Arendt and the Makers

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Abstract

This thesis project seeks to define and understand the boundaries and practices of online maker communities as sites of arts learning and teaching that exist outside of traditional educational contexts. Drawing on Hannah Arendt's notion of a community defined by a gathering of peers, I suggest that Maker communities rely on shared values in relation to the practice of making through open source educational models which utilize the internet as a public space of participation in contrast to the restricted access of the academy or earlier apprenticeship models. I argue for an understanding of maker communities that is separate from replication focused DIY content through their emphasis on community members being able to contribute incremental changes or development to ongoing, collectively designed, but individually created projects.

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Introduction

It is very difficult to make generalizations about the internet, and as a result this thesis is concerned very narrowly on Makers as they exist on Youtube as a way of thinking about community and the social as it exists online. While the precursors to contemporary Maker communities have existed since the early days of the internet in the form of Hackers and the open source movements they also predate the internet in DIY movements which emphasized self sufficiency and a departure from consumerism throughout the 20th century. The Maker as they are explored in this project is an individual creation who emerges as a function of the shifts in online culture that resulted from the rise of Web 2 and its emphasis on siloed platforms and user generated content. However, the shift from the early internet to the structures of Web 2 is not the key area of focus for this work as it reflects a large scale change in the way that users engaged with online spaces that impacted all internet users, not just the Makers which are my focus. During this period the focus shifted towards user generated content in the sense that rather than creating their own sites, people uploaded the content they created to large corporate websites where traffic and engagement was monetized through the sale of advertising, as well as placing an increasing emphasis on the use of algorithms to promote or hide content based on the ability to maintain attention and clicks on the platform[1]. It is none the less important to recognize that the shift to Web 2 was instrumental in shaping the infrastructure of the contemporary internet as well as introducing the element of corporatization and the use of the internet for immense financial profit. A discussion of those topics is important for building an understanding of the internet at large but lies outside the scope of this project which is very narrowly focused on exploring the ways that online Makers resist the rise of the social in order to form communities

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[1] Nick Srnicek *Platform Capitalism*. (Malden: Polity, 2017).

as understood through the lens of Hannah Arendt's ideas as described in 1958's *The Human Condition*.

Despite predating the internet, Hannah Arendt's theory offers a way of thinking about some of the tensions between participation on social media sites while also attempting to create spaces that encourage genuine discourse between participants. Her ideas are particularity well suited to discussions of Makers on Youtube because while there is an element of the social given their existence on social media platforms, the participants themselves seem to be genuinely seeking to create interesting solutions to problems or desires while engaging both viewers and other creators in a more collaborative or discursive mode. This thesis largely focuses on the making of material objects through a variety of means but people who identify as makers also work in code, digital art, and a variety of other media which cannot be easily generalized. By taking up Arendt's ideas, the setting of the internet can be considered in relation to historical forms of public space and the intellectual discourse that happens within it. Arendt herself looks back to the classical polis as a successful creation of political public space that resisted conformist tendencies through the social while also addressing the problems that she saw arising in her own 20th century context. I feel that her approach to the shifting use of public space and the slipping away of genuine political engagement is useful in thinking about how Makers attempt to maintain spaces that value the ability of participants to meaningful engage the ideas that are emerging in that space. Additionally, I have observed a gap in existing discussions of the internet as public space, while many people do consider whether places like Twitter can serve as public spaces in relation to national politics, there is much less consideration of Arendtian models of action and discourse in relation to intellectual communities like Makers who operate on a smaller

scale while maintaining many of the core values that allow Hannah Arendt's public realm to function. This gap suggested to me that a productive and interesting discussion could and should be had about the ways that the rise of the social is amplified through platforms like Youtube but also how smaller communities could structure themselves around a resistance to some of those homogenizing trends.

Throughout this text I argue for an understanding of the Maker as a participant in a community that exists as a functional public realm while also recognizing that the context of the internet inevitably entwines Maker communities with homogenizing pressure as a result of their existence on the social internet. By walking through a number of example cases I believe that a more nuanced understanding of Makers in online spaces can be developed in ways that suggest a deeper engagement with online communities as potential sites of learning and discourse. The result of this exploration has been a deeper understanding of the figure of the Maker and how that figure exists within the public realm of Maker spaces on Youtube. I hope that through this discussion of the figure of the Maker a new angle of consideration for intellectual communities online can be developed in ways that suggest future paths for research and conversation across other internet spaces.

1. Definitions

The use of labels in online spaces tends to be disparate and vocabulary is often adopted by a particular group or site without clearly explaining that choice. As a result, there are several terms that reference interrelated communities and practices both online and in person which are relevant to the discussion ahead. While this list is not exhaustive, three primary labels appear in both community spaces and academic scholarship on the subject: Do-It-Yourself or DIY, Hacker and Maker.

Do-It-Yourself or DIY

DIY or Do It Yourself is the term that is likely most familiar to the average internet user, largely due to the proliferation of viral videos in this category. However, understanding the use of this label online connects back to a longer tradition of sharing skills that enable self-reliance, separate from the need to purchase mass produced goods or rely on paid services for relatively mundane tasks. In a conference paper discussing a study of DIY communities online, Kuznetsov and Paulos trace the notion of DIY as being identifiable back to the 1920s home magazines before offering a strong summary of how those historical themes present today, "Today's DIY cultures reflect the anticonsumerism, rebelliousness, and creativity of earlier DIY initiatives, supporting the ideology that people can create rather than buy the things they want"[2]. This focus on creativity and existence separate from capitalist consumerism it, but it is the nuances around anti-consumerism that create a key point of difference between DIY practices and the Maker community. Where DIY focuses on the utility of projects so as to avoid engaging with the consumer market or to meet household needs, the utility of what is created in Maker

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[2] Stacey Kuznetsov and Eric Paulos "The Rise of the Expert Amateur: DIY Projects, Communities, and Cultures" *Nordic Conference on Computer Human Interactions* (2010), 296.

communities is often less important and the emphasis is on creative exploration and iterative design in relation to a problem or idea even if it does not ultimately 'solve' the problem or situation the creator started with.

Since DIY content is often focused on utility, problem solving in order to save money or disengage from exploitative systems, DIY content shared online is usually focused on allowing the viewer to exactly, or at least very closely, replicate the process being demonstrated to achieve a near identical result clearly and the intention is that the viewer recreates them exactly to arrive at a specified end product that functions in a particular content. Home renovation projects are a particularly rich source of DIY videos and subjects like tiling a shower turns up both highly produced videos by large corporations (see Lowe's Home Improvement's "How to Tile a Shower | Tile Prep and Installation"[3]), but also amateur productions more in line with the content I consider in this thesis, such as "How to tile a floor or wall, A beginner's guide" by The Created Home[4]. The format of these videos aligns clearly with the idea of step-by-step instructions and while the fact that the creator cannot address the specificities of the viewers case is implied, there is a general sense that this is the 'correct' way to undertake the project and that the video should be followed closely. Even when talking about less obviously utility based content, the same theme of encouraging exact replication remains prominent with the assumption that the viewer is engaging the content because they want to achieve a very specific goal. Small decorative projects are common topics for the more creativity focused DIY videos, as seen in compilation videos like "60 Handmade DIY Christmas Ornaments The Whole Family will Enjoy || To Make and

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[3] Lowe's Home Improvement "How to Tile a Shower | Tile Prep and Installation" Youtube video, 7:00, February 1 2020, https://www.youtube.com/watch?v=VVNxXfW_zXY.
[4] The Created home "How to tile a floor or wall, A Beginner's Guide" Youtube video, 6:43, October 19 2019, https://www.youtube.com/watch?v=9usbyWIhQDI .

Sell" by CreArtive by Nature DIY & Decor[5]. This video has a similarly replication focused style with the video and narration bringing viewers through each step of the small crafts, while also clearly demonstrating the desire by DIY creators to replicate mass produced consumer objects at home and at a lower cost. DIY content across these categories has clear utility and benefit for viewers and aligning with the themes that Kuznetsov and Paulos identified in relation to self-sufficiency. However, the emphasis on exact replication is in contrast the Maker community that encourages participants to experiment with designs and as a result Maker content rarely has the exact step by step guidance found in DIY videos[6].

Hacker

Hacker is another term that appears often in scholarship related to content adjacent to and included in what I would define as Maker based as is further discussed below. The term primarily relates to high-tech and computer-based practices. This includes code-based work, including the kinds of unauthorized access that are associated with the word in popular parlance, but also the use of small parts or programmable chips for advanced technology-based creations. Yet, the slang term 'hack' has started to appear on DIY videos as defined above in recent years, but in more niche online communities and in scholarship the idea of the hacker and hacker projects is very specifically focused on the use of computers and code for projects - some but not all of which include the kind of unauthorized access that is part of popular associations with the

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[5] CreArtive by Nature DIY & Decor "60 Handmade DIY Christmas Ornaments The Whole Family will Enjoy || To Make and Sell" Youtube video, 3:39:37, October 7 2021, https://www.youtube.com/watch?v=jgC6whBNCLg .
[6] For discussions of this shift see "A Tacit Understanding: The Designer's Role in Capturing and Passing on the Skilled Knowledge of Master Craftsmen by Wood, Rust and Horne as well as Van Ittersum in "Craft and Narrative in DIY Instructions".

word[7]. The material aspect of these practices is often less emphasized even though the code being written may be with the goal of controlling a material object or task, as seen in videos like "I run untested, viewer-submitted code on my 500-LED Christmas tree." Where Matt_Parker_2 places the emphasis on exploring the wins, losses, bugs, and clever solutions found in the programs viewers sent rather than on the general affordances of his particular model of Christmas tree[8].

Even when Hackers work from existing technological and/or everyday objects which can be incredibly innovative on its own to control the object as seen in "Teaching a Robot Dog to Pee Beer" by Michael Reeves where he takes a Boston Robotics machine and then codes a program that locates red solo cups, paths to that location, and positions the robot to 'pee' beer[9]. Since creators are largely starting with premade objects or technologies the innovation and creativity arises out of the code, so it seems to be prioritized in the creation of videos even when to the viewer the object is also a potential source of fascination. Based on observation but not comprehensive study, Hackers take great pride in using high tech objects, and incredibly complex code to perform ridiculous or mundane tasks. Seemingly just to prove that they can.

Hacker projects align with Maker content in contrast to DIY content in a key area as participation in the public discourse of the space is contingent on making new contributions to the ongoing topic of discussion rather than just replicating existing models. Not all of the

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[7] The meaning of the term hack is much discussed and can writing on this subject from within the community can be found from Hacker Folk Lore (http://www.catb.org/jargon/html/meaning-of-hack.html) and Gareth Branwyn at Make Magazine (https://makezine.com/article/maker-news/on-the-use-of-the-word-hacks/).
[8] Matt_Parker_2 "I run untested, viewer-submitted code on my 500-LED christmas tree" Youtube video, 45:16, https://www.youtube.com/watch?v=v7eHTNm1YtU .
[9] Michael Reeves "Teaching a Robot Dog to Pee Beer" Youtube video, 16:05, https://www.youtube.com/watch?v=tqsy9Wtr1qE .

programs submitted in Parker's video end up executing successfully, but they become a part of the content because they are critically engaging with the challenge put forward of coding a light program for the tree. By moving away from the idea that content is being created so that a project can be exactly copied by a viewer, the Hacker community becomes distinct from the goals of DIY and moves much closer to how I consider Makers. However, with possible exceptions from isolated instances of the word being taken up as part of a critical stance about gendered divisions (see chapter five) the term Hacker is applied narrowly to projects that are focused on coding a new technology, thus excluding a range of practices which can be addressed under the term Maker.

Maker

The term Maker is the most broadly applied term and is often vaguely defined in ways that include or exclude the previous two types of practices in seemingly arbitrary ways depending on the person writing or speaking. The broad application and general uncertainty in defining the term presents both challenges and possibilities in the context of this project but ultimately it is the range of practices addressed that is core to the functioning of the Maker in my writing. The term can be applied very broadly across online creative practices and importantly for my work can cover both the use of contemporary fabrication technologies like 3D printers and instances of traditional craft practices that predate the internet. This breadth is a contrast to the idea of the hacker which is only able to consider the application of core values in a very specific set of practices, resulting in a less diverse consideration of how creative practice is undertaken online.

However, the Maker community does produce content that is noticeably different from the DIY content as discussed above and does not encourage exact replication, rather asking viewers to engage critically and experiment on their own. This is the case even when the project is incredibly simplistic, such as in the famous Maker Adam Savage's video "Adam Savage Takes the Aluminum Foil Ball Challenge!"[10] and the sequel video "Adam Savage's Aluminum Foil Ball Cut In Half! (Ft. Waterjet Channel),"[11] which engage the process of hitting a wad of kitchen foil with a hammer repeatedly until it compresses into a smooth seemingly solid ball.

This is not an original idea that Savage came up with for his video, rather he is taking up an ongoing topic of conversation and creation online. Over the course of the video, he takes the standard process which is largely focused on time rather than any particular skill and uses his much larger workshop of tools to further refine the process by adding several sanding apparatuses alongside his musings to the camera about why exactly the aluminum foil behaves the way it does. Even this very simple process is one that can be considered on a deeper level as part of a Maker framework that emphasizes the Maker's ability to engage critically with existing processes to create a change or adaption to the design that is already circulating. The video then culminates in Savage trying (and failing) to cut the ball in half using a large saw, another change on the aluminum ball project that was not accessible to most of the people who popularized the challenge online. The transition into the second video in the series, "Adam Savage's Aluminum Foil Ball cut in half! (Ft. Waterjet Channel)" demonstrates the collaborative and open-source nature of Maker communities even though the topic of discussion is centered on a very simple

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[10] Adam Savage's Tested "Adam Savage Takes the Aluminum Foil Ball Challenge!" Youtube video, 27:31, March 7 2022, https://www.youtube.com/watch?v=q_YZX1SgZ5Y .
[11] Adam Savage's Tested "Adam Savage's aluminum Foil Ball Cut in Half! (Ft. Waterjet Channel)" Youtube video, 7:51, June 25 2022, https://www.youtube.com/watch?v=onZDAKJq6z4 .

project.

In this second video Savage acknowledges that several people offered suggestions for how to cut the ball safely, including the solution that Savage ultimately settled one - the use of a water jet cutter. The solution to the problem is one that was discussed collectively, and Savage makes it clear that he recognizes and values the suggestions of people in the comments who are able to engage seriously with the technical issues of the project. This kind of project lacks utility and does not move Savage away from the consumer market, in fact it is a very expensive ball given the tools that are used in its creation, creating a clear distinction between this practice and DIY movements. The lack of computer technology and coding also means that what Savage undertakes in the two videos cannot be described under the label of a Hacker project even though some of the values including experimentation and iterative design are similar. The Maker label provides the openness required to include the quirks of this bizarre project while also suggesting the key set of principles that are discussed in this thesis.

Usage of the Terms

Although the boundaries laid out here are relatively fixed, the usage of these terms in both academic and online contexts are more nebulous and fluctuate between spaces and speakers. This blurring of terms is further exacerbated by creators who may use several labels to describe their work or who shift their labels of choice over time. The element of the algorithm is also a large potential factor in these label choices when considering platforms like Youtube but the influence of the algorithm is not the focus of this discussion and can be better explored through the work of scholars who specifically consider the impacts of algorithms (Chun was of particular interest in

my own research)[12]. In existing scholarship, the choice between the three terms or other minor variations occurs primarily in relation to the body of content being discussed. Much of the scholarship, spanning a wide range of disciplines, is focused on a particular type of practice on a particular site and understandably, sources follow the language of the creators that are being discussed. As a result, there is little consensus about barriers between different terms or how to refer to related movements collectively. However, it is the factors discussed above that shape my usage of the terms for the sake of consistency.

The rapid growth of scholarship on the subject of online creators that began in the early 2010's seems to predominantly use the term Maker when discussing people who show not only completed projects but also the process that goes into creating a creative piece, I think partially because this is the language used by the popular press publications that covered the developing movement related to 3D printers and other home fabrication[13]. This popular culture consideration of Makers is generally traced back to Chris Anderson's book *Makers: The New Industrial Revolution*, a text that, though problematic on several fronts, brought an awareness to the new forms of creative communities that were operating in online settings[14]. Anderson was an early entrepreneur within the Maker community who appropriated the labour of the community to build a profit seeking corporation, when his business failed he set aside many of the core values that he espoused in *Makers* and exploited members of the community in increasingly overt ways. The company which started out as a community driven model and drone company now contracts

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[12] Algorithms often dictate success or failure on social media platforms including Youtube. This includes deciding what videos will be shown to users of the platform and how those videos are monetized. Being 'successful' in the sense of making a livable income from Youtube often requires creators to shift their content to align with what the algorithm is promoting and financially rewarding.

[13] Magazines such as Wired, Make Magazine, and Popular Mechanics were early bridges between growing online communities and physical printing with more traditional circulation.

[14] Chris Anderson, *Makers: The New Industrial Revolution*. Toronto: Signal McClelland & Stewart, 2012.

for the American military[15]. Additionally, there is also an ongoing body of work relating to the

use of Maker values and technologies in traditional classrooms that has settled on the Maker

label over 'DIY' or 'Hacker', although the internet specific elements of Maker practice are often

lost when those practices are appropriated for traditional classrooms. This wider use of the term

Maker as a part of popular writing as well as a catch all term for the use of the movement in

classrooms or other educational spaces provides a grounding in existing scholarship for my focus

on the notion of Maker communities throughout this text.

While the existing usage of vocabulary in this area of study remains flexible, this text's use of

'Maker' as the primary term is focused on providing a framework for practices that fall in or

between the three categories. The diversity of practices that are involved in these communities

both digitally and in physical spaces requires vocabulary that is inclusive while still enabling

useful distinctions between Maker content and other genres of media that appear online. My use

of the term Maker is chosen as a way of setting a scope that is conducive to both a general theory

of this type of internet content and is able to support useful distinctions. Of particular concern is

ensuring that the vocabulary being used is able to encompass both traditional craft practices and

practices that have emerged in relation to emerging technologies related to computing and 3D

printers. Where 'Hacker' privileges the high-tech, Maker leaves more space for a range of

practices that exist separate from computers or other newer technologies. I also feel that it is

important to create a distinction between Maker content and the wider internet phenomenon of

the DIY which I define as videos or other content where the viewer is intended to replicate the

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[15] Mac, Ryan "Behind The Crash Robotics, North America's Most Promising Drone Company" Forbes, October 5 2016, access March 2023, https://www.forbes.com/sites/ryanmac/2016/10/05/3d-robotics-solo-crash-chris-anderson/?sh=45a81ec73ff5 .

object or action exactly without major alteration. This definition departs somewhat from earlier definitions which emphasize the departure from capitalist consumption as seen in Paul Atkinson's definition in the Journal of Design History where he wrote "Historically, productive and creative activities of this kind have allowed consumers to engage actively with design and the design process at a number of levels, and to express a more individual aesthetic unbounded by the strictures of mass-production and passive consumption"[16]. While DIY content holds value in its use by everyday people to complete tasks or solve basic problems in their home, I suggest that the collaborative and creative elements are absent in those videos making them different from the conceptualization of Maker content that I am developing.

As a starting point, one which I hope will be further complicated in the body of this thesis, I define Maker communities as separate from replication focused DIY in their emphasis on community members being able to contribute incremental changes or development to ongoing, collectively designed, but individually created projects. In seeking to further understand and define the boundaries of the Maker community this working definition aligns with the key themes of interest, relating to the sharing and development of knowledge online. In order to build a framework for understanding the ways that Makers exist within the larger internet and in relation to each other I turn to the ideas of Hannah Arendt to consider the public realm, community, and the rise of the social in the context of the internet.

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[16] Paul Atkinson "Do it yourself: Democracy and design" *Journal of Design History* 19, no. 1 (2006), 1.

2. Community and the Social

Hannah Arendt wrote before the advent of the world wide web, let alone the kind of social internet of the contemporary moment, and her prime model for a defined political realm is even older in her turn towards the polis of ancient Greece so some extrapolation is needed to view the internet as a potential public space. Arendt herself makes clear that the physical space of the polis is not its most important feature, rather "The polis, properly speaking, is not the city-state in its physical location; it is the organization of the people as it arises out of acting and speaking together, and its true space lies between people living together for this purpose, no matter where they happen to be"[17]. In this way, the absence of a shared physical location between people on the internet is less important than their ability to intentionally create an organized shared space. While the polis is a key point of reference for Arendt and her high esteem for Ancient Greek culture is clear, she recognizes that it was not the geography or architecture of Athens that made its political community significant. Rather Arendt places the emphasis on the ability to create a sense of togetherness which allows for impactful speech and action which makes individuals known to each other, "The revelatory quality of speech and action comes to the fore where people are *with* others and neither for nor against them - that is, in sheer human togetherness"[18]. The emphasis that is placed on the way that people relate to each other within a space over the characteristics of a particular physical place opens the possibility of connecting applying the model of the public sphere that is developed in *The Human Condition* to the context of the internet despite the fact that Arendt died before being able to update her ideas in relation to this new technology herself.

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[17] Hannah Arendt, *The Human Condition,* (Chicago: The University of Chicago Press, 1958, 2018 edition), 198.
[18] Hannah Arendt, *The Human Condition,* (Chicago: The University of Chicago Press, 1958, 2018 edition), 180.

There are strong arguments to be made for the users of the internet creating bounded spaces that function as a public realm. The primary concern is in creating a level of intentionality for people who are engaging with each other. While the internet at large poses problems related to scale (discussed below), the use of particular platforms narrows the number of people that an individual is potentially communicating with and as well as providing infrastructure for users to further narrow their engagement to people with whom the share concerns thus inspiring the desire for togetherness. Arendt further defines the public realm as "It is the space of appearance in the widest sense of the word, namely, the space where I appear to others as others appear to me, where men exist not merely like other living or inanimate things but make their appearance explicitly"[19]. This includes the notion that appearance and togetherness, must be done intentionally within the particular space rather than through happenstance. Applying these ideas to the internet at the highest level the entirety of the online world does not function as a public realm, a user of the general internet is one among billions and is not able to make their appearance to those billions explicit and acknowledge the appearances of others in turn.

Since the internet at large cannot function as a shared public realm, individual sites or platforms can instead be understood as the bounded spaces that facilitate intentional acts of appearance and experiences of togetherness. Trevor Smith offers a three-layered conception of digital space in order to understand the ways that bounded spaces can be created on individual platforms within the wider internet, which is otherwise too large to facilitate the sense of togetherness required by Arendt. In Smith's schema, "similar to pre-Internet conceptions of the political realm, the fibre optic cables, switches, and routers no more determine whether the internet can be a political

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[19] Hannah Arendt, *The Human Condition,* (Chicago: The University of Chicago Press, 1958, 2018 edition), 198-199.

realm than the walls of the ancient polis. The second layer of the constitution or framework of

rules and boundaries is equivalent to the software layer of the Internet. Like a constitution, the

software layer has something of a pre-political character as someone needs to make a website

and program how it works before it can become part of the political realm. The top layer consists

of the people, and could in computer terms be called the wetware."[20] This model attempts to

address the problems of scale that occur when considering the internet as a public space and

continues to place and emphasis on a plurality of people engaging with each other in an

intentional way, "Like in offline space, the people or wetware are clearly the most important

element, as politics cannot exist without people. While each layer depends on the one below it,

the entire structure is socially produced by the circulation of people at the top who rely on the

lower layers merely to collect them into a common space"[21]. Smith's model maintains an

emphasis on the people as making up the community while also addressing the ways that internet

technologies still enable a bounded space of togetherness.

The creation of bounded public spaces of appearance shifts between online platforms but

maintains the important characteristic of intentionality and an ability to converse. Makers in

particular use a range of platforms, some of which were specifically designed to support Maker

communities and others which are more general social media sites which are taken up and used

to create more niche spaces, this is most clear in contrast to the DIY or 'hack' videos that seek to

capture the broadest possible audience and maximize clicks where Makers seem to be more

content to speak to a smaller audience of people who are making intentional efforts to engage

with content of this kind – all of which follows along from the ways that Makers distance

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[20] Trevor Smith "The Possibility of an Online Political Realm" *New Political Science* 27, no. 2 (2015): 252.
[21] Trevor Smith "The Possibility of an Online Political Realm" *New Political Science* 27, no. 2 (2015): 253.

themselves from single mindedly prioritizing profit. Of particular concern for this project is the use of widely popular online streaming platform Youtube, which presents video material of all kinds with the tagline "Broadcast Yourself" but has also been widely adopted by Makers as a way of circulating information and content. This thesis is not an argument for the benefit or use of this platform generally but is rather a consideration of how Maker communities' function in those spaces. As Smith observes in his discussion of Arendt's work in the age of the internet, the internet is not used the same way by all people or groups so the negative facets must be acknowledged but not override the potential and current productive uses of these platforms, "With the early concerns about the Internet being isolating and alienating now falling away, the bigger question is whether all this communication can bring people together to create a common political realm or whether it will simply fragment the world into small bubbles of hypercommunication"[22]. Just like how Arendt's understanding of the polis is shaped by the ways that people within that space relate to each other, Smith's interpretation of a layered internet keeps the burden on the human participants of a virtual space to act and speak with the intentionality that Arendt calls for - acknowledging that there is still the possibility of conformism and thus the rise of the social.

In a text for Omar Kholeif's catalogue *I Was Raised on the Internet*, writer Joanne McNeil addresses the devaluation of the word community with a notable level of frustration, "Today the word "community" is stretched out beyond recognition as it is applied to those who use the internet - that is, more than half the world's population"[23]. She suggests that the way that

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[22] Trevor Smith "The Possibility of an Online Political Realm" *New Political Science* 27, no. 2 (2015): 255.
[23] Joanne McNeil, "The Community of Everybody and Nobody" in *I Was Raised on the Internet*, ed. Omar Kholeif for the Museum of Contemporary Art Chicago (Chicago: DelMonico Books, 2018), 103.

community is used in general internet parlance is really an attempt to make users feel like they have more connection to a platform, like Facebook, that is in actuality a corporation that seeks to profit off the data collected on the site. McNeil does not suggest that community online is impossible, rather she makes a point of identifying smaller groups of users who interact with each other in more intentional ways. McNeil is not interested in a systematic definition of community in the way that Arendt thinks about it, and the piece itself is far more focused on ways that smaller groups of individuals can come together to support and care for each other online, but her frustration with the way that community is used interchangeably with what might more accurately be considered users (or Han's swarm[24]) becomes problematic for defining community in a meaningful way.

Arendt does seem to consider the limitations of size in her political realm as there is a point at which it is no longer possible to understand or meaningfully respond to ideas or speech that is circulating if there are too many people involved. In *The Human Condition* she writes, "Politically, this means that the larger the population in any given body politic, the more likely it will be the social rather than the political that constitutes the public realm"[25]. She indicates that, while there is no hard line at which it is no longer possible for a public political realm to function, the increase in size is detrimental to the ability for meaningful engagement with ideas to happen instead devolving into behavioralism and the social. McNeil's observations in *I Was Raised on the Internet* can then be read as a tracing of when the population of a platform becomes too large and the term community loses value when really it is describing users, but

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[24] This concept emerges from Byung-Chul Han's more pessimistic view of the internet as outlined in 2017's *In the Swarm.*
[25] Hannah Arendt, *The Human Condition,* (Chicago: The University of Chicago Press, 1958, 2018 edition), 43.

also the potential for smaller groups within the swarm to shape their own public space through an enforcement of boundaries, possibly related to progressive social politics. McNeil's naming and shaming of the misuse of the term "community" develops a key factor that would influence the outcome of the potentiality that Smith suggest that the internet holds. Examining how people create smaller bounded spaces within the wider context of the internet which is far too populous for effective communication is a key factor in the ability of users to create a shared public world in which intentional togetherness is possible. To return to an example discussed early the 18,000+ comments on Adam Savage's video "Adam Savage Takes the Aluminum Foil Ball Challenge!"[26] cannot be honestly described as a community, at some unclear point the number of commenters passed the point at which all participants could realistically engage with each other, but the emergence of smaller conversations within the larger body of comments suggests the formation of community within the larger population. It is those commenters who were able to offer productive suggestions about the problem that Savage countered at the end of the video that gained a response from Savage and other commenters in the process of discussing how to safely cut the ball. Similar to how Smith addresses the ways that bounded spaces can be created online, applying McNeil's ideas to the context of the Adam Savage video suggests a model through which Arendtian community can be formed online even when the number of users engaging with that content is vast.

Considering the new ways in which community forms online is important to understanding the ways in which Maker content is able to function with the values of dialogue and the sharing of ideas. While these spaces and conversations function differently from the Greek model that

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[26] Adam Savage's Tested "Adam Savage Takes the Aluminum Foil Ball Challenge!" Youtube video, 27:31, March 7 2022, https://www.youtube.com/watch?v=q_YZX1SgZ5Y .

Arendt often looks back to or even the globalizing moment that she wrote in, the internet is a possible site of community that can become the grounding for productive and meaningful conversation that operates with the unique context of the internet. Trevor Smith's argument rides on considering how the previously physical space of the polis could be translated into the virtual platforms of the internet, but another potential model for considering online sites of Arendtian public realms is through a loosening of how speech is characterized. In a paper specifically considering Twitter as a potential public realm sociologist Stanley Raffel suggests that "Arendt's differentiation between the kinds of speech is probably too categorical. More crucial to the potential of revelation than whether the speech act is purely purposeless is the possibility of some form of mutual contact between the speaker and his listeners"[27]. In discussing the specific format of Twitter, Raffell goes on to suggest supplementing an understanding of online speech with the ideas of Maurice Blanchot about fragmentary speech in comparison to Arendt's views,

> "Like Arendt, he treats speech as extremely important, a true exigency. He is also
> like her in differentiating essential speech from various other things that can be done
> with speech, especially the kind of communication envisioned by Searle. But Arendt
> and Blanchot do differ in how they depict the prime function of speech. In
> Blanchot's version, "Generally, when we speak, we want to say something we
> already know – whether to share it with someone else because it seems true to us or,
> in the best case, to verify it by submitting it to a new judgement. Still more rare is a
> speech that reflects while expressing itself"[28].

Yet, in the longer form context of Youtube, I would suggest that simply opening the possibility

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[27] Stanley Raffel "Twitter through the Prism of Hannah Arendt and Maurice Blanchot" *Diacritics* 45, no. 3 (2017), 59.
[28] Stanley Raffel "Twitter through the Prism of Hannah Arendt and Maurice Blanchot" *Diacritics* 45, no. 3 (2017), 62.

that participation in the public realm can be in pursuit of several goals is sufficient to address shifts in the way that Arendt's notion of intentional appearance might function for Makers on Youtube.

It is when the possibility of adjustment, particularly in relation to smaller scaled communities within the larger internet, that problems arise. When considering the internet at large the key issue that arises is the tendency to create echo chambers, spaces on social media that encourage conformity rather than a self-definition in relation to others. Plurality is a key feature that defines successful acts of appearance in a shared public realm for Arendt and is connected to the idea that one only becomes fully human through that joining of a public political realm, "If action as beginning corresponds to the fact of birth, if it is the actualization of the human condition of natality, then speech corresponds to the fact of distinctness and is the actualization of the human condition of plurality, that is, of living as a distinct and unique being among equals"[29]. So, if social media platforms are primarily used by an individual or group of people to create homogeneous spaces of agreement, they cannot constitute a public realm.

This problematic is taken up by scholars who suggest that the internet cannot be accurately described as an Arendtian public space. In a paper titled "@hannah_arendt: An Arendtian Critique of Online Social networks," Elke Schwarz argues that social media platforms are primarily used in ways that centre the person speak rather than attempting to relate to other participants in that platform, thus avoiding the sense of plurality and togetherness where individuality is defined as a person engages in the existing community of perceived equals, "This

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[29] Hannah Arendt, *The Human Condition,* (Chicago: The University of Chicago Press, 1958, 2018 edition), 178.

suggests that the activities on social networks might largely be introspective and hedonistic endeavors that have little, if nothing to do with establishing a shared and common world. The focus is no longer a being-with-others, but rather a broadcasting-to-others that defines such types of one-way communication"[30]. Rather than becoming known through one's relation to the equals who inhabit the public sphere, the goal instead is to forward a fabricated identity that conforms to social expectations and potentially draws a like-minded audience, all things which align with the rise of the social that Arendt is concerned is impeding on the public realm even as she wrote in the 1950s.

When considering the general usage of the internet, especially in relation to the more recent phenomena of influencer who carry large followings and are closely tied to the economics of social media platforms, I would suggest that smaller internet communities can be defined by their efforts to maintain a shared public realm where those who participate are expected to contribute productively to discourses beyond just replicating the positions that are already being represented. Schwarz is concerned that a "broadcasting-to-others" is becoming the primary use of the internet but in Maker communities there is an expectation that your speech responds to the ongoing discourse and that ideas, projects, problems, or materials from what is shared can then become a topic of discussion for the community. Through this thesis, I hope to position the Makers as a community as one that is pursuing the being together that Schwarz thinks is lost online by suggesting that the Makers on Youtube operate as the "distinct and unique being among equals" that is required for Arendtian plurality.

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[30] Elke Schwarz "@hannah_arendt: An arendtian Critique of Online Social Networks" *Millennium: Journal of International Studies* 43, no. 1 (2014), 182.

3. Education

Although online Maker communities often serve as spaces to share knowledge and projects, it operates separately from formal education structures. These spaces place little value on the qualifications of people sharing their projects, most of whom come from a range of backgrounds with and without formal qualifications. This dismissal of the reliance on formal qualifications is a core feature of Maker communities and appears even in early uncritical texts about the community, including in Chris Anderson's *Makers: The New Industrial Revolution*. He writes about turning away from formal education as a way of tapping into previously unrecognized sources of ideas, "What they don't do is pull rank based on credentials. Amateurs have as much influence as professionals. The same is true in almost any open-innovation community: when you let anyone contribute and ideas are judged on their merits rather than on the resume of the contributor, you invariably find that some of the best contributors are those who don't actually do it in their day job"[31]. Anderson speaks from the perspective of drawing on Makers as part of a commercial enterprise but, as an early writer on the subject of Makers, his recognition of this principle as a core part of these communities points to the early emergence of this characteristic that continues to be in use today.

The content being created and published remains (at least theoretically) visible to any person with access to the internet: there is no test required for entry and no need to prove that a potential viewer of the content has particular credentials. However, as discussed previously, having a bounded space in which to engage in action is an important facet of Arendt's model, one which digital Maker communities create through the community norm of participants demonstrating an

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[31] Chris Anderson, *Makers: The New Industrial Revolution*.)Toronto: Signal McClelland & Stewart, 2012), 127.

ability to engage with the existing discourse of the space in a meaningful way whether they are engaging as a creator posting content or a viewer leaving a comment in response to that content.

In considering the way that Maker communities do not value – *Against Meritocracy* by Jo Littler, *Success and luck: good fortune and the myth of meritocracy* by Robert Frank, "Meritocracy a myth?: A multilevel perspective of how social inequality accumulates through work" by Hans van Dijk et al. – but the reordering of qualification hierarchies creates a distinctive shift in the ways that Maker communities regulate participation in these online spaces. It is important to note that the Maker community is not perfect and these values are not always applied equally to marginalized people attempting to participate as addressed in the later section on gender divisions in the community. This aligns with Hannah Arendt's notion of the public realm as being a space of appearance that functions only when all those present in the space are presumed to be equals with the potential to contribute valid ideas while also making a distinction to those outside of the public realm who are not able to contribute and are thus positioned as unequal to the in group, "To be sure, this equality of the political realm has very little in common with our concept of equality: it meant to live among and to have to deal only with one's peers, and it presupposed the existence of "unequals" who, as a matter of fact, were always the majority of the population in a city state"[32]. Thinking about the necessary existence of unequals in order to create a distinction between the masses and the space shared with peers is helpful in thinking more deeply about the claimed meritocracy of online Maker communities.

The ability to participate in the public space, to interact with existing discourse in the shared

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[32] Hannah Arendt, *The Human Condition,* (Chicago: The University of Chicago Press, 1958, 2018 edition), 32.

world of appearance, is what defines equality. For Arendt this often means thinking historically about the requirement of owning property or at the very least not needing to labour to meet basic survival needs. However, in the context of online Maker communities, the requirement for entering the shared world is the ability to build on the existing discourse and demonstrate at least a basic understanding of the material. The requirement is not to provide entirely novel ideas but rather to make small alterations and experimentation with the preexisting designs or problems being considered in the space. Lora Oehlberg, Wesley Willett and Wendy Mackay also explicitly connect this requirement to lowering the barrier to entry through the emphasis on collaboration, "In this idealized view of collaboration, makers collectively contribute to the development of new designs by iteratively remixing and refining one another's work. Moreover, this view assumes that remixing serves as an entry point for new makers, who can dissect and build on top of the work of others to bootstrap their own making process"[33]. This emphasis on collaboration aligns with the notion of being in a common space with one's peers, the people who were able to meet the minimum requirements for entry, and thus participate in the public life of the community. For Makers the minimum requirement for entry can be achieved through observation of the existing public space in order to build an understanding of the content that is made easily accessible through the Youtube platform without the barriers to entry that are present in more traditional, academy based, forms of education.

Iterative making is an important facet of how online Maker communities operate, requiring that participants contribute to the creation of the shared world and the dialogue that takes place within the public realm that is created. Ideas are appropriated and remixed by Makers who seek

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[33] Lora Oehlberg, Wesley Willett, Wendy MacKay "Patterns of physical design remixing in online Maker Communities" *Conference on Human Factors in Computing Systems - Proceedings* (2015), 639.

not to provide an entirely new innovation but rather explore particular ideas or problems that they encounter in the work of others. While collaboration is not occurring in the sense of a shared physical space or working on the same physical object, the process of different Makers exploring a given idea or problem builds a selection of resources and solutions which are shared in the public space – offering the possibility that new Makers can join in on the conversation and collaborative process in the future. More than the sense of having the final piece being physically worked on by many people, it is the designs that are grounded in the community discourse and the circulation of ideas.

This process of several Makers engaging in similar projects using separate approaches to address challenges and expand on each others work can be seen by looking back through the Makers referenced in North of the Border's video "I made the Great Wave off Kanagawa out of Resin" from January 2022, which not only provides a process video for how Adam (the creator of the channel and the projects) created his own version of Hokusai's *The Great Wave off Kanagawa* (1830), but also how he decided on the project and his approach in relation to other Makers whose work circulates in similar spaces[34]. This includes the 2D art being sold on etsy by creator PixeleyzArt that, while no longer for sale, is visible in the video on North of the Border's channel and shows a piece where the famous *The Great Wave off Kanagawa* print has been altered to include the boat and Link character from the Zelda: Wind Waker videogame. Adam, whose catch phrase is "I like to make tiny nerdy things," expresses his desire to move from the 2D painting of PixeleyzArt towards the kinds of objects he makes in his own practice. His self positioning as both a Maker and a nerd provides some explanation of why he chose to undertake

[34] North of the Border "I made the Great Wave off Kanagawa out of Resin" Youtube video, 15:33, January 28 2022, https://www.youtube.com/watch?v=Mmc3WxTjVSQ .

this project, not by passively purchasing an artist's work but by engaging with the idea himself through his personal making practice.

Despite the positioning as a Maker of "tiny nerdy things" and a body of work that relates entirely to sci-fi, fantasy, anime and video games, Adam's video also demonstrates an awareness of how other Makers have approached creating 3D models of *The Great Wave off Kanagawa* as he directly references a project by Minibricks on Youtube, both verbally in his narration and with a direct link in the description which is reminiscent of citational practice in more traditionally academic settings. Adam's narration does not even imply that his project and process is superior, rather he explains that while Minibricks[35] used a 3D printer to create the whitecaps for the waves he does not have access to that tool so instead uses oven baked clay before going onto discuss the challenges of including oven bake clay on a resin project that cannot go into the oven. This acknowledgment of differences in process and the unique challenges of each approach is presented in ways that is aligned with the agonism, the productive disagreement and difference, that is part of what characterizes a productive public realm for Arendt. He enters the public realm of the Maker community not just through the posting of his video on Youtube but more importantly through his ability to situate his contribution in relation to the ongoing discourses of the space.

Adam also extends the possibility of productive difference to the viewing audience of his video. When addressing his choice to use clay to create a version of the Red Lion to replace the boats in the original image Adam speaks directly to the viewer to say, "however if you want to see how

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[35] Minibricks craft "The Great Wave off Kanagawa with resin | Hokusai | not godzilla" Youtube video, 14:51, February 20 2021, https://www.youtube.com/watch?v=MA0S9gFIPGI .

to make a bigger boat out of all kinds of stuff then you really ought to check out Studson's video[36] where he makes a pretty perfect totally seaworthy version out of foam and wood and clay and cloth and glue and etc"[37]. This fourth wall break is typical of content on Youtube inside and outside of the Maker community but it does suggest that Adam considers at least some of his viewers to be a part of the public community of Maker peers. His statement shows that he actively considers how his viewers may be taking up his own iteration of the Great Wave project for their own work as well or that they may instead be jumping off from his model of the small boat. By showing not only his own process but also point to (and linking) the work of another Maker he expands the possibility of the conversation continuing through the work of his audience should they decided to engage with and develop upon the existing discourse of the space.

Examining these conversations around particular types of projects or materials reveals parallels between the structures of learning and discourses in the Maker community and the notion of a problem posing education as developed by Paulo Freire. Rather than asserting the kind of singular knowledge that must then be entirely adopted by a viewer or student as in the banking model, North of the Border's video demonstrates an openness to dialogue and collective exploration that is outlined in Freire's model. The notion of the problem posing education provides a useful framework for thinking about how Makers engage with each other in a non-hierarchical way that while not collaborative in the sense of working on exactly the same project, still relies on dialogue to develop new ideas and strategies in their practice. This shift is a key

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[36] Studson Studio "How to make a Miniature King of Red Lions from the Wind Waker" Youtube video, 15:17, February 18 2021, https://www.youtube.com/watch?v=RbcHcy-fNLE .
[37] North of the Border "I made the Great Wave off Kanagawa out of Resin" Youtube video, 15:33, January 28 2022, https://www.youtube.com/watch?v=Mmc3WxTjVSQ .

part of how Freire imagines a more radical and revolutionary form of education as he writes,

> Those truly committed to liberation must reject the banking concept in its entirety, adopting instead a concept of women and men as conscious beings, and consciousness as a consciousness intent upon the world. They must abandon the educational goal of deposit-making and replace it with the posing of the problems of human beings in their relations with the world. "Problem-posing" education responding to the essence of consciousness - intentionality - rejects communiques and embodies communication.[38]

This model reflects a respect for the minds of learners as potential contributors and intellectual equals – in line with Arendt's participation in the public realm – even if they are not working from the same body of held knowledge as the teacher, which Freire thinks about in planned educational settings can also be transferred into the more informal context of the internet.

When thinking about North of the Border as well as the Maker format more generally, there is no formally outlined teacher student relationship and there is no educational program like Freire is discussing, nor is there the kind of face to face or real time conversation that was the sole option at the time that Freire was writing. However, in online contexts the dialogue often occurs across longer time spans as creators respond to each other's work while viewers can also engage through the comment section. I would suggest that this is what dialogue might look like as it moves online, losing the immediacy of face-to-face conversations but gaining a reach and

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[38] Paulo Freire, *Pedagogy of the Oppressed*. (New York: Bloomsbury Academic, 1970, 2018 edition), 79.

accessing resources that might not otherwise be available. This becomes especially important with the kind of work and education that Makers are engaging in online since specialists and interested peers may not exist in close physical proximity. Oehlberg, Willett and Mackay describe the emphasis on collaboration as a model for sharing knowledge, referencing the ways that Makers build on the designs and ideas of other creator's projects and while it is collaborative in a way that differs greatly from the way that Freire described liberatory education it is still grounded in the idea that many people can hold knowledge and that it is through engaging in conversation that learning in pursuit of revolutionary change can happen[39]. In Freire's education that means movement building away from capitalism and oppressive governments but for online Makers it is instead a reclaiming of knowledge and a community's ability to learn what may otherwise be held in institutions through acts of collective creation - a foundation I would argue is valuable for Freire's political project even though it lives online rather than on the streets.

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[39] Lora Oehlberg, Wesley Willett, Wendy MacKay "Patterns of physical design remixing in online Maker Communities" *Conference on Human Factors in Computing Systems - Proceedings* (2015), 639-648.

4. Style

My understanding of Maker communities also rests on the blurred boundaries around education, inspiration, and display, which are present in the videos posted by Makers. As suggested in my initial definition of Makers and supported by the iterative and collaborative elements of many Maker designs, the primary goal of any given post is not to enable a viewer to exactly replicate the project being displayed. Rather the video serves to introduce strategies, techniques or problems that can be taken up in new iterations – as seen in North of the Border's "I made the Great Wave off Kanagawa out of Resin"[40]. The citation practice in that piece is one way that work is placed within the community space as a part of a discourse. However, across longer projects a series of videos may be used to enable a sufficient level of detail and build up the narrative of the process of working on larger projects. In these types of projects, the Maker's engagement with the discourse of the community is demonstrated through their ability to move through the process of design and creation through technical skills and the ability to address challenges. This process-based work becomes the central theme of the videos and are accessible to the viewer in a way that the exact execution of the hand labour is not.

The importance of narrative, particularly personal accounts of navigating challenge in an individual project, has been noted as a characteristic feature of Maker content that might otherwise be categorized as tutorial content, or what I would define as DIY content in the context of this thesis. In a paper discussing another platform for Maker content, the text and imaged based site Instructables, Dr Derek Van Ittersum considers the community norm of sharing personal narrative in technical communication and how the sharing of that information impacts

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[40] North of the Border "I made the Great Wave off Kanagawa out of Resin" Youtube video, 15:33, January 28 2022, https://www.youtube.com/watch?v=Mmc3WxTjVSQ .

the types of knowledges that are being taught. He offers a strong distinction between attempts to teach fixed technical skills and the more fluid cognitive models that are inherent in making,

> The narratives in the instructables presented in this article cannot help readers jump the hurdle between tacit and explicit knowledge; they cannot teach readers through the text what needs to be learned through practice. But, they do work against the misleading ways that techne is typically presented by dramatizing and making explicit the kinds of relationships, ways of being, and experiences that led to authors acquiring their techne"[41]

This perspective not only explains the prevalence of more narrative structures in Maker content but also addresses the limitations of attempting to convey hands on making skills through the internet.

The narrative structure used across a multi-video documentation of a longer project can be seen both in traditional craft practice Makers and Makers working with more recently developed techniques – seen here in the project "Lady Sherlock" by Bernadette Banner and "Iron Man Mark I" by Adam Savage[42]. These two projects are each done by a relatively high-profile Maker and have elements of fan culture which make connections to existing aesthetics based on those source texts. By expanding their content over several videos, the Makers are able to create a

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[41] Derek Van Ittersum "Craft and Narrative in DIY Instructions" *Technical Communication Quarterly* 23, no. 3 (2014), 243.
[42] The Youtube playlists for Lady Sherlock and Iron Man Mark I can be found at these two links respectively:
https://www.youtube.com/watch?v=YALgW15PVtQ&list=PLjMlfIMJIJDgZrT9qzWZCLPbFqCW8FbJQ
https://www.youtube.com/watch?v=Vt0RxHzEhws&list=PLJtitKU0CAegriOw97VIK2Ci-zs6HKP4B

narrative structure around the process of working on large projects.

While the overarching narrative of the videos remains connected through the singular projects, by making each piece of the costume into a separate video the Makers can still give time and space to the particular characteristics and challenges of each piece. Van Ittersum also addresses the peculiar balance of step-by-step process and descriptive narrative that is present in Maker content saying,

> some instructables, unlike conventional instructions or tutorials, describe projects that are either not meant to be replicated by readers or not possible to replicate (eg, because they rely on unique items or situations. At the same time, the step-by-step template of each instructable suggests a strong encouragement to authors to teach readers to do something, not just describe their unique accomplishment, which could be done more conventionally in a straight narrative not broken into steps. [43]

When looking at the Youtube series by Bernadette Banner and Adam Savage, it is clear that both have divided up a large project into logical steps based off the individual pieces of the costumes. Banner's Lady Sherlock series includes videos like "Drafting and Making a Late Victorian Waistcoat (1895),"[44] as well as more casual videos like "A Month of Marathon Sewing [part 1] || Vlog,"[45] each of which stand as stand-alone creations but also make clear reference to the larger

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[43] Derek Van Ittersum "Craft and Narrative in DIY Instructions" *Technical Communication Quarterly* 23, no. 3 (2014), 233.
[44] Bernadette Banner "Drafting and Making a late Victorian Waistcoat (1895)" Youtube video, 20:03, June 22 2019, https://www.youtube.com/watch?v=THzNFKwrIOM .
[45] Bernadette Banner "A Month of Marathon Sewing [Part 1] || Vlog" Youtube video, 37:05, April 20 2019, https://www.youtube.com/watch?v=x53RSP4pnWo .

project they are a part of. In this mode, Banner is able to show and discuss the individual challenges and techniques of each piece while maintaining a sense of larger narrative through the series as she works towards the goal. Similarly, Adam Savage divides his Iron Man build through a series of "One Day Builds" which contextualize each piece in a more manageable way for viewers, making what would otherwise be a monumental project into something that feels at least somewhat accessible. Neither creator is working on a project that would be realistic for most viewers online but the effort the Makers take to ensure that their work seems possible and understandable to their audience aligns with Ittersum's interpretation and the Maker community's characteristic goal of ensuring that the process of creation is made more transparent.

Interestingly, both the Banner and Savage projects culminate in a display video in which the creators wear the completed costume in the public realm, both on and offline. Adam Savage uses his Iron Man suit to walk around the floor of Comic Con without getting recognized (his mythbuster's run and Maker Youtube channel make him a celebrity to many folks who attend conventions), he documents this public use of his creation in "Adam Savage Incognito as Iron Man"[46] as the culmination of his series. The Making process was individual and, while the process became a part of public discourse through the sharing of the video series, the use of the creation at Comic Con firmly situates the project within Savage's community of peers – the fans and costume creators that he interacts with while in costume. This conclusion to the 'story' of the project is an important part of how the Maker project is placed within discourses of creation both as a narrative of individual work, and a shared source for others to follow for guidance.

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[46] Adam Savage's Tested "Adam Savage Incognito as Iron Man!" Youtube video, 8:12, September 2 2021, https://www.youtube.com/watch?v=lg1YuthqB9g .

The display video for Bernadette Banner's does not include an audience in the way that Savage's

done but rather just features Banner herself in dramatic outdoor images that help to capture the

aesthetic of the Sherlockian creation[47]. The display is also public in that it brings the project

outside of the private space of the home and contextualizes the project as a part of the public

realm which is more challenging for traditional craft creations which are negatively impacted by

gendered divides in Making. The conclusion of the story that Banner created frames the piece not

just as a mundane aspect of everyday – albeit very dated – clothing, but rather as a complex

Making project that can be viewed and used in the public realm.

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[47] Bernadette Banner "Lady Sherlock Holmes || Final Project Feature" Youtube video, 3:26, July 20 2019, https://www.youtube.com/watch?v=E94L4EggTnc .

5. Gender

While plurality remains an important part of thinking about the Maker community from an Arendtian perspective, there are aspects of difference and division that cannot be adequately addressed through the lens of *The Human Condition*. Hannah Arendt was largely uninterested in questions of identity politics or the intersection of lived experiences that impact the way a person may exist in their community (not to mention the fact that these challenges were much less well theorized, at least in dominant western philosophy, at the time she was writing). While race, class and a number of other factors may impact a person's engagement with online Makers, I will focus on the ways that divisions of gender are enforced within Maker communities, particularity between practitioners who are relying on contemporary technologies as opposed to more traditional craft practices.

The gendered gulf in Making is something that often remains unspoken, at least in the sphere of high-tech who are predominantly male. And when the silence on gender politics is occasionally broken, the community demonstratives a defensive and reactionary response which become flash points for considering these issues. In 2018 that response was turned against a female Chinese Maker, Naomi Wu, who participates in the online Maker community under the handle Sexy Cyborg. The internal Maker community conflict was further amplified by a VICE article which broke boundaries that Wu explicitly set when agreeing to be interviewed and resulted in messy situation which put the physical safety of several people at risk while exposing the far from idealistic ways that Maker community norms, particularly in tech, are enforced[48].

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[48] Good coverage from outside the Maker community can be found on Youtube by science communicator Rebecca Watson who gives a concise and evenly represented timeline of events here: https://www.youtube.com/watch?v=Y0dkwwV_iaw .

Wu's work as Sexy Cyborg emerges around her embodied experience as a woman, with her projects being focused primarily on wearables that emphasize an explicit femininity with her large, augmented breasts and revealing wardrobe. In the wake of the controversy Wu self-described, saying: "I am a futuristics Chinese girl, 1/25 Synthetic, the rest Human. I am from Shenzhen – the most cyberpunk city in the world. I hack hardware, write code, and make things you've never seen before"[49]. She claims both her embodied experience as a cyborg with a synthetic and augmented form but also her ability to create that body herself while also using vocabulary that resonates with canonical works of cyberfeminsim, most notably Donna Haraway's cyborg manifesto. Wu's ability to create, to engage with the principles and core values of the Maker community, was at the heart of the controversy as Makers on Reddit and other platforms had been accusing her of not being the creator of the projects she wore, suggesting that instead they were made by her tech-educated partner. This conspiratorial debate demonstrated underlying biases about the intellectual and physical capabilities of women, implying that one could not be both beautiful/sexy and competent in a chosen field of expertise.

It was Wu's discomfort with addressing the brewing conspiracy theories about her work that led to the situation with VICE which was then further complicated by the Western's publication's lack of sensitivity to the precarity of politicized speech in China. In 2018 Naomi Wu agreed to be interviewed for a VICE profile on her work, leaked emails would later show that she clearly established boundaries about what she was willing to discuss including her relationship status

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[49] Naomi 'SexyCyborg' Wu "Shenzhen Tech Girl Naomi Wu, Part 2: Over the Wall and into the Fire" Medium, January 17 2019, https://medium.com/@therealsexycyborg/shenzhen-tech-girl-naomi-wu-part-2-over-the-wall-and-into-the-fire-5e8efc5c1509 .

and family to protect her personal safety, both from individuals in the public and from potential consequences from the Chinese government. Just prior to the visit from reporters she emailed to confirm, "Off limits stuff -I don't talk about my relationship status or my sexual orientation. China is China and it's a complex issue that is sometimes dealt with in pragmatic ways – and my focus is on other issues. It's just a lot of trouble here that I don't need at this point"[50]. This quotation demonstrates the circuitous wording that Wu used throughout the entire controversy, likely in order to avoid further risking her safety with statements about the potential implications of an article that was not written with cultural sensitivity in mind. However, after the initial interview was completed over three days the situation would collapse with VICE publishing an article that violated the previously agreed upon boundaries and put Wu's personal safety at real risk. In response Wu doxxed one of the editors at VICE, an action that in turn put his physical safety at risk and as such should be condemned, being both ineffective as a way of explaining her position and creating a situation that could easily result in harm. The situation continued to devolve with VICE denying they had done anything to violate agreed upon boundaries and condemning Wu's doxxing of their editor while Wu defended her desperation and fear of consequences in the very different cultural landscape of China. The ethics of the situation are complex and, while I would suggest that both parties acted recklessly, there is an underlying dismissal of the validity of Sexy Cyborg's content as Maker creations which is more relevant and productive for beginning a discussion about the role of gendered divisions within Maker communities.

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[50] Naomi 'SexyCyborg' Wu "Shenzhen Tech Girl Naomi Wu: My experience with Sarah Jeong, Jason Koebler, and Vice Magazine" Medium, August 5 2018, https://medium.com/@therealsexycyborg/shenzhen-tech-girl-naomi-wu-my-experience-with-sarah-jeong-jason-koebler-and-vice-magazine-3f4a32fda9b5

By claiming an identity that is both Maker and that of a sexualized woman, Sexy Cyborg draws attention to gaps and boundaries within the theoretically meritocratic and open Maker community. Her catalogue of work includes the facets that I have already established as core to the Maker community. In "LEBs – Cyberpunk Wearable Fiber Optic Implant Transillumination"[51] Wu takes viewers through the process of creating a top with a lighting system that passed light through her breast implants with the result being a deep red glow that gave Wu the sexualized cyborg aesthetic that her handle suggests. From the beginning of the video, Wu makes it clear that the goal of the project is to further explore the properties of the material she has available to her – the silicone implants and her own body tissue – and walks viewers through the challenges that arise out of that exploration, which are primarily centered around the balancing of a light powerful enough to create the effect, without being too hot and burning her skin. Similar projects of exploring a particular material or process are an accepted part of the Maker community and Wu's posting of the video opens the human tissue + silicone implant medium for further exploration, and alternate problem solving in line with the information sharing values of the community. Read on its own, the video captures the features that I have identified as core to the Maker community, as Wu shares process in the public sphere then responds to comments, questions and suggestions that arose in response to her work. It is in the reception and response to her work from the other participants that questions of exclusion arise, seemingly on the basis of how female bodily autonomy are addressed in the oeuvre of the Sexy Cyborg channel.

Wu's videos validate her claim that she can "hack hardware, write code, and make things you've

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[51] Naomi 'SexyCyborg' Wu "LEBs - Cyberpunk Wearable Fiber Optic Implant Transillumination" Youtube video, 13:36, July 31 2018, https://www.youtube.com/watch?v=a929IRtg4YU .

never seen before," in ways that align with the established norms of the participation in the high tech end of the Maker community but that work is inseparable from the politics of her gendered body. She becomes not just any cyborg, but a female one who shows not just an autonomy over her choices about her body but the skills to alter it herself. That desire to engage in hybridity is not what is being questioned, rather the community casted doubt on whether Wu had the skills necessary to Make herself into Sexy Cyborg. Other female Makers who work with digital fabrication do not face the same level of scrutiny, with creators like Simone Giertz being a particularly notable example of a woman whose projects gain a great deal of attention. However, Giertz's projects modifying a Tesla[52] or building a rolling puzzle table[53] do not circle around her gendered body and instead align with projects created by similar male creators in the space. The acceptance of Giertz's work by male Makers suggests that the reaction against Wu is not about the pure fact of her being female but rather her choice to make her womanness an inherent part of her practice.

The paranoia about Naomi Wu's ability to be both the Maker of the technologically complex outfits and a beautiful model for the clothes then traces out a boundary that is otherwise unspoken in the Maker community. Alignment with core ideals of engaging a shared discourse through open information sharing and a willingness to collaborate are not sufficient to guarantee a place in the public sphere. Wu's uncompromising practice of taking her own body as material for her projects changes male Makers who, rather than accept her status, fall back on an idea that Sexy Cyborg is not their "peer" and is instead an unequal "outsider."

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[52] Simone Giertz "I TURNED MY TESLA INTO A PICKUP TRUCK" Youtube video, 31:03, June 18 2019, https://www.youtube.com/watch?v=jKv_N0IDS2A .
[53] Simone Giertz "A mechanical table with a hidden puzzle surface" Youtube video, 18:10, September 29 2021, https://www.youtube.com/watch?v=G5VQUDpK9Iw .

Donna Haraway's 1985 "The Cyborg Manifesto" became a core text for the emerging field of cyber-feminism and provides grounding for many of the contemporary feminist thinkers that engage with the implications of gender in Maker spaces, both on and offline. Haraway rejects the concept of an original unity that has been disrupted by 'unnatural' forces that must be removed to return to an imagined uncontaminated past and in "The Cyborg Manifesto" the image of the cyborg becomes a powerful tool for seeking out liberatory understandings of technology and the body without falling back on those problematic understandings of nature[54]. Haraway argues for more nuance in responding to the developments of technology, particularly in how they are taken up by women – and I would add trans and gender non-conforming folks – as a way of exploring embodied experience in shifting world. The motif of the cyborg is clear in Naomi Wu's handle but also in her self description as brought up above, in describing herself as "1/25 synthetic, the rest human" and appearing online as Sexy Cyborg Wu enacts the figure of the cyborg in the real world, an assertion of agency and empowerment through technology that expands beyond the textual argument of Haraway's writing[55].

While Haraway offers a more overarching argument about cyber-feminism, other theorists have developed these argument about the potentials for feminist technology in specific relation to the practices of Making. Cyd Cipolla argues that rather than seeing feminism as an additional lens that must be applied on top of a longer and more established practice of technology-based

[54] Donna Haraway "A Cyborg Manifesto" *Socialist Review* (1985) accessed as pdf online, https://monoskop.org/images/4/4c/Haraway_Donna_1985_A_Manifesto_for_Cyborgs_Science_Technology_and_Socialist_Feminism_in_the_1980s.pdf
[55] Naomi 'SexyCyborg' Wu "Shenzhen Tech Girl Naomi Wu, Part 2: Over the Wall and into the Fire" Medium, January 17 2019, https://medium.com/@therealsexycyborg/shenzhen-tech-girl-naomi-wu-part-2-over-the-wall-and-into-the-fire-5e8efc5c1509 .

Making, the gendered labour of the home should be understood as the historical groundings that cannot be separated from the contemporary movement. "One way to challenge the gendered and raced lines around 'making' and complicate the relationship between hard and soft engagements with technology," Cipolla notes, "is to continue to assert that what crafters do is making and engineering"[56]. However she also notes that there needs to be a move beyond simply claiming to be universally accepting which is particularly important in light of the Sexy Cyborg situation and its demonstration of reactionary response to creators who cross those "gendered and raced lines around 'making'," Cipolla calls for educational frameworks that support the identification and naming of oppressive and exclusionary structures "An explicitly feminist maker pedagogy, and particularly one that is committed to decolonization, queering, antiracist, and anti-ableist agendas, both explicitly invites those who feel left out of a universal view and gives them the tools to name and challenge the hegemonic systems of exclusion"[57]. Cipolla's article addresses her own teaching practices, which occur inside a more traditional academic setting rather than the far more unstructured space of the internet; in considering the ways in which digital Maker communities replicate larger systems of harm, her ideas suggest a potential route for supporting marginalized Makers in ways that current community norms do not, especially when considering the high tech led areas of practice.

Considering this gendered divide within the Maker community challenges the ways in which popular press discussions of the Maker movement have progressed, undermining any argument that the Makers have managed to run a true meritocracy where all can participate in the public realm as the intellectual equals that an Arendtian model suggests. Since the Maker community is

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[56] Cyd Cipolla "Build it Better: Tinkering in Feminist Maker Pedagogy" *Women's Studies* 48, no. 3 (2019), 266.
[57] Cyd Cipolla "Build it Better: Tinkering in Feminist Maker Pedagogy" *Women's Studies* 48, no. 3 (2019), 267.

not utopic, I suggest that while not an original part of Hannah Arendt's framework, considerations of identity and embodied experience remain vital for understanding the range of experiences within the community and thinking about how the models of participation and discourse that occur within digital spaces might carry forward into other contexts.

Conclusions

What I hope has become clear over the course of this document is that Makers and online Maker communities are far from monolithic and while in many ways they resist some of the more extreme trends of internet conformism, they also respond to the pressures that Hannah Arendt identified with her concept of the social.   This interplay between seemingly resistant communities built on core values of open education, iterative design, and collective discussion and the negative trends that pervade internet spaces, most notably in the way that marginalized voices are treated is more nuanced than many discussions of the virtual world can be.

The Makers show that the internet can be used to build communities of peers where ideas connected to shared bodies of practice can be discussed and built upon by participants. However, while the content itself is accessibility and open through the use of platforms like Youtube, it is also clearly demonstrated that the community reproduces many of the deep flaws that exist in offline spaces. Maker communities do set aside a banking method education for one where learners are encouraged to create their own designs building on what has already been shared but in these spaces people are still expected to set aspects of their identity aside because they are perceived of as less worth of serious intellectual thought.

There is also the possibility of moving the focus of the work towards offline spaces and considering how the functioning of online Maker communities aligns with or departs from the way that Maker concepts are taken up in traditional classrooms or other physical spaces. Given that Makers and Making have becoming increasingly popular with schools and libraries with the rising availability of relatively cheap tools like 3D printers it seems important to consider how

the values and knowledge systems created by online Makers are being translated into these very different spaces which face far different types of control from larger institutions.

It is from this understanding that several future avenues of research open up in order to better discuss the Maker within the larger framework of the internet and the many other communities and social spaces that exist online. Of particular interest is expanding the discussion outward to consider spaces and communities that align more explicitly with politics and academic thought. Given the impact that Hannah Arendt's understanding of the public realm, the rise of the social, and the tools of intellectual life have had on this project, a further exploration of how her theory can be taken up in relation to these new potential sites of political life. It is down this path that I envision this work continuing, asking questions about how serious thought can be undertaken across the boundaries of traditional institution to include the public space of the internet.

Appendix: Hackers and the Early Internet

This thesis does not set out to provide a comprehensive discussion of internet history, however it is worthwhile to consider the ways that the internet and its inhabitants have been shaped since the early days of experimentation in order to create the online world that the Makers referenced in this document inhabit. This discussion of internet history focuses on hackers as early users of the internet beyond the professional circles (academic and military) that were the only legitimized sources of experimentation, and the ongoing struggle to develop a theory of the internet to support broad intellectual discussion. By juxtaposing the communities that emerged from the development and use of the internet with the difficulty in institutional spaces of finding a way of discipling the internet into a cognizable form, I hope to lay a stronger groundwork for my own theorizing of what community in online spaces means through a recognition that many alternate positions are possible, and necessary, in order to discuss the full range of online experience.

Despite the now global reach of the internet and its relative ease of access, that was not the original intention when the technology was being developed. In fact, networked computers and the underlying technology that would enable first ARPANET and later the World Wide Web was developed for the American military as a strategic communication system that could survive a potential nuclear strike at the height of cold war tensions. MIT engineers and other experimenters in university settings would start to expand access outside of approved sources and military responses, including threats to remove access, show that from the moment of its invention, the goal was not to create the internet as we know it today: "The DCA [Defense Communications Agency] was more serious than ARPA had been about preventing the use of

the network for 'frivolous' activities, even if these activities did not disrupt network operations. For instance, in March of 1982 the DCA's new ARPANET manager, Major Glynn Parker, complained about an 'email chain letter' that had been circulating on the network and threatened to cut off hosts whose users forwarded the letter"[58]. Given that memes, vlogs, cat videos, and all kinds of other "frivolous" material is now pervasive on the internet, it is clear that this early vision of the internet was not successful.

This is due in large part to the labour, exploration, and creativity of those who would eventually become known as hackers. Janet Abbate connects the hacker to an even earlier subculture of tech experimenters and disruptors in the form of 'phone phreaks' who used various strategies to take advantage of phone lines, suggesting a different potential lineage for hackers and later Makers to look back to than the DIY traditions that relied on more analog means[59]. Hackers would be important for shaping early internet culture and many of the core values that remain at the centre of Maker communities despite Makers now existing in what seems to be a distinct position. It is also important to recognize that the popular vision of what it means to be a hacker in 2023 seems to have grown apart somewhat from what early definitions of the identity conveyed in those formative years for the internet.

For the sake of this discussion, I want to work from Eric S. Raymond's writings as a primary source about hackers. An early hacker, Raymond is   prominent and respected in the community; his website the Cathedral and the Bazaar continues to archive, compile, and think through many

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[58] Abbate, Janet. *Inventing the Internet*. (Cambridge: MIT Press, 1999), 136.
[59] Abbate, Janet. *Inventing the Internet*. Cambridge: MIT Press, 1999.

of the text resources that early hacker communities created. In his early publication "How to Become a Hacker" he answers the question of 'what is a hacker' :

> "There is a community, a shared culture, of expert programmers and networking wizards that traces its history back through decades to the first time-sharing minicomputers and the earliest ARPAnet experiments. The members of this culture originated the term 'hacker'. Hackers built the internet. Hackers made the Unix operating system what it is today. Hackers make the World Wide Web work. If you are part of this culture, if you have contributed to it and other people in it know who you are and call you a hacker, you're a hacker. The hacker mind-set is not confined to this software-hacker culture. There are people who apply the hacker attitude to other things, like electronics or music - actually, you can find it at the highest levels of any science or art. Software hackers recognize these kindred spirits elsewhere and may call them 'hackers' too - and some claim that the hacker nature is really independent of the particular medium the hacker works in. But in the rest of this document we will focus on the skills and attitudes of software hackers, and the traditions of the shared culture that originated the term 'hacker'"[60].

Interestingly, Raymond's definition does much the same thing that this thesis does with the term Maker by gesturing to the fact that the underlying values in the term hacker are not specific to the world of code despite the fact that discussions about hackers, including his own, are very computer-focused. His definition touches on the idea of the hacker as a shaper of history, and the activity of hacking to be at the core of how the internet reached its current form, but also points to the idea of community, recognition, and contribution to a larger project. Those values remain

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[60] Raymond, Eric S. "How to Become a Hacker" Cathedral and the Bazaar, accessed March 2023,
http://www.catb.org/~esr/faqs/hacker-howto.html .

centered in online Maker spaces, although I would suggest they are less focused on accomplishment. You can be a member of Maker communities without having to be at the "highest levels of any science or art". Effort and participation in the realm of public discourse are valued by Makers, in addition to the ground-breaking innovations that emerge from particular minds or circumstances.

Scholar Pekka Himanen expands Raymond's definition to ask, "What if we look at hackers from a wider perspective? What does their challenge then mean? Looking at the hacker ethic this way, it becomes a name for a general passionate relationship to work that is developing in our information age"[61] (ix). This expansion is interesting too: it loses many of the specific qualities that are identified in Raymond's definition of the hacker and my own definition of the Maker, instead turning to an attempt to generalize what the subculture means for the offline world. Himanen posed the question of the wider cultural significance of the hacker in 2001 in what I suggest is a continuation of how people attempted to think about the internet. From the early frustrations of defense agencies with supposedly frivolous uses of networked computers, to Raymond's grandiose vision of the creative hacker, through to the connection to more traditional spaces, there is a gradual expansion of what the internet is and what it means to be online.

There has been a lot of thinking and writing done about how the online and offline worlds relate to each other. Some of this lives in the dense and often obtuse world of theory with ideas like Hito Steyrel's concept of the internet as creating an excess of worlds, or incredibly artistic almost manifesto-like niche texts like "The Dark Forest Theory of the Internet" by Bogna Konior.

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[61] Pekka, Himanen. *The Hacker Ethic*. (New York: Random House, 2001), ix.

However, there is also a wide body of literature where scholars attempt to analogize the often slippery world of the internet in ways that will make sense to non-expert regulators, investors, or observers. Sally Wyatt points out that the metaphors used to discuss the internet are far from neutral, writing "These commitments add to the analysis of metaphors used to describe the Internet and digital media by reminding us that metaphors are not only evocative and political but that they also suggest something about how the actors who use them understand the economic and physical materiality of new media"[62]. These metaphors include ideas like the cloud, which turns attention away from the physical hardware that makes the internet function, and big data, which hides the everyday realities of how user privacy is infringed upon. What I think is particularly useful in reading Wyatt's article is the tracing of how theories of the internet connect to the specific goals of the organizations, groups, companies, or agencies that take up these metaphors as a way of conceptualizing the internet. In fact Wyatt concludes the article by challenging today's scholars to turn away from these metaphors that can hide distasteful elements of online life: "Social science and humanities scholars concerned with emerging digital societies and communities can contribute to debates about the regulation of the Internet and about the role of digital technologies more broadly. One way to contribute is to insist on dispensing with metaphor and be firmly literal. For example, returning to some of the examples mentioned earlier, a hunk of metal in space is not a library, and a huge, privately owned technical system is not a fluffy cloud"[63]. While this project has not sought to develop a general theory of the internet, Wyatt's article underlines the importance of recognizing the limitations of any critique that is advanced. So while I acknowledge the role that hackers have played in the

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[62]Sally Wyatt "Metaphors in critical Internet and digital media studies" *New Media and Society* 23, no. 2 (2021): 407.
[63] Sally Wyatt "Metaphors in critical Internet and digital media studies" *New Media and Society* 23, no. 2 (2021): 412.

development of the internet, and the ways that their values have been passed onto the Maker community I have discussed, they are no longer the primary shapers of digital life. The role of the hacker has shifted to the point where most users' online experiences are firmly controlled by large corporations who own digital platforms such as Youtube, which have moved the functioning of Maker communities in a different direction than their predecessors.

The hacker no longer dominates the online spaces in the way that they did in the early days of the internet. Being online has become much more accessible and the social media platforms that characterize web 2.0 have enabled people who lack technical skills in coding to post and engage with content without specialized computer knowledge, allowing the shift towards the Makers who lie at the heart of this thesis.   However, the values and attitudes towards open information that lay at the core of early hacker communities find points of continuity with contemporary Maker movements as well as in the ongoing coding projects and discussion spaces created by the hackers discussed in Chapter One. Through an awareness of hackers, early internet history, and the struggle of the academy to think through and with internet cultures I think a solid foundation is created not only for situating online Maker communities within the wider world of the internet but also for thinking about how the project of thinking about these subcultures and their values could be expanded in the future.

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