-tool this contested language and strategically intervene in hegemonic discourses. However, in some cases feminist activist work does re-circulate oppressive logics—like neoliberalism, gender essentialism, and White privilege—which I argued demonstrates the difficulties in implementing intersectional feminist ideals within a broader patriarchal, racist, heteronormative, capitalist, neoliberal societies. As such, this chapter promotes a deeper understanding of the complex interconnections of hegemonic discourse, power, and activist intervention. Finally, in Chapter Six, I have forwarded the notion of ‘collective care’, which focuses on fostering joint responsibility within activist groups and the wider communities they should serve. This framework highlights the politics of care and how collective care infrastructure builds formal and/or informal organizations. Therefore, while I largely focused on making-as-activism, Maker Culture, and makerspaces, my theoretical analyses and conceptual frameworks are widely applicable to further comprehending how activist identities, ideologies, practices, and communities can simultaneously work in opposition to *and* in alliance with oppressive power structures and institutions. Therefore, as we all work to reconcile the ongoing contradictions of our personal and community identities and ideals within ever-shifting discursive contexts, as I end this journey, I am left with a deeper understanding of the complicated realities of living an activist life.

Appendices

Appendix A: Recruitment and Interview Materials

A.1 Recruitment Poster



CUREB Clearance #106571



Seeking participants for a 60 minute interview for a study exploring 'tinkering' spaces, 'Maker Culture', and feminist politics

Do you enjoy Crafting, Making, Hacking and/or Fixing all kinds of technologies?

Are you a member and/or organizer of a communal work space, like a:

Hackerspace

Makerspace

Community Workshop

Community Laboratory

Are you:

Female, Fem* and/or Woman-Identified?

Over 18 years old?

Located in either Toronto, Montréal or Ottawa?

If you are interested in participating in this study, or would like further information, please contact:

Jessica.Ring@carleton.ca

The Carleton University Research Ethics Board reviewed the ethics protocol for this project. Should you have questions or concerns related to your involvement in this research, please contact the Carleton University Research Ethics Office via email ethics@carleton.ca or by phone (613) 520-2600 ext. 2517

A.2 Recruitment Email



Dear _____,

My name is Jessi Ring and I am a PhD Candidate in Communication and Media Studies at Carleton University (Ottawa, Canada). For my dissertation, I am interested in studying different 'tinker' spaces—communal spaces that encourage playful experimentation and collaboration with various tools and technologies—and understanding how these spaces intersect with feminist politics and activism. Although I am not a member of a 'tinker' space myself, I consider myself a 'feminist geek', and I think that the projects happening in your space sound fascinating!

For my research, I would like to conduct either in-person or Skype interviews with any adult, fem* or women-identified, feminist members interested in sharing their experiences. I would also like to take photographs of your space. I will not publish any names, photographs, or other identifying features without explicit consent from everyone involved. I respect that your space may have a Code of Conduct, and I have no issues with following its requirements.

In order to recruit participants, I would greatly appreciate it if you posted the attached recruitment poster and invitation in your space, as well as circulated a digital copy via group email, listserv, and/or through social media. The Carleton University Research Ethics Board reviewed the ethics protocol for this project. Should you have questions or concerns related to your involvement in this research, please contact the Research Ethics Board-A via email ethics@carleton.ca or by phone (613) 520-2600 ext. 2517.

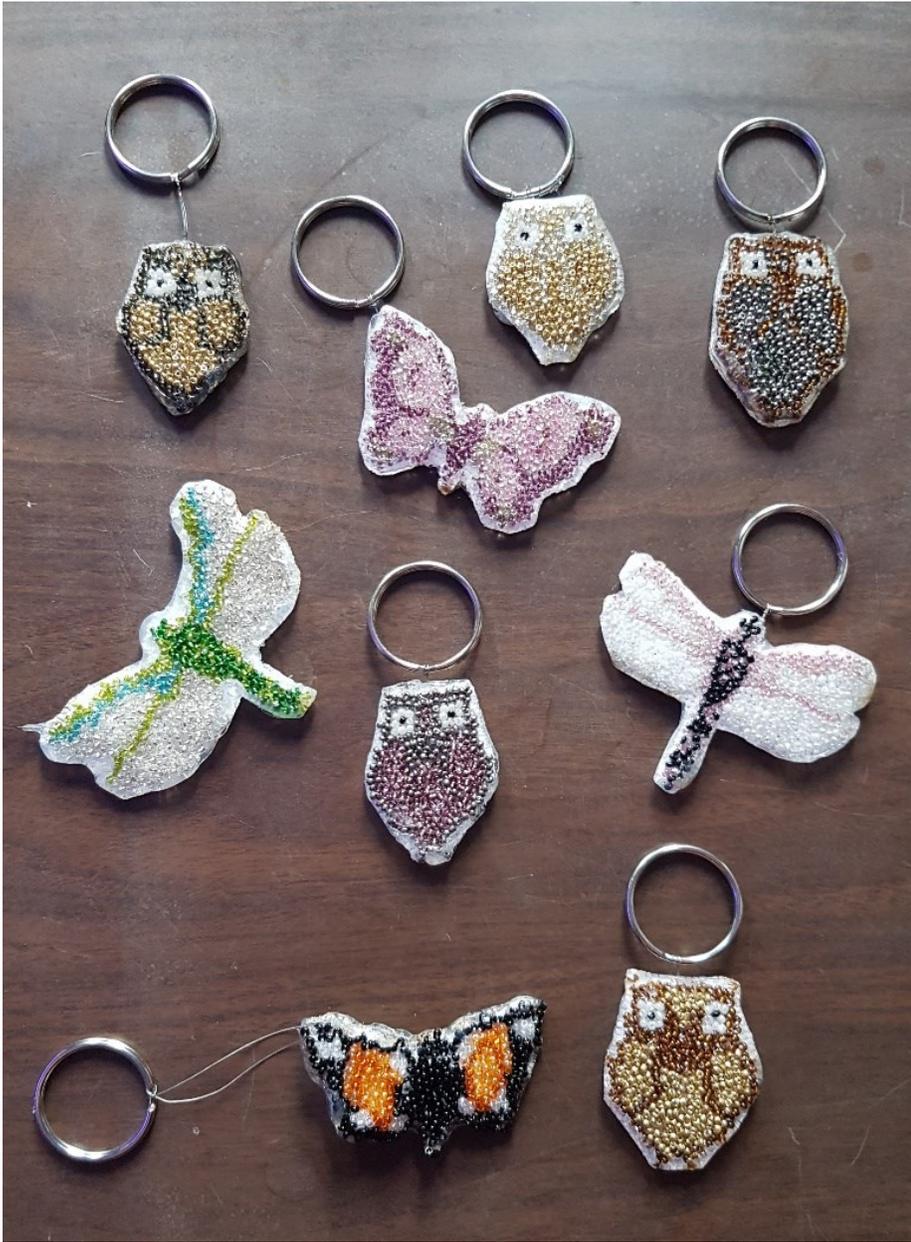
Thank you for your time and consideration. If you have any questions or concerns, please do not hesitate to email me (Jessica.Ring@carleton.ca).

Best,

Jessi Ring

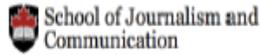
PhD Candidate, ABD, Communication and Media Studies
School of Journalism & Communication
Carleton University
Ottawa, ON, Canada

A.3 Sample of Honorarium Gifts



A.4 Informed Consent Form

CUREB clearance #: 106571



Title: Re-Tooling the Sisterhood: Reclaiming Feminist Epistemologies and Technical Practices Through Feminist Tinker Spaces

Date of ethics clearance: April 19, 2017.

Ethics Clearance for the Collection of Data Expires: April 30, 2019.

In signing this form, I _____ (first and last name), consent to participating a study on feminist tinkering practices. This study aims to understand feminist knowledge building and technical practices and recognize them as significant activist engagements. The researcher for this study is Jessica (Jessi) Ring, who is a doctoral candidate in Communication and Media Studies, in the School of Journalism and Communication at Carleton University. Dr. Sheryl N. Hamilton, who is an associate professor in the School of Journalism and Communication at Carleton University, is supervising this study.

This study will involve one sixty-minute in-person/Skype interview. I have been informed that all interviews will be audio-recorded for quality assurance, and that I may request that my interview is not recorded. I also understand that during the interview the researcher will be taking physical notes, which may be used as data for the study. I have been informed that I will have one opportunity to edit any of my comments made during the interview, which includes deletion and adding supplementary information, to ensure an accurate portrayal of my account. I understand that the transcripts of my interview will be emailed to me once for my approval, after which my responses will be final. Also, I have been informed that if I do not respond to this email within 14 days from the sent date (without a request for more time), that the transcript will be considered approved by me and available for analysis as is. I also am aware that the researcher may contact me with follow-up questions. This follow up will take no more than sixty minutes of my time and will occur either through email or Skype, depending on my preference.

As a token of appreciation, I will receive a small handcrafted gift, valued at approximately five dollars. I will also be reimbursed any public transportation costs (e.g., subway/bus fare) associated with attending the interview. I may keep these honorariums even if I later withdraw from this study.

I am aware that this study will use pseudonyms, which will replace my legal name in all transcripts, notes, and publications. I also have been informed that only the researcher (Ms. Ring), and her supervisor (Dr. Sheryl N. Hamilton) will have access to the interview data, including transcripts and audio-recordings, which are all stored on a password-protected and encrypted USB key and kept in a secure location.

Once the project is completed, all research data will be kept for five years and may be used for future research projects on the same topic, including presentations, lectures, and/or publications. At the end of five years, all research data will be securely destroyed, electronic data will be deleted, and hard copies of all notes will be

shredded. If I would like a copy of the finished research project, I am to contact the researcher to request an electronic copy.

In signing this form I understand that I have the right to not participate in this study, to refuse to answer any questions, and to stop my participation at any time without prejudice, by signing a formal Withdrawal Form. If I choose to withdraw from this study, I understand that any data collected during my participation, including written notes and audio-recordings, will be destroyed and not used in the project. I understand that once I approve my interview transcripts that I may not withdraw from this study.

The ethics protocol for this project was reviewed by the Carleton University Research Ethics Board, which provided clearance to carry out the research. My signature below indicates my consent. Should I have questions or concerns related to my involvement in this research, I am to contact:

CUREB contact information:
Carleton University Research Ethics Board-A
Tel: 613-520-2600 ext. 2517
Email: ethics@carleton.ca

Researcher contact information:
Jessi Ring
School of Journalism & Communication
Carleton University
Email: Jessica.Ring@carleton.ca

Supervisor contact information:
Dr. Sheryl N. Hamilton
School of Journalism & Communication
Carleton University
Tel: (613) 520-2600 x1975
Email: Sheryl.Hamilton@carleton.ca

Do you agree to be audio-recorded: Yes No

Signature of participant

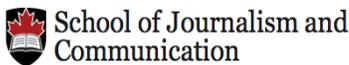
Date

Signature of researcher

Date

A.5 Withdraw Form

CUREB clearance #:106571



WITHDRAW FORM

I, _____, hereby formally withdraw my consent from participating in the above titled research project. I have been informed that Ms.

Ring will be performing observation and interviews in my space for her doctoral thesis beginning in May 2017. I understand that during this time, she will be physically attending my space, participating in approved events/workshops/clinics, making physical field notes and taking digital photographs of the space.

In signing this form, I have been assured that every precaution will be taken to prevent my affiliation with this project. I understand that any field notes, audio recordings, and/or photographs suggesting my presence will be permanently deleted or altered so as to maintain my anonymity. I also understand that in signing this form I am withdrawing any previous consent I may have issued for this project. I have been informed that only in signing (or re-signing) an Informed Consent Form will this withdrawal be annulled.

The ethics protocol for this project was reviewed by the Carleton University Research Ethics Board, which provided clearance to carry out the research. Should I have questions or concerns related to my withdrawal from this research, I am to contact:

CUREB contact information:

Dr. Andy Adler, Chair
Carleton University Research Ethics Board-A
Tel: 613-520-2600 ext. 2517
Email: ethics@carleton.ca

Researcher contact information:

Jessi Ring
School of Journalism & Communication
Carleton University
Email: Jessica.Ring@carleton.ca

Sheryl.Hamilton@carleton.ca

Supervisor contact information:

Dr. Sheryl N. Hamilton
School of Journalism & Communication
Carleton University
Tel: (613) 520-2600 x1975
Email:

Signature of withdrawn participant

Date

Signature of researcher

Date

A.6 Interview Question Guide

Consent: Explain Aims of Project
Review and Sign Informed Consent Form

Location of Interview:

Date of Interview:

Interviewer:

Length of Interview:

Demographic Information (Optional):

Age Range:

- 18-25 years old
- 26-34 years old
- 34-50 years old
- 51+ years old

Gender Identity:

Racial/Ethnic Identity:

Education (check the highest level of completed education):

- Elementary School
 - High School Diploma
 - Some University/College
 - College Diploma
 - University Undergraduate Degree
 - Some Graduate Studies (Masters' Program)
 - Completed Masters' Degree
 - Some Doctoral Studies
 - Completed a Doctorate
-

Permission for a Follow-up Interview: Yes / No

If yes, contact information:

Date of follow up: _____

Questions for Members:

- 1) How long have you been a member of this group?
- 2) Are you also a member of another similar space? Or, were you in the past?
 - a. If yes, could you tell me a bit about your experiences in these other groups?
 - b. If in the past, could you tell me a bit about why you made the decision to leave this group?
- 3) Why did you join this group?
- 4) Have you, or would you, recommend this group to your feminist friends?
- 5) How often do you visit this space?
- 6) Do you use public transportation to travel to this space?
 - a. How long does your commute take?
 - b. Is your bus/subway stop close by?
 - c. Do you feel safe travelling in this neighbourhood during scheduled group events?
- 7) Could you tell me a bit about some of the projects are you currently undertaking?
- 8) In your opinion, is this space a feminist space? Why or why not?
- 9) What do you like best about this group?
- 10) Is there anything you would like to see changed?
- 11) Have you taken part in any workshops or other teaching/learning events hosted by this space?
 - a. What did you enjoy the most about these events?
 - b. Did you like how the event was organized/facilitated?
 - c. In your opinion, was the event a success? Why or why not?
- 12) Have you ever led a workshop or other teaching/learning event here?
 - a. If yes, could you describe what was generally discussed and/or taught, and how?
 - b. If yes, in your opinion was the workshop a success? Would you do anything differently next time?
 - c. If no, would you ever lead a workshop or other teaching/learning event? If yes, what general topics would your workshop cover?
- 13) Do you feel safe in this space?
 - a. If yes, what makes this space safe for you?
 - b. If no, what changes would make this space safer?
- 14) In your opinion, what challenges are currently facing this group?
- 15) Is there anything else about your thoughts or experiences that you would like to share?

Questions for Organizers:

- 1) How many organizers are currently involved in this group?
- 2) What made you decide to start this group?
- 3) How would you describe the purpose of this group?
- 4) Why did you select this location?
- 5) Did you make any renovations to this space? If so, what changes did you make and why? Are (more) renovations planned for the future?
 - a. Have you encountered any setbacks or challenges when trying to re-decorate or re-design this space?
- 6) How are important decisions made for this group?
- 7) Describe for me the process involved in organizing workshops, or other teaching/learning events?
 - a. Are workshop leaders members of the group?
 - b. How are workshop leaders/facilitators/teachers selected?
 - c. Who decides what is taught?
 - d. Do workshop leaders receive some sort of remuneration?
 - e. Have you faced any challenges in organizing these events in the past?
- 8) What do you like most about how this space is organized?
- 9) How is this space funded?
- 10) Have you faced any funding challenges?
- 11) Have you faced any other organizational challenges?
- 12) In your opinion, does this space represent a safe space?
 - a. If yes, what elements of this group make it a safe space?
 - b. If no, what would you like to see changed to increase the safety of this space?
- 13) Do you have any advice for other feminists interested in starting up their own group?
- 14) Is there anything else about your thoughts or experiences that you would like to share?

Additional Info and Follow Up

Would you like a copy of my finished dissertation? If yes, email to:

A.7 Pseudonym Creation

Pseudonym Name	Site of Inspiration
Amelia	Named after Amelia Earhart, the first female aviator to fly solo across the Atlantic Ocean.
Becky	Named after Becky O’Shea, a tomboy female character from the 1994 movie <i>Little Giants</i> .
Cam	Named after Cameron Cole, a character I always read as a queer woman of colour, from Victoria Aveyard’s <i>Red Queen</i> book series.
Gabriela	Named after the General Assembly Binding Women for Reforms, Integrity, Equality, and Action (GABRIELA Women’s Party), which is a leftist Filipino organization that advocates for women’s rights. The organization was originally named for Gabriela Silang.
Jehanne	Named after Joan of Arc, using the original French spelling (Jehanne d’Arc).
Jo	Named after Jo March, from Louise May Alcott’s book <i>Little Women</i> .
Luce	Named for the feminist theorist Luce Irigaray.
Maddie	Named after Madelyn Altman, a fictional character from John Flanagan’s <i>Ranger’s Apprentice</i> series. She is the first female to be trained as a Ranger.
Molly	Named after Molly Weasley from J.K. Rowling’s <i>Harry Potter</i> series.
Nesryn	Named after Nesryn Faliq, a woman of colour rebel character from Sarah J. Maas book series <i>Throne of Glass</i> .
Samira	Named after actress Samira Wiley, best known to me as Poussey Washington in <i>Orange is the New Black</i> and as Moira Strand in <i>The Handmaid’s Tale</i> .
Yvette	A play on the fictional character ‘Ygritte’ from George R.R. Martin’s <i>Game of Thrones</i> series (“You know nothing, Jon Snow”). I selected ‘Yvette’ to give the name a more Francophone feel.

Appendix B: Makerspace Site Descriptions

B.1 Permanent Makerspace Overviews

Permanent Makerspaces	Site	Size	Date Established	Organizational Structure	Funding Model	Accessibility	Guiding Principles
	Housed in a University -- Faculty of Engineering; Large main workshop and smaller classroom spaces; workshop is cluttered and 'well used' (recycling and garbages were full; shelving full with past projects). Garage/workshop aesthetic: cement floors, CNC machinery and workbenches; row of sewing machines and a CNC embroidery machine along window; along side wall is multiple 3D printers; back corner has soldering iron workbenches.	2017/2018: 2000 users ~3,200 sq ft (200 sq m)	2014	Paid Makerspace Staff (full-time and part-time postons) -- handle the day-to-day oversight; mostly students. Makerspace Managers -- 5 at time of interview -- each responsible for a key area (e.g., Heavy Machinery, Computer Lab) Faculty of Engineering Research Chair serves as Director	Donor funding Grant from Canada Research Chair University allocated funding	Semi-Open: Open to all faculty and registered students; Open to public at certain times	Openness Collaboration Creativity Inclusion Entrepreneurship
	Big open warehouse; tenet businesses have separate space with private entrances; separate office space and welcome area (waiting room style, couple sofas and a coffee table); clean and has a blurred aesthetic of workshop and artist space (e.g., cement floors but a large wall mural); stall washrooms divided by gender	2020: Number of tenets: 32 over 19,000 sq ft (~1,765 sq m)	2015	At time of site visit (2017) 1 Owner 1 Director (paid) 1 Community Manager (paid)	1) Business Tenets Leases (pricing unknown) 2) All or a portion of the space is rented for events (hosted by other organizations) 3) Working Space Rentals a) Coworking space (ft access is \$199/month; \$99 p/t access) - communal workshop; drop in, first-come, first-served b) Project space (\$499/month) - 100 sq foot semi-private pod c) Office space (\$699) -- private enclosed space	Semi-Open: hosts private and public events; all members receive 24/7 FOB access to workshop space, but some spaces more private	Community Collaboration Entrepreneurship DIY
	Large two-story workshop (upper level only accessible by stairs); heavy machinery on the first floor; electronics, sewing machines, and 'social area' (couches, table and chairs) upstairs; incendiary toilet available, but at time of visit was told it was not operational; no running water--members go to a MacDonald's across the street for bio needs; pop vending machine available; has a grungy basement hangout type of feel (not dirty really, but cluttered and worn from heavy use); locker doors hang ajar from being crammed with stuff; shelves piled full of old computers, TVs, etc.	2017: ~ 60 members 2,000 sq ft (~186 sq m)	2012	Fully volunteer run Membership Structure All membership levels pay the same; to advance up the ranks, you must level up through active participation in the space. Level 1: Introductory Membership: access the space weekends and Monday nights only. Level 2: Associates: 24/7 access to the space (provided a key). Level 3: Core Members: 24/7 access to the space and provided decision-making privileges	Fundraisers Membership Dues -- \$60/month Small storage rental (e.g., lockers): \$10-\$20/month Registration fees from Introductory classes Donation Jar (e.g., for public 'open house' nights -- expectation that if you use materials to make something, you give some money to cover costs)	Semi-Open: anyone can become an Intro member (limited access to space); free 'open house' nights for the public	Openness Collaboration

	Large open gathering space with separate work rooms (e.g., computer lab, office space); clean and orderly -- almost to the point of looking sparse; gallery aesthetic; polished wood floors, clean white walls, glass doors; washrooms were not noted during visit.	Membership size: Unknown, but have the sense that it is quite large (very well known in the community) At least 21 people involved in organizing (Board, Staff, Committees)	1996	Horizontal organizational structure 7 members of staff 8 Board members 6 programming committee members All work is paid. No unpaid student volunteer jobs or internships -- must be reimbursed either monetarily or through school credit (e.g., co-op).	Multi-Level Membership 1) Artist Membership a) Regular (\$50/yr) b) Student (\$30/yr) c) Organization (\$70/yr) --all have a vote in Assembly, can attend events, access to Lab during hours of operation, free (or discounted) access to equipment rentals 2) Community Memberships (\$10/yr) --can attend events and vote in Annual General Assembly Receives grants through provincial and municipal cultural and employment partnerships	Semi-Open: membership must be approved, but hosts public events; operates using standard business hours of operation (e.g., 10am-6pm weekdays)	Feminism Openness Accessibility Do-It-Yourself/ Do-It-Together
	Small office suite; no private spaces; has a artist 'dorm room' feel: aged but comfortable couch, mismatched chairs and tables, milk crates; shelving is packed full with materials; member-made artwork lines the walls; cramped but not messy; washroom is shared with other office spaces (single use)	2017: 15 members	2017	Non-hierarchical, grassroots approach; unanimous decision making structure	Costs are split evenly among members; however, only a few members have a building FOB key (very expensive to get copies), so entry to space depends on whether another member is inside to 'buzz' you in (unless a FOB member).	Closed: members only; must be invited to join; at time of visit: were discussing plans on hosting public events (would need to find partners since there was not enough room in the current space)	Inclusion Feminist principles

B.2 Transitory Makerspace Overviews

Transitory Makerspaces	Site	Size	Date Established	Organizational Structure	Funding Model	Accessibility	Guiding Principles
	Mobile (no permanent space); typically meet in cafes, other collective spaces/makerspaces, and members' homes	3 core organizers; primarily host small workshops (10-15 people at a time)	2011	3 co-founders are decision-makers Volunteer run	Donation Jar available at public event Paid by groups for private workshops	Semi-Open: Although willing to provide workshops and events for anyone (e.g., no criteria needed), organizers have decline requests in the past because of time constraints.	Intersectional feminism Feminist/Queer hacking Open Source Hardware/Software Do-It-Together
	Hosted in a new space every year--previously that has been a Legion, a Community Center, and a Makerspace; the main area is a horseshoe design with some tables forming a center island; community tables mixed in with vendors; each vendor/community table creates their own aesthetic (e.g., tablecloths, signage, product placement); separate area available for childminding and children's crafts; washrooms depend on the hosting space, but gender-neutral signage is used	2019: 1200 visitors; 44 vendor and community tables	2013	Two key organizers -- if possible, some costs are reimbursed Steering Committee -- volunteer; help select vendors	Pay-What-You-Can entry free Vendor tables pay to rent a table; community tables are free (but space is limited) Local businesses, some MP offices, and private sponsorships Most money raised is donated to a local feminist/queer non-profit (after costs of the event are covered)	Semi-Open: Open event; participating vendors must apply	Accessibility Diversity Intersectional feminism

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