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INTRODUCTION

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> *reprogramme* | *reprogram,* v.
> "Transitive. *To programme differently or again; to supply with a new programme.*"
>
> (OED 2020b)

Reprogramming describes the activity of revising or rewriting an existing program. The definition of reprogramming contains within itself the presupposition that a current program exists and functions in some way. To be sure, the act of reprogramming does not necessarily entail a positive or negative connotation. Even the most popular software can benefit from periodic upgrades to layer new functionality over an older infrastructure. At other times, however, entire programs or parts of programs need to be rewritten and reconceived entirely because they are not functioning well.

This collection addresses a specific program: rhetoric and composition scholars' past and present engagements with critical making and maker cultures. While there is no single overarching program that can characterize the diversity of this work, our field's early engagements have nevertheless settled into some familiar subroutines. In turn, these subroutines necessitate a sustained and dedicated act of reprogramming, which *Reprogrammable Rhetoric* seeks to address: First, an all too familiar lack of *critical* in critical making and, second, a related need to rethink how we employ critical making to negotiate the theory and practice divide in rhetoric and composition studies. We will unpack these claims in this introduction as the effort to reprogram these two subroutines offers a rationale for why we have set up this edited collection in the way that we have.

MAKING AND CRITICAL MAKING OUTSIDE OF RHETORIC AND COMPOSITION

The term "critical making" is understood differently throughout academic and nonacademic contexts. It generally describes a wide range of practices, theories, and methods that emphasize the potential of

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making, hacking, and remaking to effect some sort of social or political change—that is, to do rhetoric. Matt Ratto's (2011) theories and practices of critical making remain an ongoing conceptual touchstone for many makers in different disciplinary and practitioner audiences. Critical making "signals a desire to theoretically and pragmatically connect two modes of engagement with the world that are often held separate—critical thinking, typically understood as conceptually and linguistically based, and physical 'making,' goal-based material work" (Ratto 2011, 253). Rhetoric and composition scholars have had many debates over the past decades regarding the relationship between theory and practice. Thus, Ratto's articulation of critical making is appealing because it allows theory (concepts, analysis, critique) to connect to material and practical forms of enactment and composition. Furthermore, Ratto allows making practices themselves to be a starting place through which to build reflective theoretical arguments (see also Ratto and Hockema 2009).

Extending Ratto's early work, Ratto and Megan Boler (2014) published an edited collection titled *DIY Citizenship: Critical Making and Social Media*. They note that critical making tends to focus on digital media, which is unsurprising given the complex and massive ways in which contemporary technologies structure and mediate identity in the present. However, they explain that DIY citizenship goes far beyond traditional craft-making and digital media considerations to examine how hybrid material compositions like yarn-bombing activism function as a form of public or counterpublic sphere participation.

Beyond Ratto's work, media artist-theorist Garnet Hertz (2012) has published an influential collection of critical making manifestos in zine form. He also runs a critical making lab at Emily Carr University in Vancouver, Canada. Similar to the idea of DIY citizenship, Hertz's work emphasizes critical making's genealogy in civil disobedience, which was even more clearly underlined in another zine manifesto collected by Hertz (2016a) called *Disobedient Electronics*. In both sets of manifestos, critical making emerges as the natural and necessary outgrowth of the tactical media famously theorized and practiced by the Critical Art Ensemble (CAE). As Hertz (2016b) argues elsewhere, the potential for critical making lies in its potential to reintroduce criticality into making and maker cultures that have become depoliticized, creating opportunities for the making of "built and functional devices" that "materially articulate particular stances and ideas" and "enable individuals to reflect on the personal and social impact of new technologies."

As this reference to the CAE highlights, it is important to observe that critical making practices draw on a number of historical lineages,

including tactical media, "hacktivism," and, more recently, the emergence of digital humanities research and pedagogy and the popular cultural "makers" movement. The makers movement includes a number of humanities-based "makers' labs" that have been started in universities throughout the United States and Canada. Art schools, from Rhode Island School of Design (RISD) to the University of California, Berkeley, also offer courses in critical making. Nearly a decade ago, RISD published an edited collection titled *The Art of Critical Making* (Somerson and Hermano 2013), which described its critical-making philosophies.

CRITICAL MAKING IN RHETORIC AND COMPOSITION STUDIES

This conceptual shift from the act or mentality of making itself (Hertz 2012, 2016b) to the potential for making things to do something offers points of overlap with rhetoric and composition studies. A great deal of previous work on multimodal composition and material rhetoric is and was already a form of critical making in all but name. Literal reprogramming that engages physical computing, critical maktivism, circuit programming, and related phenomena such as rhetorical processes and compositions has been one common approach that our field has imported from making discourses. Helen J. Burgess and David M. Rieder's (2015) special issue of *Hyperrhiz* ("Kits, Plans, Schematics") offered a landmark engagement with critical making and composition, which was followed by Rieder's (2017) book *Suasive Iterations: Rhetoric, Writing, and Physical Computing*. Most recently, Burgess and Roger Whitson (2019) published a special issue of the online journal *Enculturation* that was devoted to executable approaches to critical making: building kits and schematics that enable readers/viewers to reprogram existing digital programs and physical objects. Digital rhetoric and composition scholars have also explored software and coding (Brooke 2009; Brown 2015; Brock 2012; Jones and Hirsu 2020; Vee 2017) and digital humanities (Ridolfo and Hart-Davidson 2015).

Echoing positions like Ratto's refusal to divide theory from practice, a number of multimodal composition scholars have challenged the reduction of writing to the print-based analytical essay. Alongside exploring digital forms of writing, Jody Shipka (2011) added that considerations of multimodality should include *all* modalities: "Texts that explore how print, speech, still images, videos, sounds, scents, live performance, textures (for example, glass, cloth, paper affixed to plastic), and other three-dimensional objects come together, intersect, or overlap in innovative and compelling ways" (8). Other scholars have more

directly pushed the notion of multimodality toward the playful and critical experimentation with the materiality of digital and nondigital objects through engagements with maker cultures in general. David M. Sheridan (2010) articulated an early argument for rhetoric and composition researchers to explore how to compose material objects through 3D printers in the writing classroom. Importantly, Sheridan productively suggested that the field's reasoning for including visual and digital forms would also lend itself to supporting the use of digital technologies to fabricate physical objects in the spirit of many still-popular maker practices and technologies.

While such arguments are aimed at researchers in the present, it is important to note that materiality has always had a role—if an unacknowledged one—in rhetorical practice. Early examples include Demosthenes's embodied embrace of the canon of delivery by shouting at waves to train his speaking voice as well as the use of the Greek *pynx*, or a small hill, to amplify an oral speaker's voice (Morey 2015). To study and enact rhetoric has always been a study of multimodality even if the modes privileged or studied in a given historical moment have been limited (McCorkle 2012). Even prior to rhetoric and composition studies' embrace of digital technologies, Gregory Ulmer (1994) noted that *chora*, as discussed in Plato's *Timaeus* dialogue, functions as a similar space of cognitive, embodied, and material potentiality for invention before rhetoric actualizes as practice (see also Rickert 2013).

While there are a number of excellent reasons that scholars have offered for studying and composing through critical engagements with rhetoric and technology's material character, David M. Sheridan, Jim Ridolfo, and Anthony J. Michel's (2013) discussion of the role of multimodality as a kairotic mode of discovery for public rhetoric pedagogy remains particularly compelling. Rhetoric in the Greco-Roman tradition historically seeks to prepare students for participation in civic life. Insofar as more forms of public interaction are occurring in digital and material ways, Sheridan et al. argue that writing teachers foreclose in advance their students' abilities to participate in these spaces if they do not explore how rhetoric works through different mediums. Furthermore, they suggest that to teach multimodality is to teach many of the same principles that we privilege for print-based writing students. To offer a recent illustration, Michael J. Faris et al. (2018) demonstrated how to teach a graduate new media rhetoric course through littleBits, a set of electronic building blocks, as an important part of learning about the risks of composition, experimentation, and failure. For this reason, the authors declare, "material composition is within the disciplinary

purview of rhetoric and composition" (Faris et al. 2018, "Situating"); or, as Sheridan (2010, 257) powerfully states, "It's ours."

To sum up, maker cultures and critical making are not something new to be added on to rhetoric and composition studies. Rather, these conversations and practices can help us to continue to explore in new ways our historic interests in materiality and multimodality. In his webtext, "A Maker Mentality Toward Writing," Sheridan (2016) offers a cogent illustration of what writing studies can gain through examining and integrating the design techniques of "makerspaces." Once strictly the domain of engineers, art and design students, and computer scientists, now a growing number in digital rhetoric are starting to experiment with the vocabularies, tools, and design techniques of physical computing, coding, and related practices. For example, Steven Hammer and Aimée Knight (2015) have advocated tinkering with circuit-bending as a way to privilege invention and acts of discovery. As part of their exigency for their special issue, Burgess and Whitson (2019) noted a desire to continue the work of the original *Hyperrhiz* special issue on "executable culture." Whether theoretical or practically inclined, making things should equip readers or viewers to make physical end products themselves. In a definition we will revisit again in the next section, Burgess and Whitson (2019) situated critical making as a process and series of relations that is not reducible to the production of an end product or technical knowledge alone. Rather, critical making as part of an ethic of executable culture involves "a special focus on sharing and the various processes involved in the construction of objects and knowledge" (Burgess and Whitson 2019). In addition to some of the individuals we have already mentioned (Faris, Rieder, Burgess, and Sheridan), Burgess and Whitson (2019) also pointed to a panoply of related concepts like "tactical media" (Raley 2009), "speculative design" (Dunne and Raby 2013), "prototyping" (Sayers 2015), and "adversarial design" (DiSalvo 2012) that are increasingly part of the vocabulary of digital rhetoric and composition scholars and teachers.

CULTURAL CODING ERRORS IN COMPOSITION'S CRITICAL MAKING PROGRAM

While critical making is still emerging as a subfield in rhetoric and composition, there is already enough work in our field and in critical making discourses outside of our field to call for some acts of reprogramming. In part, one of our challenges for *Reprogrammable Rhetoric* was not just in identifying some of the problems within how critical making has been

defined and continues to be defined but also in determining to what extent these problems are reprogrammable. Clearly, we believe that some of these problems are indeed reprogrammable, and we hope that our contributors' efforts will help in these activities of reprogramming.

As a call to action, Joyce Locke Carter's (2016) chair's address to the Conference on College Communication and Composition membership called for the field to adopt a maker mentality. This approach went beyond mere technological training (or tool learning) to also include and yet conceive differently our traditional focus on ethics, audience, situation, and motive. In support of Carter's call to think about ethics, the continued insistence or implicit default to apolitical conceptions of the technical and material remains a broader problem that faces our field's past and present engagements with maker cultures.

As a powerful example, Burgess and Whitson (2019) pointed to Hertz's (2018) effort to reprogram *Make* magazine's highly influential "Maker's Bill of Rights." Early conceptions of maker culture were populated by technical concerns such as, "Components, not entire subassemblies, shall be replaceable" (Jalopy, Torrone, and Hill 2006). By comparison, Hertz's (2018) update refused to divorce technical concerns from political ones. He offered new ethical axioms such as, "If women don't have a pivotal voice at an event, panel or exhibition, I'm not participating." To put it simply, engaging critical making and maker cultures must be accompanied by a firm ethical commitment or, at least, an ethical commitment needs to emerge out of whatever it is we are making. Context matters. Even if the purpose or subject matter a given making activity is not explicitly political in orientation, to be an actualized thing in this world is to be already shot through with political structure, power, and other forms of relationality. As a case in point, Burgess and Whitson (2019) observed that far from politically neutral areas of rhetorical invention, makerspaces on college campuses all too often function as low- or unpaid development labs for large technical companies.

An additional problem with viewing technical skills—digital and nondigital—as apolitical lies in contributing to a historic and ongoing white masculinist bias within making discourses. Christina Dunbar-Hester (2014) noted that nonwhite activists who seek to embrace critical making have struggled with "inscribed historical patterns of inclusion and exclusion, as electronics tinkering has long been associated with white masculinity" (76). Many treatments of critical making may pay lip service to inclusivity, but nevertheless continue to embody a particular set of tools that often require advanced expertise in forms of knowledge and practices from white male-dominated fields. Examples include

Raspberry Pis, physical circuit building, data visualization and analysis, and Arduino microcontrollers (Gollihue 2019). In the introduction to *Making Things and Drawing Boundaries*, Jentery Sayers (2017) affirmed that critical making still needed to critique "the normative assumptions and effects of popular maker cultures—usually white, cisgender, straight, male, and able-bodied" (7).

In the history of composition studies and new media studies, the theories informing such criticality have perhaps been too narrowly limited in their genealogies. Malea Powell (2016) and Angela Haas (2007) have both suggested that making is not a newly theorized practice but has intellectual roots in Indigenous practices—practices that also theorize rhetoric and composition. Following from their arguments, we should understand practice as operative theory. Even calling to overturn or deconstruct a theory–practice divide by engaging critical making can still turn on other unacknowledged divisions like the ongoing colonization of knowledge in our field and in maker discourses.

In recognition of this problem, some of our chapters in this edited collection trace excluded alternative genealogies of making. Steven Hammer's chapter explores how non-Western maker ontologies predate many of the Western thinkers' interests in nonhuman agency such as "rhetorical carpentry" (Brown and Rivers 2013), Wendi Sierra's chapter explores Indigenous game design and play as a form of critical making, and, finally, Cana Uluak Itchuaqiyaq's chapter explores critical text mining in the context of studying academic citation practices through text mining and decolonial theory. Kellie M. Gray and Steve Holmes also recontextualize text mining into webscraping and analyzing tweets for #blacklivesmatter to participate in data curation as a form of activist engagement for racial equality.

These are the types of approaches that we hope this edited collection features in order to help rhetoric and composition researchers, teachers, and makers reprogram our early efforts to engage critical making discourses and practices. To be sure, more work than what this edited collection represents is needed. In reprogramming the "Maker's Bill of Rights," Hertz (2018) also acknowledged that the broad claim that technology can solve society's issues often obscure the fact that these same invoked technologies are still causing many of them. Other historically excluded or unrecognized makers have specifically challenged this issue, such as the work that occurs in feminist hacker spaces. As the title of Amy Burek et al.'s (2017) zine chapter is titled, "Feminist Hackerspaces: Hacking Culture, Not Devices." Other hackathons or makerspaces outside of institutional spaces have specifically endeavored to support

people of color, women, and gender minorities. Echoing Burgess and Whitson's (2019) emphasis on processes (executability) and not just end products in critical making, Krystin Nicole Gollihue (2019) noted that the Tuscone Women Techmakers Hackathon makes ethical dispositions like civility ("Be excellent to one another" [quoted in Gollihue 2019, 15]) as a fundamental element of critical making. For these and other excluded makers, to ask about critical making is not about tool use or technological mastery per se, but about what type of ethical community of relations and identities a given making activity supports or sustains.

Similarly, other maker collectives like Machine Room, Noisebridge, Seattle Attic, and Double Union also situate their work in a comprehensive ethical code as an alternative to mainstream maker cultures. Patrick Jagoda's (Bennett et al. 2018; Ehrenberg, Jagoda, and Gilliam 2018; Jagoda et al. 2015) work with economically disadvantaged youth in Chicago with game building offers another alternative history alongside queer game designers who explore how the materiality of controllers can shape perception (Pozo 2018). Countless examples exist. We have to participate (as some already have) more broadly in recognizing these efforts. Furthermore, part of our reprogramming activities must include understanding the mechanisms in our field and making discourses outside our field that continue to prevent us from engaging them. These structures run deep in critical making, but also through digital rhetoric and digital humanities scholarship. In a review of the role of "critique" in critical making and digital humanities scholarship, Jagoda (2017) complained, "When we engage and test the ideas of [notable critical makers], however, it is through methods of bricolage, remixing, modding, and design" (361). In other words, all too often scholars continue to revert to the cultural programming routines of the old "Maker's Bill of Rights" instead of using Hertz's (2018) reprogrammed one or reprogramming new ones on their own.

This tendency is one that cuts to the central problem with answering this question about the extent to which critical making is reprogrammable. As a case in point, consider the turn to "object-oriented rhetoric" or "things" (Barnett and Boyle 2016), which undergird certain approaches to critical making such as rhetorical carpentry (Bogost 2012; Brown and Rivers 2013). In Andrea Riley-Mukavetz et al.'s (2016) Cultural Rhetorics Conference panel (titled "Three Queer/Feminist/Indigenist Rants and a Critique of Heteropatriarchal Colonialism in Object-Oriented Theory"), they argued that object-oriented rhetoric (OOR) and object-oriented ontology (OOO) reinscribed colonial relations (see also Powell 2016). While OOR and OOO are arguably more complex than some of

their critics have allowed, it is undeniable that OOO, by metaphysical design, offers no answers for ethics and politics beyond a Heideggerian quietism and the perpetual claim that objects' realities are deeper than our knowledge of them. OOO and OOR do not shift easily from an ontological "is" to an ethical "ought." Furthermore, there is an undeniable ethnocentrism in OOO. Graham Harman (2011) began with Heidegger and other mostly European phenomenologists as the basis for OOO rather than considering or even attempting to acknowledge prior Indigenous epistemic traditions. From the perspective of making critical-making discourses, it is difficult to overlook these historical contexts because no philosophical form or theory ever fully lifts free from contingencies of culture and language (Felski 2015). Metaphysical claims in print about the ontological nature of reality are material instantiations and shot through with the contingencies of history.

To sum up, the *critical* part lies in connecting any discussion or use of technologies and making to their ethical and political contexts. If rhetoric and composition scholars only privilege, for example, 3D printers and even text mining or coding, we may unwittingly reproduce a colonial mentality ("can," Burgess and Whitson [2019] argue, is a privileged form of making, whereas not all college classrooms will have a research university's corporate-funded makerspaces). For a similar reason in a different context, Rick Wysocki and co-authors argue in their manifesto "On Multimodality" that "practices of making and critical activity must be rendered mutually supportive" (2019, 21). That is, criticality and composition are not separate activities, but constantly in conversation—in conjunction—with each other. Rhetoric and composition scholars arguably need our own paradigm since our field approaches writing and rhetoric through a generative sense not seen in other fields. Politics in rhetoric and composition's interests in critical making, Burgess and Whitson (2019) clarify, is at once about activism for a particular cause like Black Lives Matter but also an interconnected and broader sense of what it means to be human in a collective society that is built on reciprocity and relationality. Thus, reprogramming critical making has to connect making culture to the material conditions that produce kairotic opportunities for interventions of all types.

Alternative genealogies of critical making should seek to trace how institutional *and* noninstitutional forms of genealogies of making work. We need to ask questions as a field such as "Do our histories of making include how women, BIPOC, queer, and working class peoples collaborate, make, tactically appropriate and critical engage with technology?" In other words, we cannot simply make things and build

our theories as we make them without acknowledging the existence of other cultural binaries and forms of epistemic and material colonization that structure sites, spaces, materials, and access to making in particular spaces and places. Thus, theories enacted by and produced by practices of making should draw from a variety of intellectual traditions. As Wysocki et al. (2019, 21) argue, "We must negotiate and continuously reorient ourselves across a spectrum of theoretical framing and practical doing."

REPROGRAMMING CRITICAL MAKING IN COMPOSITION

So far, we have laid out some of the functioning programs for critical making in order to suggest some methods for reprogramming them. Reprogramm*able* is the adjective form: "Capable of being reprogrammed" (OED 2020a). As this edited collection will hopefully testify to, there are some productive ways to reprogram some of these issues. While we have talked about programming as a verb, the noun "program" possesses some useful etymological resonances along these lines:

> **program** (n.) 1630s, "public notice," from Late Latin programma "proclamation, edict," from Greek *programma* "a written public notice," from stem of *prographein* "to write publicly," from *pro* "forth" (see pro-) + *graphein* "to write" (see *-graphy*). General sense of "a definite plan or scheme" is recorded from 1837. (Harper 2020)

One needn't be a full-fledged Derridean to appreciate this "always already" connection between the public and the activity of programming in itself. This etymological connotation is yet another reason why we argue that this particular word—reprogrammable—is worth emphasizing for this collection. To reprogram always constitutes the possibility of change and productive (or unproductive) deviation for reaching the Other. To program and to reprogram are to admit these sometimes-neglected sites of construction and relationality. It is to admit that any program is part of a complex and emerging nature–culture assemblage. To reprogram is also to presuppose that something functioning can be done differently for ourselves and the others who use it, even if our goal is to negate, bracket, or ignore that Other. Someone or some*thing* (human and nonhuman) is required to run the program. Programs emerge socially and materially; they enable and disable.

Taken together, our chapters in this collection constitute and initiate some new programs of action for critical making in composition studies. We aim to offer expanded discussions of ethics and politics aimed

at guiding the *critical* part of "critical making." We also hope to foster a more traditional engagement with critical making among rhetoric and composition studies teachers who may still be reluctant to view spending thirty dollars on a Makey Makey kit or an Arduino as equivalent to assigning a textbook on digital writing or multimodal composition. By design, we have asked a number of contributors to feature the actual assignments and technological instructions that they taught in actual college courses. Many of the authors have generously agreed to maintain the source code or instruction sets at a durable online location or to otherwise make their programming tutorials accessible to readers of this edited collection and the general public as part of the executable or kit-generating part of critical making. We aim to equip readers both to think about making and to make things themselves.

Some of our chapters are more theoretical and some are more practice-based. However, we want to affirm that we do not see the theory versus practice distinction as a useful one. Lisa Ede (2004, 119–29) and Bruce Horner (2019, xii–xiii), among others, have argued that theory is a form of material, social, and situated practice. And further, practice can be a way to make theory. Ede (2004) writes that we can "use practice as a means of thinking *through* complex scholarly and professional issues" (16), a sentiment that resonates with critical making, which Ratto and others identify with "doing theory" in a way that "entails moving beyond shallow critical reflection" and "attempt[s] to reconcile a schism between those who purportedly create" and those who critique and theorize (Resch et al. 2017, 152). Consequently, we understand practices of critical making as an opportunity to reinvent theory. As Horner (2019) writes, rhetoric and composition classes are sites where students can be invited to "theorize . . . differently": "To theorize is to reinvent, and reinvention requires theorizing" (xiii). Erin Manning (2016), in a discussion of her work at the SenseLab in Montreal, also argues that *making* can open up new avenues of knowledge. She asks, "How does practice that involves making open the way for a different idea of what can be termed knowledge?" (11). Part of this reinvention of practice (making) and theory/knowledge entails, we suggest, identifying conditions that enable and disable certain practices, which remains a valuable part of any critical making project for rhetoric and composition. One only has to look at how some critical making practices have elided intersectional and decolonial considerations to realize that more theoretical or, certainly, ethical discussions are essential. It does our field little good to *do things* and *make things* if such conversations are not accompanied by robust and rigorous political and ethical frameworks to differentiate

which forms of critical making help us to build a better and more equitable or just community.

By exploring these themes, *Reprogrammable Rhetorics* explores ways to approach several overlapping questions that we believe our edited collection engages. First, *what ethical and political theories are important for our field to explore in relation to critical making?* Clearly, not all forms of political making fit into left-leaning or progressive social justice or public rhetoric scholarship. In other words, while we do not wish to limit critical making's spirit of experimentation, we and, indeed, our chapters in this collection, strive for more than "making for the sake of making." Second, *what additional intersections between critical making scholarship and digital rhetoric and writing studies can help to extend both the multimodal scholarship and material rhetoric scholarship that our field already explores? Reprogrammable Rhetoric* as a whole engages how an explicit engagement with critical making scholarship and practices can extend the various material, embodied, affective, and political dimensions that our field has already enacted while trying to offer new (or neglected) political directions and making practices to explore. Third, *what does our field offer critical making scholarship that it does not necessary attend to as strongly or as explicitly?* For example, does our historic attention to issues of audience or public rhetoric help offer more systemized methods of theorizing the activity of critical making itself? Could critical making scholarship and practice learn from exploring our scholarship on the history of invention or delivery (including decolonial, queer, and feminist interrogations of these histories)? Does our work on intersectional concerns in writing and social justice lend alternative forms of methodological, conceptual, or practical extension to areas and objects of concern for critical making? For example, our chapters on "critical text mining" in section 2 offer examples of how some of our contributors have reconceptualized data collection and analysis methods—methods that may still be treated as an apolitical technology by many. In a comment we in no way mean as critical or presumptuous, perhaps our disciplinary interest in very expansive definitions of materiality and technology might be useful to help critical making discourses shake up some of the "terministic screens" that may have started to settle into place as this research and making area has stabilized around some common objects of interest. By keeping these broad tensions in mind as a primary exigency, it is our hope that *Reprogrammable Rhetoric* offers a new inroad for both critical making and rhetoric and composition audiences.

Our edited collection is divided into five categories, which reflect these ends.

SECTION 1. FRAMING CRITICAL MAKING

Chapters in this section frame critical making as part of rhetoric and composition and specifically as a political practice. Steven Hammer's essay, "Post-Noise: A Story of Co-Design and Relationality," directly engages ethical issues with regard to making but from the standpoint of Indigenous making practices and accessibility on behalf of disabled users. Hammer's essay offers additional relevance for the field's interests in points of overlap and departure between material and cultural rhetorics (object-oriented rhetoric, new materialist rhetorics, etc.). By appealing to the need to ground critical making in prior marginalized non-Western relational ontologies, Hammer importantly situates a turn toward critical making not as a "new turn" but as a need to highlight the prior work with object rhetorics from oppressed populations and counter-histories of rhetorical materialism. He grounds this discussion in a study of accessibility and the "intention of helping deviant bodies perform traditional tasks on passive instruments." In this regard, he offers a specific manifestation of the purpose of this collection by reprogramming some of the ontological and epistemological divisions that the field has yet to fully engage in critical making scholarship.

Similarly, David M. Sheridan's essay reminds audiences that "critical making" is a term that has a genealogical and political history that is built into the idea of reprogramming itself. For example, this collection has a goal, which echoes the concerns of other critical makers, of creating a shared repository to enable executability. This goal has precedents, including the Creative Commons' web sharing, but, importantly, through artistic models such as postcards as in Craig Saper's discussion of "networked composition." In "The Circulation of Touch: Very Simple Machines for Creating Tactile Textual Experiences," Sheridan offers a theory of invention for critical making grounded in what he calls a "metaphorical reinterpretation" of the concept of "reprogrammable circuits." He explains this concept by describing many of his practical illustrations for teaching critical making through the creation of paper writing devices (PWDs), which can load text in analogous ways to physical computing circuits to create compelling interactive experiences for users. Like Hammer, Sheridan's essay importantly frames rhetoric and composition's interest in critical making as one that must interrogate the theory/practice divide rather than necessarily settle on one side or another.

SECTION 2. TEXT MINING RESEARCH METHODS AS CRITICAL MAKING

This section represents an attempt to reprogram the data visualization component of traditional practices of critical making. For clarification, David Staley (2017) declared that "the 'maker turn' expands the range of objects humanists might construct" to include "non-textual and perhaps even non-discursive objects" (37). He argues that "making, designing, and experiencing these visual, tactile, and material objects are hermeneutic acts, which afford the kind of inquiry expected in the humanities" (33). As this section will argue, Staley's point is perhaps taken to highlight a need to connect any performances of the screen to their public rhetoric instantiates beyond academia or making for making's sake. There are also concerns among critical makers (Sayers 2017) about the explicit need to make scholarly explorations of making as data analysis or data generation an ethical practice that is distinct from technological entrepreneurism or the "cathedral of computation" (Bogost 2015). After all, coding and programming is both a material and a political practice. In response, this section is designed to align some of our field's interest in critical making with our ongoing interest in text mining, digital humanities, linguistic methods, and descriptive statistics with a particular eye toward both enabling new text mining practices and, specifically, thinking about politics: How can we fashion or employ text mining tools to locate new data points to then form new topological models for how the field functions?

In her chapter, "The Woman Who Tricked the Machine," Cana Uluak Itchuaqiyaq retells a narrative of feminist and Indigenous critical making practices through an ethical application of text mining. Itchuaqiyaq employs quantitative methods with decolonial theory to study the status of citation practices of historically marginalized individuals in technical communication scholarship. While some continue to draw lines between the neutral use of quantification methods and algorithmic critique, Itchuaqiyaq productively documents how the two can be linked into what we might call "critical text mining."

The specific term "critical text mining" is a merger of critical making discussions with text mining methods. This term is the specific subject of Kellie M. Gray and Steve Holmes's essay, "Critical Text Mining: Ethical Paradigms for Determining Emoji Frequency in #blacklivesmatter." Their approach reflects especially Hammer's framing efforts to show that the idea of reprogramming is historical and culturally specific. As they explain, text mining is often critiqued as an object of neoliberal

oppression or circumscribed as a narrow empirical method. Yet Gray and Holmes resituate critical text mining as a middle position that combines ethics with text mining methods to create or maintain datasets in public ways. They demonstrate critical text mining through a tutorial hosted on this collection's companion website that uses the data science programming language R and the twitteR package to webscrape tweets to produce activist datasets on #blacklivesmatter.

In a similar collaborative vein, Ratto (2011) argues that critical making projects could include "the act of shared construction itself as an activity and a site for enhancing and extending conceptual understandings of critical sociotechnical issues" (254). As an additional example, Ryan M. Omizo's approach to text mining is more methodological and instruction-based than either Gray and Holmes's or Itchuaqiyaq's respective essays. However, Omizo's essay, titled "Reprogramming the Faciloscope: An Experience Report on the Search for Genre," offers one of the best performances in this collection of what reprogrammable means since he is describing his methods and technical executions for revising an existing digital humanities project: the Faciloscope with Bill Hart-Davidson. The updated Faciloscope 2.0 offers an interactive interface that allows users to upload text in order to have software locate genre signals (Miller 1984). Omizo also includes instructions for using it as well as code for participating in the ongoing evolution of the Faciloscope 2.0. In relationship to critical making discourses, Omizo's essay fulfills the spirit of executability and contains an open invitation to readers to participate in the ongoing development and refinement of the Faciloscope 2.0 as a possible conduit to enable critical text mining activities.

Aaron Beveridge and Nicholas Van Horn's chapter, "Big Data, Tiny Computers: Making Data-Driven Methods Accessible with a Raspberry Pi," similarly offers code and tutorials for a different and more traditional form of critical making—programming the reprogrammable circuit board, the Raspberry Pi—but through a nontraditional purpose: text mining and data archiving. While Gray and Holmes engage text mining, Beveridge and Van Horn explore "big data" in relation to critical making. Big data has more resonances with datasets assembled and analyzed by largescale commercial software or proprietary knowledge sets that may require substantial amounts of technical know-how, financial capabilities, and processing power to engage. Yet Beveridge and Van Horn argue that everyday researchers and makers already have access to DIY tools of building their own large datasets through purchasing a relatively inexpensive Raspberry Pi computer (roughly $35), which, they contend, can address key hardware and workflow issues for

long-term data collection projects. While the bulk of their chapter is instructional in helping readers connect a Raspberry Pi to their open-source MassMine webscraping tool suite, they do offer specific connections to how data curation can function as a form of critical making.

SECTION 3. EVERSION AND CRITICAL MAKING

One way to reprogram an existing program lies in using neglected theoretical concepts to help shed light on the deficiencies or limitations of prior ones. With respect to the theory and practice division, the concept of eversion is useful, which comes from William S. Gibson's (2007) *Spook Country*, which describes the "eversion of cyberspace." What he meant by this term is a situation through which the virtual or immaterial inverts itself and leaks out into the physical world. Work on wearable rhetorics and the Internet of Things are perhaps familiar illustrations of eversion. In a traditional critical making approach, eversion captures this sense of working with haptic wearable media or physical computing, which Rieder (2017) identifies as providing possibilities "to combine the virtual with the real in new ways, and to creatively bend the conventional experience of reality toward some suasive end, by folding into it some of the affordances of the virtual" (5). As Steven E. Jones (2018) notes in the context of discussing eversion and the digital humanities, *eversion* is also a call to *ground* any form of making back its material, social, cultural, and material contexts, which is one of the exigencies for this collection.

The first chapter in this section demonstrates how eversion applies to multiple chapters in this edited collection and not just in this particular section. In "Touch-Interactive Rhetorics: Exploring Our 'First Sense' as a Rhetorical Act of Eversion," Matthew Halm and David M. Rieder draw on eversion to highlight the need to develop new vocabularies and concepts for the field to be able to explore political interactions through touch and haptic design. For example, they rightly ask what it means for rhetoric and composition scholars to compose through forms of physical computing when wearable sensors can collect data unseen and largely unregulated from the haptic interactions of embodied users. Such new forms of theory and data collection can lead toward a reciprocal feedback loop of composing new compositions that make users more aware of how forms of physical computing monitor and control their agency: "With that transduced data in hand, a digital rhetor can generate multimodal feedback directed at their audience that leads to a stylized experience."

The Gibsonian spirit of merging and yet reconceiving differently two historically distinct knowledge domains was also reflected in another

chapter by Andrew Pilsch, titled "What the Computer Said: Poetic Machines, Rhetorical Adjuncts, and the Circuits of Eloquence." He explains how the rhetorical concept of "eloquence" can be coupled with computer-generated compositions. Using a computer to compose means that both the human programmer and the computer come together to create an emergent product that neither could have produced without the other. He declares, "By imagining the computer as an eloquence adjunct, we can further think through digital rhetoric as a product of intimate relationships with our devices." Pilsch, who is well known in our field for creating bots, such as @InfiniteQuintilian on Twitter, uses this theoretical framework to offer some critical self-reflection on how his approach to building bots evolved, including specific discussions of the type of code and datasets that he used.

The concept of eversion also has alternative rhetorical histories in all but name. Sean Morey and M.Bawar Khan, in "Actionable Monuments: Making Critical Augmented Reality Activism," combine a theory of rhetorical/invention and making (Ulmer's "electronic monuments" or a "Memorial") with coding an augmented reality (AR) technology in an AR application devoted to bearing witness to the neglected animal costs of the Louisiana Gulf Coast BP oil spill of 2010. This application, which is available in the essay as well as their code available on this collection's companion website, is coded with Unity and the Vuforia AR SDK, corresponding image and video assets, and C# scripts. These scripts will link this app with the user's automobile via a Bluetooth onboard diagnostic scanner to provide real-time data on the user's relationship to the petrol economy and the nonhuman animal sacrifices that result from this participation. Here, Morey and Kahn illustrate how programming, AR interfaces, and theorists of electrate invention can intersect with critical making, eversion, and public rhetoric issues to address ongoing kairotic exigencies.

SECTION 4. CRITICAL PLAY AS CRITICAL MAKING

Critical making discourses can and should involve more than just Arduinos. In this section, contributors investigated material making through play as a form of ethical practice. Getting straight to the issue of eliding theory and practice, Michael J. Faris, in "Reparative Making: Re-Orienting Critical Making for Queer Worldmaking," repurposes Ratto's concept of critical making to theorize what he calls, drawing on Eve Kosofsky Sedgwick's work, *reparative making*. As he explains, reparative making involves "restorative making for individuals and groups that can assist in queer worldmaking practices, opening up the world to new ways

of thinking and being." Faris turns to queer indie video game scenes, explaining how queer and transgender individuals make indie games for survival and reparative purposes; how these games often challenge or queer normative assumptions about gameplay, gender, sexuality, and disability; and, finally, how physical interfaces for video games and maker movements themselves can be queered as reparative modes of making.

Wendi Sierra, in "Developing *A Strong Fire*: Bridging Critical Making, Participatory Design, and Game Design," describes the ethics of invention through participatory critical making in the context of video game design. Part reflective-narrative and part theory-building, Sierra's chapter defines and draws on Elizabeth LaPensée's concept of Indigenously determined game design to describe how she and other actually affected Indigenous stakeholders have worked together on *A Strong Fire*, which is an Oneida culture and language game developed with the Oneida Nation of Wisconsin. In this regard, Sierra also reminds readers that our epistemic starting places for critical making matter in terms of whether we theorize and enact from Western or Indigenous (decolonial) starting places.

Many of us may not have the knowledge or classroom time to teach video game programming. However, critical play can be taught with a variety of tools, as Kendall Gerdes demonstrates in "Twisted Together: Twine Games as Solidarity Machines." Gerdes offers a rhetorical theoretical approach to the critical making practices seen in the Twine game *Depression Quest*, by Zoë Quinn. *Depression Quest* became the lightning rod for the 2014 GamerGate controversy. Since it defies so many conventional expectations of mainstream video game narrative, gameplay, and character archetypes, Gerdes uses Ratto's idea that critical making can "parse . . . a world that exceeds language's meaning-making powers" to offer a productive rereading of feminist critical making approaches with regard to game design. Far from just a description, Gerdes, who draws on Avital Ronell's and Diane Davis's work, also uses a performative second-person address to reframe author–audience perspectives in the parallel way to how *Depression Quest* operates.

SECTION 5. CRITICAL MAKING AS INSTRUCTIONAL DESIGN

While many chapters touch on pedagogical implications, two of our chapters place the college classroom as a specific focal lens for critical making discourse and practice. In "Cultivating Critical Makers: Crafting with Paper-Electronic Circuits in an Online First Year Composition Course," Bree McGregor discusses how physical computing can be enacted through accessible nondigital means such as poster boards

and graphite pencils to draw physical circuits can be taught in an undergraduate classroom. She examines the use of critical making assignments—paper-electronic circuits—to help students engage in tactile, reflective practices and rethink how they reach audiences and achieve rhetorical goals. McGregor includes an examination of the pedagogical design for an online, maker-themed course and discusses resources and support—including a website she built specifically for this purpose—for both instructors and students as they engage in new modes and mediums of composing.

Similarly, John Jones's chapter, "Crafting in the Classroom: Carpentry and Pedagogy in Rhetoric and Composition," offers another conceptual and practical application directly aimed at the undergraduate classroom. His chapter explores the idea of carpentry—making things that do rhetorical work (Bogost 2015; Brown and Rivers 2013)—and its relation to rhetoric and composition pedagogy. Using the lens of an upper-level digital media course that focused on making with the Arduino platform, Jones addresses how the creation and function of a course can be considered a form of carpentry and suggest how this framing can benefit both instructors who wish to integrate reprogrammable circuits into their teaching as well as those who do not. He examines the syllabus, a document that is primarily textual, but in its function exhibits tool-like qualities, exploring it in turn as a program, an object, and a platform and examining what is at stake in each of these framings. Speaking to the political issues of OOR and OOO, the chapter also addresses recent concerns in rhetoric and cultural studies related to these terms and discusses how instructors can integrate diverse voices into making-centered courses.

CONCLUSION

We (re)wrote and revised this introduction during the 2020–2021 global coronavirus pandemic (and many authors revised their chapters heavily during this pandemic as well). It's amazing how many people across the world turned to making during the early months of the pandemic. For instance, flour became a scarce commodity in many markets because so many US residents turned to baking bread as a pastime as they stayed at home to help suppress the spread of the novel coronavirus. Others turned to crafting and making practices like knitting, cooking, and sewing (especially of masks) and even more elaborate engineering feats like YouTuber and engineer Mark Rober's (2020) squirrel maze he built in his backyard to pass time and test how quickly squirrels could figure out his maze and successfully earn their treats.

But to state that so many turned to making during the pandemic is also to point out the privileged ways we often understand making. While many turned to baking bread or feats of whimsical engineering to pass time, others were still working full-time in service occupations, risking their health to continue to earn a living. Others weren't afforded the luxury of leisurely making as education moved online in spring 2021 and childcare become unavailable. This disparity was particularly gendered, as women academics, for example, became more responsible for stay-at-home childcare and at-home online education while their male counterparts (in comparison) continued publishing at rates higher than women (Flaherty 2020; Viglione 2020).

The coronavirus pandemic is not the only context for this collection, of course. But this kairotic exigency along with pressing issues such as Black Lives Matter and structural racism (Kendi 2019) highlights the ongoing need to situate critical making as a context of "both/and" instead of "either/or" when it comes to refining a flexible operating program for rhetoric and composition. The very selection of materials on offer or the ability to engage in making are themselves shot through with political relations and hierarchy. Admitting this should not be interpreted as suggesting a barrier to overcome or call to avoid experimentation and tinkering. Instead, the present era requires that we strive to connect making to all of its forms of affectivity and political inscription. At the minimum, we hope that this collection helps makers inside and outside of our field grapple productively with this set of tensions.

We have titled this collection *Reprogrammable Rhetoric: Critical Making Theories and Methods in Rhetoric and Composition*. We hope that the chapters in this collection provide models for reprogramming rhetoric, for thinking and enacting rhetoric anew as a way to engage in the world. We like to think of *rhetoric as making*—a way to critically engage in the world through enacting new practices that open up possibilities for world-making. This collection, we hope, joins critical making scholars who see critical making as a politicized endeavor in which "making becomes a means of not only designing a more just social future but composing a transformative tomorrow" (Wargo and Morales 2021, 137).

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