Studies in Pattern Making: Principles of Patternmaking as Principles for Fashion System Reimagining

Caleigh Smith

A Thesis

in

The Department

of

Design and Computation Arts

Presented in Partial Fulfillment of the Requirements

for the Degree of Master of Design at

Concordia University

Montreal, Quebec, Canada

September 2025

CONCORDIA UNIVERSITY

School of Graduate Studies

This is to certify that the thesis prepared

By: Caleigh Smith

Entitled: Studies in Pattern Making: Principles of Pattern Making as Principles for Fashion System Reimagining

and submitted in partial fulfillment for the degree

Master of Design

complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

Signed by the final examining committee:

_____ Chair
Miranda Smitheram

_____ Examiner
Rilla Khaled

_____ Examiner
Kevin Yuen-Kit Lo

_____ Supervisor
Miranda Smitheram

Approved by _____
Dr. Martin Racine, Graduate Program Director, 2025

September 2025 _____
Dr. Annie Gérin, Dean of Faculty of Fine Arts

ABSTRACT

Studies in Patternmaking:

Principles of Patternmaking as Principles for Fashion System Reimagining

Caleigh Smith

This thesis investigates the potential of using creative pattern making methods as tools to derive creative policy solutions to the wicked problems associated with the fashion industry. As one of the world's most polluting and carbon intensive industries, many countries have implemented policy frameworks to initiate sustainability in the fashion industry. However, Canada has not yet developed a sustainable fashion policy framework. This research seeks to support thinking on the development of a Canadian sustainable fashion policy framework, by uncovering creative approaches to policy design informed through pattern making methods. Through research-creation explorations in pattern making, this research translates the principles embedded in 5 different pattern making methods into Principles for Fashion System Reimagining. Drawing from literature in design, political imagination, environmental studies, and fashion, the research finds that design principles distilled from pattern making methods can be used as generative thinking prompts to guide systemic problem solving and policy development for sustainable fashion. The intention of the research is to demonstrate how pattern making may be able to offer alternative problem orientations, intervention points, relationalities and scales of thinking on the sustainable fast fashion issue that are urgently required in the climate crisis.

TABLE OF CONTENTS

LIST OF FIGURES

"When you explore new
techniques and methods of making,
you deal with chance, luck and hope.
Sometimes you completely
mess up, sometimes the
mistakes are really much
better than you were
hoping for, and sometimes
you discover something
about cloth that you didn't
think was possible."

Julian Roberts

CHAPTER 1: INTRODUCTION

1.1 Positioning the Researcher

I have always been a sewer and I love working with fabric. I love how it feels like you are working out problems and playing out possibilities through tactile problem solving. When I think about how I learned to sew, its not the precise techniques or construction methods that stick with me most, but rather, the way of thinking that sewing taught me. This way of thinking is full of "what if" questions that feel joyful and optimistic to think about rather than frustrating and limiting. This way of thinking has informed what types of questions I am interested in exploring through research, and how I approach them.

Approaching research from this perspective means, believing that there's always a solution, that imagining is playful, important and expansive, and experiencing that it is a delight to engage in a problem solving process - regardless of what the problem you're trying to solve is. I believe that making teaches us to answer "how" questions. How can we make something using only the materials we have? How can we match techniques to materials and processes in order to make the things we imagine real? I am also interested in the "how" of systemic sustainability interventions; how do we advance climate solutions in ways that are equitable and that balance the needs of multiple communities, by bringing together the right combinations of people, processes and materials in creative ways? These questions can be what feels impossible about climate solutions, but there is also potential for this to be a creative, interesting, resourceful and even joyful process. This joy is a resource, if applied at the system scale, that may be able to help us uncover better ways of problem solving that can guide us to create more sustainable and equitable fashion systems.

I came to be interested in these types of questions through my background working with non-profits to advance community-scale sustainability interventions. I was part of multiple community engagement projects that sought to advance sustainability through promoting behaviour change. While this is an important scale for problem solving on sustainability issues,

I was frequently disheartened by the slow speed of change and the lack of palpable impact. I became interested in what would happen if we took the speed and scale of change needed seriously, how we might tackle these issues equitably, and found the scale of governance and policy to be the most direct, strategic and fun to think about.

This sewing-informed way of thinking, matched with my interest in large-scale climate solutions has also influenced the types of questions I am interested in exploring through research. This research addresses exploring solutions to problems that seem impossible to solve, through an interest in looking at problems at the scale of complexity, because at that scale, all parts of a problem are visible. This mindset on making is where this project started. I was interested in exploring whether the same creative and joyful methods that we use to imagine and produce clothing designs could be translated into tools for thinking differently about and solving the complex challenges of our time. The following sections introduce the problem context that the research responds to, and gives an overview of the research process.

1.2 Thesis Context

This research sits in the overarching field of sustainable fashion, and explores this issue from a climate lens and complexity perspective. The research explores new approaches to policy making through research-creation. Research-creation is an interdisciplinary approach to knowledge production that merges research and creative practice in order to ask original questions and generate new knowledge (Loveless, 2019). Drawing from key literature on design, political imagination, environmental studies, and fashion, Studies in Pattern Making investigates the potential of 5 pattern making methods as tools for imagining and implementing original solutions to the sustainability challenges associated with fashion. Through research-creation explorations in patternmaking, it seeks to uncover new ways of thinking and imagining that have the potential to inspire original futures and guide transformative change in fashion.

Climate change is the biggest and most existential human-made crisis that the earth has ever faced (Lewis & Maslin, 2015). It is also a complex problem, to which there is no “‘solution’

in the sense of [a] definitive and objective answer" (Rittel & Webber, 1973). There are countless environmental and social impacts caused by climate change, many of which are hard to see as interconnected to one another, and many of which we cannot directly see or touch at all. 'Solutions' for climate change are being proposed and carried out by many scales and types of stakeholders who contribute and relate to the economic, social and environmental dimensions of this issue in different ways, while operating according to different values, interests and logics.

Complex human systems have produced the climate crisis, and many associated ecological issues that are nested within the climate issue. This includes the climate and environmental impacts of the fashion industry, which is one of the world's most polluting and carbon-intensive industries due to its global supply chains, resource and energy-intensive production practices, and escalating rate of production. This industry is responsible for producing 20% of global wastewater, and 10% of global greenhouse gas emissions (Reichart & Drew, 2019). The environmentally degrading impacts of the industry coupled with a rise in consumerism since the 1950s has turned the fashion industry into one of the most resource-intensive industries globally (Why Do We Need a Fashion Revolution? : Fashion Revolution, n.d.)

Many businesses, governments, individuals, and organizations are working to formulate solutions to the textile sustainability problem. While the solutions that are put forward by sustainable fashion businesses are impactful, it has been argued that sustainable production, consumption and other capitalism-based solutions are not sufficient for solving the environmental problems created by fast fashion (Thomas, 2019). As businesses are structurally confined to the conventions of capitalism, with its associated dependence on overconsumption, exploitation of people and unsustainable resource extraction, to be truly successful, change must be driven by forces outside of the fashion industry itself (Scales, 2014). Complex systems problems are best addressed from the highest scale possible (Meadows, 2008), which within human systems, tends to point towards policy and governance. Evolving out of this context, this research-creation project is concerned with deriving policy and political imagination frameworks

from creative practice that can push the boundaries of what policy solutions we see as possible for the current system.

1.3 Overview of Thesis

In response to this problem context, this thesis investigates the potential of 5 pattern making methods as tools for imagining and implementing original solutions to the wicked problems associated with the fashion industry. Through research-creation explorations in pattern making, it seeks to uncover new ways of thinking and imagining that have the potential to inspire original futures and guide transformative change in fashion. The research-creation process culminated in the development of a series of *Principles for Fashion System Reimagining* derived from traditional and creative patternmaking methods. The blouses produced through research-creation experiments demonstrate the potential of different patternmaking approaches as speculative thinking tools that present unique possibilities for material and systemic imagining. The intent is to demonstrate how pattern making may be able to offer alternative problem orientations, intervention points, relationalities and scales of thinking on the fast fashion issue that are accessible through pattern thinking, and urgently required in the climate crisis.

This research began with an intent to explore the sustainable fashion issue at the system scale and in the Canadian context. Driven by a desire to look at this problem both pragmatically and joyfully, the Literature Review chapter draws on key texts from the field of design, sustainable fashion, environmental studies and political imagining. The Methodology chapter introduces research-creation as the key method used to explore potential parallels and linkages between patternmaking and policy making and then summarizes the making and thinking processes that led to the discovery of the Principles for Fashion System Reimagining. The Discussion chapter puts these principles into context and explains how they could be used to inform solutions to the sustainable fashion issue. It also introduces additional overarching conclusions from the research-creation process, as well as potential applications and future directions.

CHAPTER 2: LITERATURE REVIEW

This literature review brings together key texts about design, systems change, political imagination, the joy of making and environmental studies in order to validate and contextualize the research-creation approach that is introduced in the following sections. Together, these texts introduce Transition Design as the central design theory that guided the research, explore the role of optimism and imagination in designing solutions to the climate crisis, articulate the joy of craft as a tool that can drive political imagining and provide an overview of different frameworks for pushing forward political imagining to support more creative imagination and visioning. Some of these texts were engaged with during the research-creation process and thus are also discussed in the methodology section. By introducing key concepts and putting them in conversation with each other, this literature review forms the base of my argument: that we need creative thinking tools to push forward political imagining in order to help us design more sustainable and equitable fashion systems.

2.1 Introducing Transition Design

Early on in this project, I knew I would need to ground my research in an overarching design theory that was interdisciplinary, imaginative, optimistic and aligned with system-scale change. While there are many design theories that deal with these themes such as Speculative Design (Dunne & Raby, 2013), Design Futuring (Fry, 2018), Design Fiction (Bleeker, 2022), I felt that the research-creation project would be best supported by a structured framework that could anchor the ambiguity and abstract thinking required in the research. While many design theories deal with the interplay between design and the future, very few of them deal with the future in a structured way that makes fundamental change feel possible. This section introduces the Transition Design Framework as the central design theory that guided my research.

Transition Design is an area of design methodology, practice and research that argues for design-led societal change to address 21st-century wicked problems (Irwin, 2015). Transition

Design seeks to uncover methods to catalyze equitable, tempered, yet ongoing change towards more sustainable and ethical futures. The Transition Design Framework is targeted towards uncovering new ways of designing that have the capacity to initiate necessary social, environmental and economic transitions in the world. By developing alternative Visions for Transition, borrowing ideas from varied disciplines in order to develop a broader understanding of dynamics of change - Theories of Change, as well as developing new designer Mindsets & Postures based in "mindfulness, a willingness to collaborate and 'optimistic grumpiness'" (Irwin, 2015), this framework provides a structure for discovering New Ways of Designing, that can produce new results in complex times.

Transition Design is a four-pillar approach. The first pillar, Visions for Transition outlines that we need different future visions in order to produce different results in the world and that to articulate these alternative visions, we need different tools for seeing and imagining. The second pillar, Theories of Change argues that developing literacy around how change happens in complex systems is essential for directing change. Transition Design looks to fields such as physics, biology, sociology and organizational development to examine how change manifests in complex ecological and social systems, and seeks to derive methods from other disciplines to inform transition design approaches. The third pillar, Mindsets & Postures, notes that while designers' internal mindsets often go unnoticed, they "profoundly influence what is identified as a problem, and how it is framed and solved within a given context" (Irwin, 2015, p. 9), greatly impacting the types and scales of solutions that are implemented. In response to this dynamic, this pillar asks designers to examine their own value systems, and argues that better solutions will be developed with more holistic worldviews that inform more collaborative and responsible postures for designing" (Irwin, 2015). The first three pillars exist as mutually-reinforcing concepts that come together to develop New Ways of Designing. The Transition Design Framework is intended as a cyclical process, where dynamic Transition Design visions can contribute new theories of change, and designer mindsets and postures that then lead to new, ever-evolving future visions. This cyclical, always evolving design process mirrors the

design approach that is required for addressing the complex problems facing our communities. Together, these pillars have the capacity to produce new ways of designing that are as dynamic and complex as the wicked problems they are trying to address.

While many design theories position design as a future-shaping force, they do not provide concrete frameworks for turning future-oriented speculations and imaginaries into reality. Transition Design draws on the future-oriented thinking that is also seen in similar approaches like Speculative Design, Design Futuring and Design Fiction, and then extends it beyond visioning, imagining and speculation; using design as a tool for investigating how to make those visions real through applied methods and processes to support the fundamental transformation that is required to address 21st century wicked problems. Transition design was ultimately selected as the design approach that would guide this research due to its focus on systems design, understanding dynamics of change, visioning, interdisciplinarity, and answering "how" questions around initiating systemic change. Transition Design is also articulated as a practical framework, in contrast to other design theories which focus on open-ended forms of imagining and design-practice-based interventions that spark critical thinking in audiences. The attitudes embedded in Transition Design are in alignment with the perspective of the research as well. Transition Design's arguments for radical collaboration, and "optimistic grumpiness" are well aligned with the sentiments that come up through craft and making processes. More than a design orientation, or an argument for what design should do, Transition Design provides a stable foundation for thinking through -- providing the "what" as well as a potential framework for the "how" of systemic change-making.

2.2 Optimism & Political Imagination

Part I introduced Transition Design as the central design theory that guides the research due to its capacity to both inspire and support the practical implementation of more sustainable futures. Building on the previous section, Part II investigates the idea that we can only make things that we can imagine, so, we need to imagine better, and we need tools to guide us to think outside of

status quo imagining in order to facilitate this. To support this argument, this section introduces texts that explore how imagination can support the articulation and implementation of desirable climate futures.

In the book *What if We Get it Right? Visions of Climate Futures* (2024), Ayana Elizabeth Johnson presents a painfully realistic picture of the severity of the climate crisis, alongside a hopeful discussion of what the world could look like if we collectively tackled it head-on. Johnson's text is centered on society's widespread inability to imagine and implement the swift and targeted climate action that is needed. She notes that frequently, we are presented with visions of climate disasters and apocalypse, rather than equitable and abundant futures. While we can easily imagine the disastrous climate futures that are already underway (floods, droughts, storms, wildfires, displacement) we have a hard time imagining positive climate futures. And if we can't imagine alternate positive realities, we will have a hard time implementing them. For Johnson, the power of imagination is that it gives us "...something firm to aim for. Something with love and joy in it. And we need the gumption that emerges from an effervescent possibility" (Johnson, 2024, p. 4).

This thesis is concerned with artistic imagination as a tool for constructing more sustainable and equitable fashion systems. It argues that the imagination methods used to design future-oriented, deeply creative fashion garments, may also be useful for imagining and implementing more sustainable fashion systems, supply chains, and textile economies. Johnson's book provides a starting point for this argument; painting an alarming picture of the urgency of the climate crisis, and positioning imagination as a key tool to tackle this crisis. She demonstrates that we already have most of the practical and technological solutions we need to change the world, but the work that is needed is to imagine how to practically implement such large-scale change in a swift way. What is interesting about pattern-making is that it is both deeply imaginative but also pragmatic. It requires creative imagination of alternate potential futures, but also the technical work of making those imagined futures real through successive technical interventions. In this sense, this text supports my thinking that patternmaking may contain

thinking or translatable methods that could support both the imagination and implementation of sustainable fashion policy.

Geoff Mulgan explores an idea of applying artistic imagination to socio-political issues in *Another World is Possible: How to Reignite Social and Political Imagination* (2022). Mulgan argues that we are at a point in time where it is increasingly necessary to harness creativity and imagination to cope with the multiple crises that are unfolding at once. He proposes the question: "how could we become better at imagining the society in which we might like to live a generation or two from now?" (Mulgan, 2022, p. 22). The book charts past examples of social, political, and artistic creativity, where imagination has successfully led to societal change, and articulates key reflections and lessons learned. Through multiple case studies on imagination, Mulgan finds that "most forms of innovation, intuitive problem solving and spiritual thinking require us to transcend language", and instead use "visual thinking" (Mulgan, 2022, p. 31), pointing towards the value of visual and artistic forms of imagination as a tool for socio-political imagining. Mulgan defines socio-political imagination as our capacity to envision, design, and bring about new forms of social and political systems that address contemporary challenges.

Drawing on how creativity is taught and sparked in artistic disciplines, he asks how we might be able to use creative imagination to dream and imagine alternative realities in ways that could be practically implemented (Mulgan, 2022, p. 87). He notes that creative people in artistic disciplines depend on tools like "palettes and paints, cameras and special effects software" to develop their creative ideas" (Mulgan, 2022, p. 87). "Artists can draw on many frameworks for creativity that both describe and prescribe the steps that can lead to a novel, painting or film" (Mulgan, 2022, p. 87). But for "society's imagineers there are not so many obvious tools, the raw materials being life and society themselves; and there are few academies or colleges that teach the craft of change" (Mulgan, 2022, p. 87). Mulgan attempts to address this gap in tools for social imagining by developing a Universal Grammar of Creativity; a series of tools that can help push our imaginations further on key social issues. This will be introduced in the following section.

2.3 The Joy of Making as a Driver of Systems Change

Extending from the Transition Design Framework introduced in Part I and the calls for creativity-driven climate action and political imagining in Part II, this section introduces the research's central argument that the inherent joy of creativity and making can be leveraged as a tool to drive sustainable systems change. While the research deals specifically with fashion design and pattern making as a lens for systemic problem solving, for me personally, and for the authors cited in in this section, the joy of making in general is a powerful force that drives and guides action within challenging moments of creative processes. This section weaves together various texts that examine and articulate the joy inherent in craft and making practice as a foundation for future discussions of applications of creative methods to policy making.

Personal making and creative practices are motivated by a care and interest in the well-being of the world, a personal sense of joy, and a deep willingness to work through the risks and hardships present in the creative process (Csikszentmihalyi, 1997). In his book *Making is Connecting*, David Gauntlett articulates that creativity, craft and making hold an underutilized social power that has the potential to initiate social change. He refers to the work of Ellen Dissanayake who identifies a deep-rooted joy and satisfaction in making, that she calls, joie de faire (Gauntlett, 2011, p.24). Drawing on Dissanyake's ideas, Gauntlett finds that there is "something important, and even urgent to be said about the sheer enjoyment of making something exist that didn't before, of using one's own agency, dexterity, feelings and judgment to mold, form, touch, hold and craft physical material" (Gauntlett, 2011, p. 24).

This joie de faire has an untapped potential to be applied to support climate action and sustainability-focused systems change. First, this urgent joy that often drives creative explorations is a motivating counterpoint to the paralysis and fear that is often felt in the face of the climate crisis and is worth exploring further. With the joy inherent in creative processes, there is also ambiguity, challenges, uncertainty and concern, all of which parallel complex problems. Furthermore, the capacity to think through complex problems through tactile engagement with materials offers an interesting entry point into systemic problem solving for problems that are

too big to touch or see. Further, in the current reality of our working world, which prioritizes industrial productivity, it is rare that we are able to see system-scale projects through from beginning to end, while operating from our own agency to create "self-initiated and expressive work" (Gauntlett, 2011, p. 47). Through the bureaucratic structures of governments and economies, we are rarely afforded the opportunity to "create the things of our world, ourselves" (Gauntlett, 2011, p. 167) from beginning to end, and in a comprehensive and satisfactory way. Within craft and making, these rules do not apply. The maker envisions a material output, and is autonomously engaged in all of the steps of problem formulation, making, iteration and problem solving until the final output is created. The process of making "affirms the self as a being with agency, acceptability and potency" (Gauntlett, 2011, p. 67) in a way that existing human-made problem-solving structures aimed at addressing complex problems do not.

The research-creation aspect of this research uses material experiments in pattern making to think through how to initiate large-scale fundamental change in the fashion industry. Joy became an important theme and potential tool during the research because, as reflected in Johnson's book and the Transition Design Framework, to initiate large-scale sustainable change, we need both imaginative future-oriented ideas and the practical steps that enable implementation. I see the joy of craft as an optimistic, energetic, creative but also practical force with the potential to support climate action and sustainability policy.

2.4 Frameworks for Expansive Political Imagining

Extending from the Transition Design framework's intention of developing actionable approaches to transition to a more sustainable world as introduced in Part I; the discussion of the important role imagination in initiating more sustainable future in Part II; and the discussion of the inherent joy in craft as a tool for designing better futures in Part III; Part V introduces a series of creative frameworks that can serve to push forward imagining on socio-political issues.

The Universal Grammar of Creativity

Geoff Mulgan attempts to fill the gap in tools for social-imagining by developing a *Universal Grammar of Creativity*; a series of tools that can help push our imaginations further on key social issues (Mulgan, 2022). This grammar is made up of conceptual creativity tools that could be used to transform current systems. It includes concepts like extension, grafting, inversion, addition, and subtraction. Different issues can be filtered through these tools to help us imagine solutions that we might not be able to access on our own. It also includes tools like mobilising metaphor and analogy, randomness, psychodrama and embodiment, patterns and Pattern Languages, thought experiments, synthesis, forecasting, narratives, and institutions for imagination. These narrative tools also act as filters that can be used on community challenges in order to develop creative, original and hopefully more equitable solutions. In the same way that a painter would use the limitations and affordances of paints and brushes to constrain their creative process and generate new possibilities, the elements in the universal grammar of creativity act as thinking tools to push socio-political imagining in directions that our minds may not intuitively go, and expand imagination and implementation of creative socio-political possibilities.

A Vocabulary for Visions in Designing for Transitions

Candy and Lockton develop a similar framework to Mulgan's but situate it within the Transition Design Framework. They argue that because the Transition Design approach is ambitiously targeted towards making desirable futures real through technical interventions, Transition Designers need tools to support the visioning and imagining of potential futures (Lockton & Candy, 2018). They develop a *Vocabulary of Visions* made up of different lenses for seeing and thinking differently that can help develop Visions for Transition.

Lenses

Lenses is both a proposed vocabulary term for Designing for Transitions, and the overarching metaphor that grounds this paper. The idea is that lenses are a frame through which we look to

see, and different types of lenses will enable different types of seeing. Drawing on the works of architects, designers, artists, game designers and philosophers, Lockton and Candy draw together the following seven creative metaphors that are useful as thinking tools, or "imagination-extenders", and can guide visionary thinking, and subsequent transition-oriented actions.

Imaginaries

This lens argues that understanding collective imaginaries regarding current situations and future possibilities is an important tool for visioning. Transition Designers can use this lens by developing an attunement to collective imaginaries of particular problem contexts, and then finding ways to make those imaginaries more tangible and easier to engage with in order to support solution identification.

Backcasting

This Transition Design lens is about "the creation of scenarios backwards from a posited point in the future" (Lockton & Candy, 2018, p. 911), allowing us to ask and answer questions such as "what would it take in order for that to happen? What would need to occur?" (Lockton & Candy, 2018, p. 911). This process gives Transition Designers a solid footing to stand on in the future to design towards, thereby decreasing uncertainty and ambiguity in design processes. Through asking; what would we do, if we were designing for this or that type of future, we are able to visualize different process steps and generate certainty around future possibilities and impossibilities, thereby filling in some gaps that make Transition Design feel more possible.

Dark Matter

The Dark Matter lens is useful as a lens for thinking about the elements of a system that may be invisible, or prone to being left out. Invisible structures and systems elements such as practices, cultures, organizational priorities, traditions and structural legacies are not value-neutral, but make up the space within which decisions are made, and have invisible, yet strong impacts on

design outcomes. Dark Matter invites Transition Designs to look at systems parts that may not always be visible, thereby leading to more original and holistic Visions for Transition.

Circularity

The Circularity lens plays with the idea of self-fulfilling prophecies, and the idea that anything we perceive as real, will have real impact, as if it were real to begin with (Lockton & Candy, 2018, p. 917). They note that "design affects [...] what people perceive that they can do" (Lockton & Candy, 2018, p. 911), which then affects what we choose to do. This can be a challenging mental trap to escape, so the Circularity lens serves as a reminder that the systems and structures that exist in the present are not natural, and are not the required path forward.

Experiential Futures

This lens asks designers to think and feel into the future, in order to ask tangible "what if" questions, that require us to take such alternate possible futures seriously. We can think of Experiential Futures as a "scaffolding to think and feel with", that can manifest as something "tangible, material, interactive, playable, and performative" (Lockton & Candy, 2018, p. 920). Through making alternative futures tangible and engageable, this lens allows transition designers to make better decisions about "which futures" we choose to design towards.

New Metaphors

This lens is built upon the idea that metaphors are useful tools for much human reasoning, understanding and creativity, which helps us understand complex ideas quickly and efficiently. By understanding one thing in terms of the structure, constraints and/or affordances of another, metaphors become an "enabling constraint" that help us think through the specifics of a given situation. This lens specifically asks us to come up with novel metaphors, beyond the familiar political contexts and corporate settings where they are typically used in order to uncover new ways of thinking that can support original Visions for Transition.

Similar to Mulgan's *Universal Grammar of Creativity*, this *Vocabulary of Visions* can help designers push beyond the status quo imagining to develop holistic, original and radically sustainable and ethical future visions. This example echoes the need for tools for thinking differently to support the development of tools to address wicked problems.

Matters of Care: Speculative Ethics in More than Human Worlds

We can also think of methodological constraints as generative frameworks for imagining and thinking differently. In *Matters of Care: Speculative Ethics in More than Human Worlds*, De La Bellacasa articulates the ethic of care embedded in permaculture approaches to agriculture, and extends it as a broader "relational way of thinking" (Bellacasa, 2017, p. 75) that could enrich transformative thinking and open up new actionable possibilities. She argues that constraints need not be limiting in a negative way, but rather, can be seen as rich tools for optimistic and original imagination. She argues that "practices help us develop a relational ethos with the world" (Bellacasa, 2017, p.153), and that the material constraints of these practices are materially co-created. In turn, the constraints of these practices generate "relational situated possibilities and impossibilities". She demonstrates this through permaculture, but such an approach is also visible in craft and sewing practices. The simple actions of doing and making that make up these practices, have embedded ethics and values. When we take part in these practices with particular ethics, and relationalities, we impose thinking constraints on ourselves that have the potential to lead to new possibilities. These constraints are not negative, but actually enable original thinking that could lead to original doing (Bellacasa, 2017, p. 152).

The three political imagination frameworks introduced in this section are different approaches to addressing the lack of political imagination that exists in the face of wicked problems. While the tools that each framework proposes are different, they all see imagination tools as generative prompts that can help us access more creative and radically equitable and sustainable future visions. These more creative future visions are an essential first step to initiating the large-scale

change that is needed in the context of the climate crisis.

Conclusion

This Literature Review has introduced Transition Design as the central design framework that guides this research. Transition Design was selected over Speculative Design, Design Fiction and Design Futuring for its' articulation of the importance of visioning and imagining for initiating large-scale societal transformations, and its' focus on deriving practical methods for the implementation of more desirable futures. The need for more robust and creative political imagination was explored further in part II, where imagination was positioned as an underutilized tool for tackling the climate crisis and other wicked problems. Part III investigated key texts that have articulated the joy of making as a tool for change-making. Part IV gave an overview of existing frameworks and tools that have been developed to guide the imagination of more desirable futures. It is argued that these types of visioning tools support the implementation of transformative ideas, because we can only create what we can first imagine. Together, these texts inform the positioning of the research-creation process that is introduced in the following section, and validate the research's intent to derive imagining and implementation tools from patternmaking methods in order to support the development of solutions to the sustainable fashion issue.

CHAPTER 3: METHODOLOGY

3.1 Methods

This thesis takes a research-creation approach to knowledge-creation. Research-creation is a category of research with the social sciences and humanities that "[integrates] a creative process, creative aesthetic component, or an artistic work as an integral part of a study" (Chapman, 2012, p. 5). Rather than just communicating or visualizing knowledge, research-creation uses the creative process to examine research questions and uncover new knowledge. This approach allows researchers to explore research questions through material or creative engagement where ideas, processes, and methods can be thought through during making. By using creative methodologies to explore academic research questions, researchers can engage with multiple ways of knowing that could not be accessed through traditional academic methodologies and research questions. Integrating creation into academic thinking enables researchers to "think with" materials, processes and creative mediums in order to uncover original thinking on key issues (Loveless, 2019, p. 59).

Research-creation is a fundamentally Interdisciplinary research approach, where unlikely disciplines and research methods work together to open up new ways of thinking on complex problems that single disciplines cannot address alone. This thesis is interdisciplinary in that creative pattern making methods are used to think through imaginative and radically sustainable approaches to fashion policy development. By exploring questions about policy design through creative practice, this research investigates innovative policy solutions to the fast fashion issue, that academic research in political and social sciences could not have accessed alone. While the two disciplines are different in many ways, there also exists parallels between them that allow each practice to inform, and question the other. Driven by curiosity, interdisciplinarity, and a desire for transformation, this research-creation inquiry led me to ask new types of questions, and uncover original thinking that is urgently needed to address complex problems.

CHAPTER 4: RESEARCH-CREATION PROCESS

4.1 Research-Creation Starting Point

As described above, this research unfolded through an interdisciplinary research-creation process, where action-reflection during patternmaking experiments resulted in new ways of thinking about solutions to the fast fashion issue. My initial research question asked; "how can garment patternmaking methods inform sustainable textile policy making in Canada?". This starting point was inspired by the EU's Strategy for Sustainable and Circular Textiles, as one of the only large-scale policy frameworks for supporting sustainable fashion industry transitions (EU Strategy for Sustainable and Circular Textiles, 2023), Private Members' Bill C-337 from June 6th 2023; which demonstrates federal interest in the development of a national strategy on the reduction of textile waste in Canada (Private Member's Bill C-337 (44-1), 2023), and Louise Drul's Critical Atlas of the Internet, where she carries out creative data visualization experiments to try to "discern the shape of the internet" (Drul, 2017). These things together demonstrate that large-scale policy solutions for fashion are possible and effective, that there is political will in Canada to develop this type of framework, and that abstract and speculative visualizations of complex political issues can be useful in developing these types of frameworks. By using these questions and projects as a starting point, my intent was to use the creative yet pragmatic patternmaking approaches of drafting and draping to creatively visualize the intangible form of the Canadian fashion industry, and ultimately support sustainable textile policy development or other forms of systemic fashion sustainability interventions in Canada.

While this concept has the capacity to lead to reflections and knowledge, the challenge was in deciding how to explore this concept through research-creation. If I wanted to create a fully functional systems map of fashion in Canada, I would need a lot of data, or some way of "sensing" the system myself (Scharmer, 2016). This data did not exist on the scale I was interested in, and attempting to create it would require a lot of scoping, interviews, data collection and analysis even before getting to the research-creation visualization efforts. As such,

I decided to start by exploring pre-existing patternmaking methods through research-creation to understand their capacity for thinking through systems problems before shifting to developing a framework to apply them as a systems mapping method.

4.2 First Iteration: Exploring Creative Patternmaking Methods

The previous section introduced my initial research question and starting point for this exploration. While there was something to the initial concept, there was a lack of pre-existing data that could support the type of visualization that I intended to do, so I needed to find a different way to explore the connections between patternmaking and policymaking. I decided to explore possible connections in a more open-ended way, by developing a research-creation annotated bibliography to expand my knowledge and experience using both traditional and creative patternmaking methods.

This project combined the summarizing and critiquing processes associated with annotated bibliographies (Basham et al., 2023), with the experiential and creative processes of research-creation (Loveless, 2019). It still looked at drafting and draping as key patternmaking approaches, but it also focused a lens on nuanced and unconventional methods, in particular *Zero Waste Fashion Design* (Rissanen & McQuillan, 2020), *Kinetic Garment Construction* (Lindqvist, 2015), and *Subtraction Cutting* (Roberts, 2010). Each of these additional patternmaking methods was developed by fashion designers as an alternative to the dominant, standardized drafting approach and offer different ways of thinking about productivity, uncertainty, ambiguity, material use, and the relationship between fabric and the body.

The annotated bibliography analyzed these 5 different patternmaking methods as problem solving approaches. While reviewing each method, I designed 5 shirts -- 1 using each method -- and reflected on each method's priorities, strengths and weaknesses as tools for navigating creation, uncertainty and change. By following the rules of each method and reflecting on the process, the intent was to articulate how different methods of patternmaking -- as processes

of negotiating compromises and identifying collaborative solutions between fabric and form -- may be able to spark new ways of thinking about and collaborating towards solutions to the fashion issue. Each patternmaking method is summarized below, followed by key takeaways and analysis of potential contributions as methods for systemic problem solving.

Drafting

Drafting is the method of pattern making you probably first think of when you think about pattern making (Aldrich, 1976). It involves taking measurements of various body parts and proportions, and then inputting those measurements into structured frameworks to develop reliable fit "blocks" upon which the designer can add design elements.

Drafting highlights the usefulness of pragmatism and feasibility when solving complex problems, and brings up questions around the trade-off between using categories and structures to increase system stability vs. the unpredictable but creative and generative power of unstructured self-organization (Meadows, 2008). We could look at drafting in parallel to evidence-based policy making (Greenhalgh & Russell, 2009). Both approaches seek to understand problem contexts through targeted quantitative measurements, and design solutions based on those measurements. While pragmatic and cost-effective, there is potential for them to falsely simplify problem contexts and result in tools that work well enough for some, but leave many individuals, sizes and dynamics completely out of solutions.

FIGURE 1

Research-Creation Iteration 1: Drafting Process

Note. Photographs by author.

Draping

Draping is the next most obvious patternmaking method, where a designer gets to play out design decisions in real time through tactile designing and imagining with fabric on the form (Kamitsis, 1996). This method prioritizes sculptural experimentation and haptic visuality in order to generate unique designs that are then translated into scalable pattern pieces.

Draping highlights the value of haptically playing out design feedback loops. Draping helps us play out alternate design decisions quickly, and translate imagined ideas into concrete ones quickly and efficiently, leading to the discovery of balanced designs that enhance the body's natural shape (Kamitsis, 1996). The haptic visuality that is enabled through this method is an important source of knowledge, that made me wonder "how would we design fashion industries if we could see, mold and tweak systems elements in the same way that we adjust the fabric on the form?". Because of the unpredictability of feedback loops in complex systems, the invisible connections between systems elements (Meadows, 2008), and the impossibility of seeing and touching this system all at once, in the same way you can with fabric, this method guides us to ask how we could make fashion industries more visible, touchable and malleable, so that we could tangibly play out solutions.

FIGURE 2

Research-Creation Iteration 1: Draping Process

Note. Photographs by author.

Zero Waste Pattern Making

Zero Waste Pattern Making is a method developed and advanced by two designer-educators, (Holly McQuillan and Timo Rissanen) and discussed in their seminal text of the same name (Rissanen & McQuillan, 2020). The method involves designing garments without producing any fabric waste. This means designing clothing based on the limits set by the natural length and width of fabric. This results in a higher efficiency of fabric use, and new aesthetic discoveries.

Zero Waste Fashion Design contributes to the idea of designing backwards from a system's capacity in order to prioritize planetary boundaries above all other parts and entities in a system, resulting in more sustainable designs. This starting point sets the designer on a completely different path; guided by the priorities of material sustainability, and systems boundaries. It also contributes to the idea that Zero Waste Fashion Design is not just a garment construction approach, but also a way of thinking (McQuillan, 2020). If implemented, this way of thinking has the capacity to disrupt how fashion industries function, and lead to the development of new, non-hierarchical approaches to designing, communication and production within the industry (McQuillan, 2020). This text was the first time I saw something I had been trying to articulate, but unsure how, written out in such clear words; If Zero Waste Fashion Design is a way of thinking, what ways of thinking are embedded in the other methods? And, if imposing such limitations on our ways of making can enhance imagination and aesthetic discovery, how could imposing such limitations on our ways of thinking improve what futures we are able to imagine for entire fashion systems?

FIGURE 3

Research-Creation Iteration 1: Zero Waste Fashion Design Process

Note. Photographs by author.

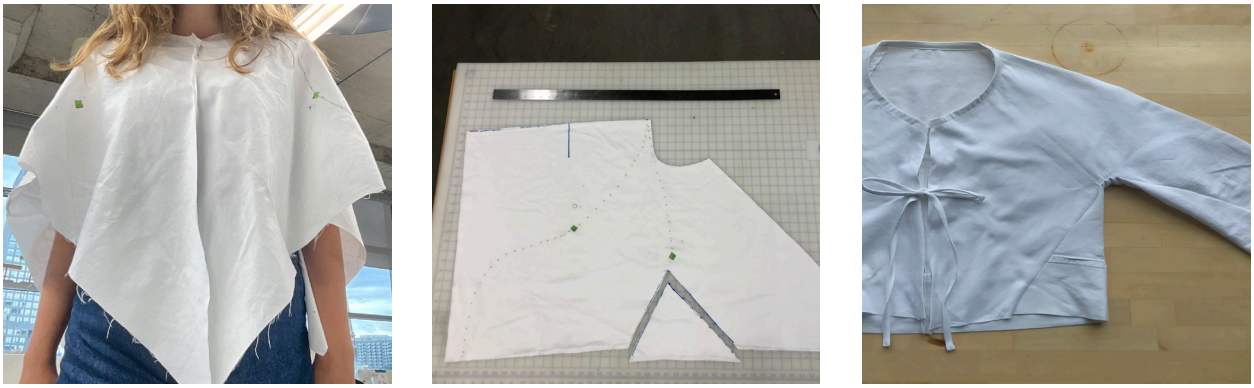
Kinetic Garment Construction

Most garments are designed using a drafting approach, which designs using static measurements of the unmoving body. Rickard Lindqvist proposes an alternative approach in his novel pattern making method; Kinetic Garment Construction. This method radically prioritizes dynamic movement by designing for the biomechanical interplay between the fabric, the body and gravity, resulting in creative garments that wrap around the body in ways that make use of gravity and rest on key balance points (Lindqvist, 2015).

Experimenting with Kinetic Garment Construction gave me a sense that we can do more unique things with fabric than we tend to believe. Lindqvist's designs are frequently made out of only one pattern piece that wraps around the body and connects to itself in creative and unexpected ways, but somehow results in very simple and clean looking garments. While this reflection is quite general, it is important when it comes to system reimagining, because we can only make what we believe we can make. In this sense, we can think of Kinetic Garment Construction as a prompt or reminder that unique ideas are out there to be discovered. Translated to the system scale, this reflection contributes to the idea that there is a real meeting place between environmental and social dimensions of problems that are able to equitably and feasibly meet the needs of both, while also being natural, simple and even beautiful.

FIGURE 4

Research-Creation Iteration 1: Kinetic Garment Construction Process



Note. Photographs by author.

Subtraction Cutting

Subtraction Cutting is a physical method of garment construction invented and shared by Julian Roberts. This method encourages chance discovery through using fast, intuitive cuts and prioritizes designing by removing fabric from a larger piece rather than by adding pieces together to create a design (Roberts, 2010). This approach involves cutting circles/negative space for the body to pass through, and sewing them together in ways that gather the fabric around the body in interesting and unexpected ways.

Subtraction Cutting (Roberts, 2020) contributes a completely opposing, unstructured and unpredictable approach to design, that enables the designer to take incremental steps towards solutions that are just beyond what they can imagine. This can serve as a tool for designers to practice risk-taking and working with ambiguity in order to uncover unexpected but needed futures.

FIGURE 5

Research-Creation Iteration 1: Subtraction Cutting Process

Note. Photographs by author.

Conclusion

Reflecting on each patternmaking method as a broader problem solving approach was straightforward, as each of the methods contained distinct ways of thinking, prioritizing and problem solving that came to the surface as I read about and designed with the methods. As I read and sewed, I noted and reflected on my abstract thoughts on how it felt to use each method, and questions about how these could translate into broader problem solving tools, and what it would mean to design policy through such haptic, relational, and imaginative means. While these general reflections came easily, the challenging part was to find a way to translate these reflections from interesting thought experiments to practical tools that could actually support the development of sustainable fashion policy.

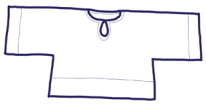
This phase of research has two main findings. The first is that each patternmaking method allows the designer to engage with a different complex system dynamic materially. This includes dynamics such as feedback loops, planetary boundaries and limits to growth, the pros and cons of imposed hierarchy and categorization, vs. self-organization to meet system needs, and the unpredictable nature of transformation and change (Meadows, 2008). This discovery has potential to be useful because complex systems are notoriously opaque, disjointed and hard to fully grasp, so these methods can serve as an interesting site for further investigation into designing for change and transition in complex systems.

The second takeaway from this part of the project, which became the central inquiry of the next phase of research is that each patternmaking method is not just a literal method of construction, but also a way of thinking (see McQuillan, 2020). These ways of thinking have different priorities and values, which guide the designer to make different design decisions, and ultimately prompt different aesthetic discoveries. In fashion, these methods exist to push forward a designer's capacity to imagine new things to do with cloth. But we don't have methods like this to help us push forward creativity and imagination on political issues. If I could imagine and make such different things when using these methods than I would if I were guided by my own ways of thinking, I wondered how these methods could be applied as tools for political

imagining to push forward imaginations of future fashion industries. This became the central inquiry for the next iteration of this project. Findings from this research phase including system dynamics embedded within the pattern making methods are summarized in the table below.

TABLE 1

Research-Creation Findings: First Iteration

Research-Creation Findings: First Iteration					
Method	Drafting	Draping	Zero Waste	Kinetic	Subtraction Cutting
					
Finding 1: Each method engages with different complex system dynamics:					
	Categorization, Imposed Hierarchy & Self-Organization	Feedback Loops & Tactile Systems Modelling	Planetary Boundaries, Limits to Growth & Creativity	Designign for Movement & Change	Uncertainty, Progress, Feedback Loops & Futuring
Finding 2: Each method contains a different way of thinking.					

Note. Summary table of findings from the first iteration of research-creation.

4.3 Second Iteration: Translating Creative Patternmaking Methods into Tools for Fashion System Re-Imagining

This first iteration provided an important entry point into the comparison between patternmaking and policy making, and validated that there were interesting reflections to be discovered through this comparison. It also helped me identify a useful new angle for my research-creation: patternmaking methods as ways of thinking that can help us to push our imaginations beyond familiar, status quo ideas. Fashion is constantly reimagining itself, pushing what is possible to do with fabric beyond what has previously been imagined and discovering new aesthetics (Von Busch, 2011). So I thought it made sense to carry out a second iteration of the same exercise that pushed the creative and imaginative aspects of the methods further both for fabric, and fashion industry reimagining.

This time, I decided to make the same type of garment in all of the methods to make the experiment more structured and cohesive. I chose to design blouses because they are a standard, familiar and technical type of garment with pre-determined style elements like collars, cuffs and button plackets. I thought it would make for an interesting visual comparison to see how the 5 methods dictated how to incorporate the standard blouse elements and push at the idea of what a blouse is in different directions. I thought that this visual comparison would help make my argument more convincing because I hoped the argument would be visible; that in the same way that different methods of creative imagining allow us to generate or access imaginative garment designs, different methods of political imagining may help us to generate visions of more equitable and sustainable fashion systems.

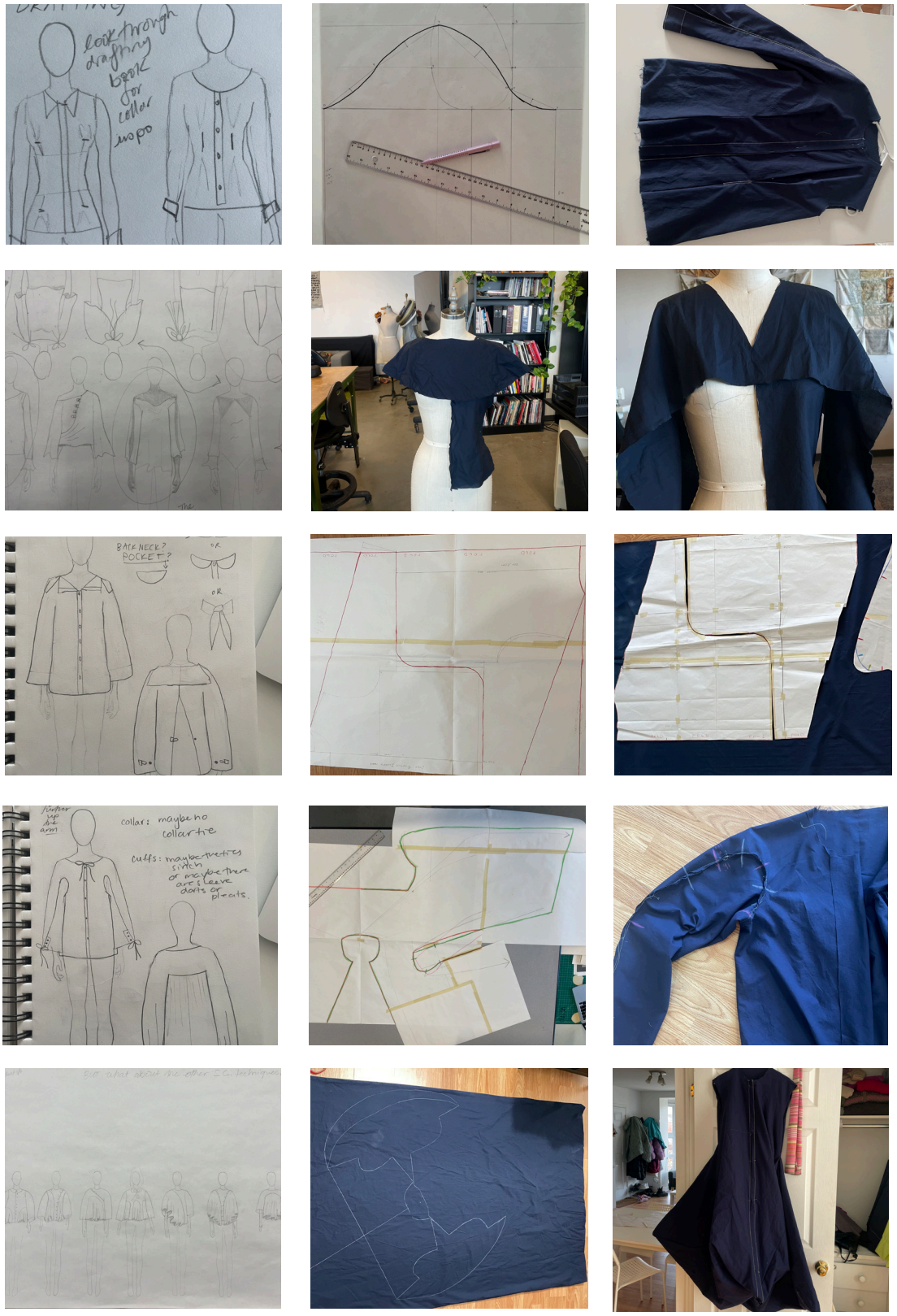
This new direction was supported by a few key texts introduced in the literature review that echoed the importance of political imagination in face of the climate crisis and the lack of tools for transformative, imaginative thinking to shift human systems to be more sustainable and ethical. Frameworks such as the *Vocabulary for Visions in Design for Transitions*, the *Universal Grammar for Creativity* and De la Bellacasa's exploration of the ethics of care that are embedded in permaculture practices all highlight that methodological constraints are generative tools that

can lead us to make different types of design decisions. Creative tools and methods that prescribe approaches, priorities and ethics can be seen as generative constraints as they guide artists and designers to imagine and make different design decisions than they usually would, leading to new aesthetic discoveries. While we have access to creative tools and methodologies that guide and prescribe some of the steps of navigating creative uncertainty and developing unique designs, such tools don't exist for political imagining (Mulgan, 2022). In order to explore this idea, this phase of research asks; how can we use creative patternmaking methods that allow us to envision creative and unique designs, to help us imagine more sustainable and ethical fashion systems?

Based on this new research orientation, I took a slightly different approach in this iteration. Before starting to sew, I spent time trying to imagine what I could make using each method. This involved lots of sketching centered on trying to imagine unique designs, while looking at fabric in the ways determined by the patternmaking methods. I wanted to test their capacity to push us to create truly new and unique designs, and fundamentally reimagine things. As I sketched, designed and constructed the garments, I took notes on what it felt like to navigate uncertainty within the methods, how accurately I was able to translate an imagined idea into a real garment using each of the methods, and other insights that came up during the process. The key output from the research-creation was the translation of these methods from the material scale to imagination tools at the systems scale. This process involved analysing, comparing and reflecting on each of the methods, understanding their important aspects as broader problem solving strategies, and writing, re-writing and summarizing the conclusions of the research-creation in brief and actionable ways. I argue that in the same way that in fashion design, methods can prompt the designer to imagine and make different design decisions allowing them to access creative and unique designs, in fashion systems, these principles can serve as prompts to help us generate more creative visions for how fashion industries could function sustainably.

FIGURE 6

Research-Creation Iteration 2: Drafting, Draping, Zero Waste, Kinetic & Subtraction Cutting



Note. Drafting (first row), Draping (second row), Zero Waste (third row), Kinetic (fourth row), Subtraction Cutting (fifth row). Photographs by author.

The idea of design principles emerged in the final stage of research and helped to clearly position my findings. I started this project with an interest in comparing patternmaking to policymaking, and while this has potential to be a useful inquiry, I found that articulating the methods' usefulness as policy making tools would require some additional steps that I didn't have time for. As well, I didn't know enough about policy making processes to be able to draw actionable links between the two processes.

Next, I reformulated my research question to explore patternmaking as a tool for systemic problem solving. This was more on the right track, as it was a bit more general, so there was more room for drawing connections between the two processes, but I was not able to articulate conclusions from the patternmaking methods on the systems scale that were actionable enough to be considered systemic problem solving *tools*. So, instead of pre-determining a type of end product I wanted to create and then molding the research-creation reflections to fit, I evaluated the notes and reflections I wrote while designing. I categorized the methods in many different ways, put the methods into tables, wrote about the methods in long paragraphs, short sentences and bullet points, until I developed a structure that I felt made sense. The final form of these reflections takes the form of *Principles for Fashion System Reimagining* and includes ~5 key points for both the material and systems scale, each point is summarized in a short sentence with a brief heading.

Design principles can be understood as guiding ideas "created to codify and formalize design knowledge so that innovative [...] practices may be communicated and used to advance design science and solve future design problems, especially the pinnacle, wicked and grand-challenge problems that face the world" (Fu et al., 2016). This definition is very aligned with the intentions of this research in that both are oriented towards solving future design problems, especially the increasingly complex challenges facing our current world. The idea of positioning my findings as "design principles" came in the very last phase of research, and emerged from the results themselves. I had spent a long time trying to articulate the patternmaking methods as systemic problem-solving tools or methods, but when I stopped trying to impose a conclusio

on the research, I saw that the reflections I had written read more as principles than as methods or tools. While principles are less prescriptive than methods or tools, they have a similar use and value, in that they guide design decisions based on clearly articulated ethics, values and priorities.

This research culminated in a series of 5 blouses with hang tags that articulate the key aspects of each method that make it a potential driver for imagining fashion garments and fashion industries. These hang tags also contain quotes from the designers who developed them, and visuals of how the pattern-pieces look in their 2D form, and how they are laid out on fabric. They are intended to contextualize the research-creation, and briefly summarize the key ideas that each patternmaking method can contribute to fashion industry reimagining. These final 5 blouses, accompanied by the hang tags were shown at the final exhibition. The blouses were placed on clothes hangers and hung from the ceiling in front of a blank wall. This allowed the blouses to spin and move. The hang tags hung from the blouses' sleeves, and invited the audience to flip through the final reflections and imagine how the 2D pattern layouts were manipulated to come together into the 3D garments hanging up. The final *Principles for Fashion System Reimagining* articulate reflections on making from the material scale that are transposed to the system scale as Principles for imaginative fashion problem solving. As seen in the first iteration of research-creation, each pattern making method also contains an opportunity to materially engage with at least one complex system dynamic.

To follow are images of the research-creation process, followed by images of the final garments and principles that were displayed on the hang tags at the exhibition. In the following discussion chapter my final research conclusions are presented, and a comparison of the utility of each pattern making method as a tool for fashion system reimagining. The conclusion extends the discussion by exploring potential applications and future directions.

FIGURE 7

Research Exhibition

Note. 5 blouses designed using drafting, draping, zero waste, kinetic, and subtraction cutting (left to right). Photograph by author. zero

FIGURE 8

Research Exhibition: Tags

Note. Tags designed to accompany the blouses, and contextualize the knowledge generated from the research-creation process. Tags contained titles, images of pattern piece layouts on flat fabric before construction, and the *Principles for Fashion System Reimagining* (introduced in detail in the following section). Photographs by author.

FIGURE 9

Research Exhibition: Drafting

Note. Blouse designed using Drafting approach (left). Drafting flat pattern layout displayed on tag at exhibition (right). Photographs by author.

FIGURE 10

Research Exhibition: Draping

Note. Blouse designed using draping approach (left). Draping flat pattern layout displayed on tags at exhibition (right).Photographs by author.

FIGURE 11

Research Exhibition: Zero Waste Fashion Design

Note. Blouse designed using zero waste approach (left). Zero waste flat pattern layout displayed on tags at exhibition (right). Photographs by author.

FIGURE 12

Research Exhibition: Kinetic Garment Construction

Note. Blouse designed using kinetic garment construction approach (left). Kinetic garment construction flat pattern layout displayed on tags at exhibition (right).Photographs by author.

FIGURE 13

Research Exhibition: Subtraction Cutting

Note. Blouse designed using subtraction cutting approach (left). Subtraction cutting pattern flat pattern layout displayed on tags at exhibition (right).Photographs by author.

TABLE 2

Summary Table of Research-Creation Process

Summary Table of Research-Creation Process

Starting Point

Research Question:
How can we use pattern making methods to visualize the Canadian fashion industry and support the development of sustainable textile policy?

Challenges:
- Lack of pre-existing data for creating a full-scale system map of fashion in Canada.
- Data collection would require extensive interviews, analysis and scoping before the visualization.

First Iteration: Exploring Creative Pattern Making Methods

Research Question:
What can pattern making methods teach us about initating sustainability transitions in fashion?

Approach:
Research-creation annotated bibliogrpahy exploring 5 traditional and creative pattern making amethods.

Take-Away:
- Inital research affirmed the potential of pattern making methods to generate non-traditional solutions for fashion, revealing connections between methods for pattern making, and methods for system reimagining and transformation.

Second Iteration: Translating Pattern Making Methods into Tools for Fashion System Reimagining

Research Question:
How can the pattern making methods be translated into tools for fashion system reimagining?

Approach:
Second iteration of the previous excercise, but with a focus on translating the methods into concrete tools for fashion system reimagining.

Conclusion

The research found that pattern making methods can be used as generative thinking prompts to guide systemic problem solving and policy development in fashion through the *Principles for Fashion System Reimagining*.

Note. Overview of approach and findings from the research-creation process.

CHAPTER 5: RESEARCH-CREATION PRACTICE DISCUSSION

The previous section presented the research-creation process, and introduced the culmination of the process; the five blouses and resulting *Principles for Fashion System Reimagining* discovered through research-creation. This section is separated into four sections. The first section introduces the *Principles for Fashion System Reimagining.* The second section discusses the main takeaways and possible applications of the principles as tools for fashion system reimagining. The third section introduces overarching conclusions on deriving new knowledge from multi-scalar and interdisciplinary research-creation processes. The last section discusses potential future applications and research directions.

5.1 Introducing the Principles for Fashion System Reimagining

The *Principles for Fashion System Reimagining* that resulted from this research are intended as a tool that can guide original thinking on the fashion issue. The value of developing five different sets of Principles is that each set contains a particular way of thinking that is incomplete on its own, but useful when used in tandem with the other approaches. Used in this manner, the different approaches provide a powerful tool for guiding the development of imaginative solutions and identifying balanced trade-offs in system priorities. In the same way that the *Universal Grammar of Creativity*, and the Vocabulary for *Visions in Designing for Transitions* were developed to inspire new ways of thinking about complex problems, the *Principles for Fashion System Reimagining*, can be seen as a series of generative constraints able to inspire original thinking and problem solving on the fashion issue.

Principles of Drafting

MATERIAL SCALE

Use of Basic Blocks
Begins with standardized 2D blocks that serve as the foundation for all design adaptations.

Standardized Sizing
Relies on standardized sizing charts to construct proportional pattern pieces.

Linear Design Process
Follows a step-by-step approach: select block ➳ apply design changes ➳ create toile ➳ refine fit ➳ finalize pattern.

Grading
Employs mathematical grading techniques to scale patterns across a range of sizes while maintaining proportions.

Cost Lay Planning
Finalizes patterns by arranging pieces on fabric to maximize material use and estimate production costs.

SYSTEM SCALE

Standardized and Limiting
As the dominant method, this approach has limited usefulness for imagining original futures.

Prioritizes Pre-Existing System Goals
Drafting is optimized for economy, cost, and efficiency—making it excellent for current priorities but not necessarily for shifting them.

Supports Incremental Change
Drafting aligns more with small, step-by-step modifications rather than radical reimaginings of fashion systems.

Great for Execution, Limited for Ideation
While pattern making excels at realizing designs efficiently, it is less suited for imagining disruptive or original alternatives.

Drafting prioritizes economic constraints and problem dimensions. This approach guides us to think about how step-by-step modifications, standardized implementation plans and the prioritization of efficiency can support transformational change. Drafting asks: how can we leverage the production and distribution systems that are already in place, and what we already know about transformation from having developed an efficient and globally connected industry, to re-imagine a more sustainable fashion system? How could these tools that enable quick and efficient imagining and implementation be used differently to support sustainable change, rather than status quo operations?

Principles of Draping

MATERIAL SCALE

Bias Cut Garments
Fabric is cut on the bias, leading to new material and aesthetic possibilities.

Tactile Manipulation
Fabric is shaped and sculpted directly on a dress form in real time, allowing immediate feedback on shape, balance, and silhouette.

Haptic Visuality
Designers use sight and touch to evaluate and adjust the design as they work, responding to how the fabric falls, flows, and interacts with the form.

Toile-to-Pattern Translation
Once a draped design is finalized on the form, the fabric pieces are removed, traced, and turned into 2D pattern pieces for sewing and replication.

Form First, Pattern After
Focuses on creatively realizing the shape and visual aesthetic first, deferring construction logic and technical sequencing until after the design is defined.

SYSTEM SCALE

Move Diagonally Through Complexity
Cutting on the bias shifts our orientation and we approach problems from unexpected angles.

Sense-Driven Iterations
Decisions are informed by what the system reveals as it's being shaped. Problem-solving is guided by feedback, feel, and flow.

Haptic Visuality
Hands and eyes work together to read the fabric's response. Multisensory approaches — including touch and perception - are new tools for understanding complex systems.

Emergence Before Implementation
Only after the form emerges is it reverse-engineered into a repeatable pattern. Systems planning logic is flipped and asks: What if form emerges first, and process adapts later?

Responsive Transformation
Fabric on the bias stretches, flows and moves with the body. Small shifts in angle and tension result in profound transformations — not by force, but by attunement.

Draping prioritizes haptic approaches to problem solving. This approach guides us to think about how we would re-imagine the fashion industry if we could tweak and mold it in our hands in the same way that draping allows us to haptically design with fabric on the form. What design decisions would we make to the system? What would we see that we can't currently see? What easy tweaks would we make right away, now that the problem feels more accessible and tangible? How can we re-orient our thinking to approach the problem from a different angle, and work with what already exists in a different way?

Principles of Zero Waste

MATERIAL SCALE

Fabric-First Pattern Planning
Design begins with the physical limits and dimensions of the fabric. Pattern pieces are created to fully utilize the cloth without generating offcuts or waste.

Simultaneous Design & Cutting
Garment design and pattern cutting are concurrent. Designs emerge with and within the constraints of fabric width, grain, and structure.

Awareness of Negative Space
Cuts create both positive and negative shapes, which must be accounted for and creatively integrated into the overall garment design. Constraint uncovers opportunity.

Puzzle Piece Layout
Garment pieces are a puzzle, laid out to nest within one another for maximum efficiency. Some are prioritized and placed first. Others are more flexible and added around them.

SYSTEM SCALE

Resource-Led Innovation
Starting with the material — rather than abstract ideals — enforces holistic approaches. Every choice impacts the behavior of the system: communities, climate, ecosystems.

Valuing the Margins and Byproducts
Recognizing that every cut creates both presence and absence, we embrace waste and leftovers as possibilities, places to innovate and adapt.

Constraint as a Creative Framework
Working within strict material limits fosters technical ingenuity and a philosophical shift. Materials limitations are generative, and scarcity catalyzes holistic design.

Zero Waste patternmaking prioritizes ecological constraints through radically valuing resources during garment design and construction. This approach invites us to explore what might happen if we take ecological limitations seriously. If those real systems boundaries were enforced, how would the fashion industry naturally re-organize itself? What natural ecological limitations can we link the fashion industry to, and design within on the systems scale? Timo Rissanen suggested calculating the national annual fibre production capabilities of a region, and limiting production to the ecological limits of the region (Rissanen & McQuillan, 2020). What other ecological boundaries are fashion industries connected with that we synchronize our design decisions to?

Principles of Kinetic

MATERIAL SCALE

Movement-Defined Pattern Cutting
All design decisions are driven by the body's motion, gravity, and ground reaction forces.

Seams Follow Motion, Not Convention
Seam placement is determined by how the body moves, not by traditional garment structures.

Shoulders as Natural Anchors
The shoulders become a key point of stability, where fabric naturally settles.

One-Piece Construction
Single-piece garments arise from prioritizing dynamic body interaction.

Inverted Design Logic
The process reverses traditional methods: instead of starting with a pattern and fitting it to the body, you begin with the body in motion, and the pattern emerges from there.

SYSTEM SCALE

Emergent approaches
New problem solving approaches emerge from real-world contexts, rather than imposed templates or abstractions.

Relational Systems Thinking
Emphasizes the interdependence of parts (fabric, body, movement) and suggests that valuing these relationships can lead to better system-wide outcomes.

New Intervention Points
Intervention points are reconsidered; shifting the space of transformation to where body and fabric interact, offering new avenues for creativity and systems organization.

Fluid, Evolving Framework
Models systems as ever-changing, allowing transformation and evolution rather than rigid structures.

Precision Meets Imperfection
Reflects the paradox of system design: you need precision, but also must accept that no solution is ever complete or perfect.

Kinetic Garment Construction centers relationships within the design process. This approach guides us to explore how arranging systems parts, based on natural alignment between elements, might guide us towards more resilient and efficient fashion systems. Are there particular relationships and ways of functioning that are working well but may be underutilized? What happens if we prioritize relationships in how we design fashion systems, rather than materials, speed and efficiency? What new intervention points and synergies might we discover?

Principles of Subtraction Cutting

MATERIAL SCALE

Designing by Removing Fabric
Garments are constructed by removing fabric for the body to pass through, rather than building up form from added parts.

Tactile Geometry
Instead of relying on precise measurements, designers use physical approximations (arms length etc.) to make spatial and geometric decisions.

Tunnel Technique
Fabric is treated as a surface the body can pass through multiple times, emphasizing shape exploration over garment type.

Plug Technique
Any two shapes with matching perimeters can be joined, no matter how different their contours are.

Displacement Technique
Rejects traditional garment divisions (front, back, sleeve) in favor of continuous, unified fabric forms. Shaping is achieved by connecting parts through loops or strategic pulling.

SYSTEM SCALE

Uncertainty as a Catalyst for Transformation
Reframes uncertainty as an opportunity for emergence to be approached with openness, adaptability, and trust in non-linear progress.

Centering Experience
Prioritizing embodied knowledge over abstract metrics prompts a recognition of the value of sensory intelligence over universalizing frameworks.

Valuing Negative Space and the Invisible
Designing by carving space reframes absence and margin as generative forces. This helps us honor what may be unseen or excluded in dominant structures.

Making with the Unknown
Prioritizes co-designing with materials and conditions beyond full control, and encourages flexibility, and responsiveness in the face of uncertainty.

Playfulness in Systems Imagining
Rooted in experimentation and employs joy, curiosity, and experimentation to subvert rigid logics. We can imagine systems that are equitable, diverse, and radically creative.

Subtraction Cutting creates opportunities for uncertainty and prioritizes designing through removal. This approach invites us to think about how the unknown and uncertainty can support transformative change. We will never be able to fully predict the impact of our design decisions. How can we use this to our advantage, or develop our comfort working within uncertainty so that we can learn to adapt to changing problem contexts? Is it possible to be guided by playfulness and curiosity when dealing with the unknown? Is there a way for us to produce and consume less, but in a constructive way? How might we reimagine fashion systems through the removing or scaling back parts of systems, rather than adding on?

5.2 Applying the Principles in Practice

This has been a high-level exploration of how pattern making might be able to guide transformative systems change in fashion. But what innovation might the *Principles for Fashion System Reimagining* facilitate if we use them to imagine alternate fashion futures at the system scale?

We will take the Canadian sustainable fashion context as an example, where the focus is on textile waste, recycling and circularity (Opportunities for Circularity in Apparel Textiles in Canada: Workshop Report, 2024), and look at this context through a Subtraction Cutting lens as an example of a potential application of the Principles. The Principles of Subtraction Cutting at the System Scale, ask us to lean into the uncertainty required for transformation, center experience, value negative space, design through removal, co-design solutions with materials, and embrace playfulness in imagining.

When we work with subtraction cutting, we typically work with about 8 meters of fabric at a time, and design by removing fabric rather than adding many smaller pieces together. It is well-known that it is more challenging for humans to imagine and design solutions through the subtraction of components from a thing, concept or context, than it is for us to imagine additive solutions (Adams et al., 2021). This is what makes Subtraction Cutting interesting as a tool for thinking about fashion system re-design.

If we were looking to solve the Canadian textile waste issue through Subtraction Cutting, the first thing we might do is consider what would happen if different actors in the system produced, bought or sold less. Is there a configuration of producers, manufacturers, consumers and other actors doing less that could produce a reduction in textile waste without leading to unjust economic challenges? What if we completely stopped allowing the production of new material by some margin, for some amount of time? How might this create an opportunity for us to build up our textile recycling, sorting, and re-valuing systems and therefore create a new textile resource out of pre-existing waste? While this would likely cause challenges and friction in the short term, could this be mitigated in the short term so that the method could guide us

towards a completely new fashion system in the long term?

While these ideas seem bold, and immediately raise flags about how such actions would affect the economic well-being of different stakeholders, and what unexpected impacts might arise, the uncertainty in such a thought process is what allows us to ask new questions, and uncover paths forward that we might not have been exposed to otherwise. Working with Subtraction Cutting was challenging because I felt that I could never fully visualize the impact that my pattern making actions would have on the final garment. I would start by removing a circle of fabric from one area, and that would lead to both expected and unexpected opportunities. When I would join that negative space to another, the gathers and billows of fabric always behaved in ways I couldn't fully anticipate. While the first idea that you have with Subtraction Cutting probably won't be the one that you use, it allows us to ask different questions and have different conversations that ultimately can lead us down a different path for action.

This section has introduced and discussed the *Principles for Fashion System Reimagining* and demonstrated the types of questions, imagination and creativity that they can instill. Alone, each set of principles is incomplete, but together, they can be used to access imaginaries and visions of fashion systems that find creative ways to balance different problem dimensions and system priorities, as explored in the Subtraction Cutting example above. The following section introduces some additional high-level conclusions from the research-creation process.

5.3 Big Picture Reflections

Patternmaking as a Tool to Explore the "What" and "How" of Systems Change

Throughout this research project, I have been guided by a desire to explore both the "what" and the "how" of sustainable fashion transitions. The "what" is important because we need to be able to define what world we want to create in order to design change towards that end (Johnson, 2024). The "how" is important because we already have a lot of the solutions to initiate more sustainable and ethical futures, but we need better tools for implementing the transformative change that is needed into reality through tangible mechanisms and processes.

One of the reasons I was drawn to patternmaking as a medium is that it is both deeply imaginative and creative, yet also deals with the technical/practical implementation of imagined ideas. As such, it has the capacity to help us explore both "what" and "how" questions around systems change. Some of the patternmaking methods that were explored here segment or delineate the "what" and the "how" of designing clothes, while others mix them together, and force us to discover the end result through the process (Kinetic, Zero Waste and Subtraction Cutting), rather than implementing a known end result through the method (Drafting and Draping). This is a valuable and actionable parallel between patternmaking and systemic problem solving that demonstrates how patternmaking may be able to inform systemic problem solving and Transition Design.

The Value of Multiscalar Research-Creation Inquiries

At its core, this research was an inter-scalar investigation; inquiring at the scale of designing individual garments to play out questions about designing entire fashion systems. A key conclusion from this research is that there is value and real linkages between problem-solving on these two scales that can serve to inform each other and produce new knowledge about how we design and solve problems.

This is seen in the discovery of linkages between the patternmaking methods and systems

dynamics that was discovered in the first iteration of research-creation. The principles articulated from the patternmaking methods each articulate different lessons from making on the material scale, that are then translated to the systems scale. As we saw in the first iteration of research-creation, each pattern making method naturally dealt with at least one complex system dynamic, and allowed the designer to engage with and learn about this dynamic through the design process. This is a useful finding because many complex problems are not visible or malleable in the same way that fabric or pattern pieces are. A large part of the joy and satisfaction that comes from designing and making garments and physical products, is the joy of molding and shaping something until it looks "right" (Csikszentmihalyi, 1997). For complex problems that are impossible to physically grasp, there is value in playing out systems dynamics that exist at every scale, to either gain familiarity with complex system dynamics, or play out more specific challenges materially, to test solutions before implementing them.

The central finding from my research is that there are real, tangible parallels between design problems on the material and the systems scale, that can serve as an important site for exploration and knowledge creation to support complex problem solving. The fact that the material scale contains such rich inter-scalar knowledge, is an opportunity that has the potential to be explored further.

The Value of Interdisciplinary Exchanges Between Creative and Non-Creative Practices

The fundamentally interdisciplinary nature of this research was key to helping me to look at the sustainable fashion issue in a new way. By looking at policy making from the unexpected lens of patternmaking, I was able to uncover new knowledge to support the development of solutions to the sustainable fashion issue. For some reason, we tend to separate what types of questions we think about in a creative or artistic way, from those we think about in a non-creative way. Policy and other forms of political decision-making tend not to be taught as creative practices, but rather as technical, scientific, specialized processes. While there is value to this way of looking

at problems and making decisions, just like art, policy making is about imagining different futures and finding creative ways to make them real. When we look at policy making and pattern making both as creative and technical processes for making an imagined idea real, we start to see that there is potential for the two processes to inform each other. The ability for this project to uncover approaches for policy design through the methods of patternmaking shows us that creative, interdisciplinary investigations into traditionally non-creative spaces can support the discovery of solutions to the key challenges of our time.

5.4 Future Directions

Patternmaking Methods as Tools for Playing out Complex System Dynamics

Before the Principles for Fashion System Reimagining were articulated in the second iteration of research-creation, the first iteration identified that each method allowed the designer to engage with particular complex system dynamics. The patternmaking methods can serve as tactile tools for designers to practice engaging with these factors and attune their design skills to systems dynamics and system scale thinking. They can also serve as jumping-off points for further inquiries into the development of creative tools and approaches to support sustainable fashion policy. While patternmaking contributes many ideas that are intuitively applicable to systemic problem solving through policy, to take these ideas further would require further interdisciplinary explorations based in a deeper knowledge of systems thinking and policy design theory and practice. The discovery that each method contains natural linkages to dynamics of change in complex systems is an opportunity to take this thinking further. Each linkage can be seen as a starting point for further research-creation explorations into how we design solutions to complex problems

Pushing Applicability Further through Case Studies

One challenge with this research was that it explored abstract ideas. I used abstract generalizations about patternmaking methods, and applied them to an abstract generalization of what the sustainability "problems" are within the fashion industry. As such, it was challenging to make this exploration more concretely applicable. In order to take the applicability of these principles further, it would be helpful to test how these could be applied in concrete, small-scale problem contexts. This could involve partnering with governments, non-profit organizations or businesses that work in textiles and working on a particular textile sustainability challenge that they are facing through the patternmaking methods. While the principles have capacity to guide design decisions to be more sustainable/ethical, they must be consciously embraced and remembered throughout a problem solving process in order for them to be useful. Tools or methods, on the other hand, don't need to be remembered or consciously taken on, because they lay out a process that is tangibly useful, that the designer wants to use because it actually prescribes the steps for making the garment or solving the problem. So, to test whether it's possible for these principles to be translated back into methods for policy making or fashion system imagining, it would be helpful to test this idea in a real world situation, and allow the situation to refine the principles back into methods.

Back to Mapping the Canadian Fashion System

The initial research question that was not directly explored, but still guided the thinking and intentions of the research, asked "how can patternmaking methods help us to map and make visible the Canadian fashion ecosystem?". This question was left behind because it would require a large amount of data collection and analysis to carry out in a comprehensive way. However, my research concludes that the principles that were developed through the research-creation, would be a compatible problem solving tool to be used with a visual map of the Canadian fashion ecosystem. The main challenge in comparing patternmaking to policy making is that patternmaking is visual and material, and policy making is not, at least not in the same way

as patternmaking. In order to make use of the principles, it would be interesting to make the Canadian fashion system visual through a mapping exercise, as a base to modify and experiment with using the patternmaking methods. I think that if these ideas were explored in this way, there would be potential for these principles and methods to support the actual development of a policy framework for fashion in Canada.

CHAPTER 6: CONCLUSION

This thesis investigated the potential of using patternmaking methods as tools for imagining and implementing original solutions to the wicked problems associated with the fashion industry. Through research-creation explorations that investigated parallels and linkages between patternmaking and policy making, the research culminated in the development of a series of *Principles for Fashion System Reimagining*. These Principles are based upon 5 different approaches to patternmaking within the field of fashion design. The values, ethics and priorities that are embedded in the five patternmaking methods were examined and then transposed from the material scale to the systems scale, and developed into a tool to spark new ways of imagining, ideating and problem solving on the fashion issue.

Creative imagining is often under-utilized in political contexts, but is essential for developing transformative policy solutions. This research demonstrated the utility of these Principles as a tool to enhance creative, out-of-the-box fashion system reimagining and support the swift implementation of sustainability solutions. It also found that using creative practice to explore system scale problems and policy issues can be a rich interdisciplinary exchange that can lead to new ways of thinking about political approaches to problem solving and imagining. While we don't always see policy issues as creative, this research finds that looking at policy issues through a creative lens can allow us to be more imaginative in the development of sustainability solutions and ultimately support the swift development of comprehensive policy approaches that are urgently required in the climate crisis. This research also found that there are real linkages and parallels between problem solving at a small, material scale, that contain important reflections for how we problem solve and engage with complex system dynamics at the policy scale. These conclusions suggest that further research-creation leveraging creative methods to inform fashion policy development will be valuable.

Both personally and professionally, this research's interdisciplinarity has influenced my design research, and lays the foundation for my further exploration in future creative, academic

and policy work. Prior to this experience, making for me has always just been about the physical thing I have made. This experience of thinking about a technical concept through making has shown me the power of interdisciplinary research-creation for accessing new ideas, but it has also reinforced the importance of making ideas clear and digestible if you want to make an impact. While interdisciplinary research-creation is useful, it can be challenging to grasp when it deals with disciplines that are uncommonly linked, and needs to be framed clearly and made more tangible otherwise it risks becoming a thought experiment rather than a useful tool. With this in mind, I hope to keep exploring policy design through research-creation to develop this foundational work into a tangible tool that could be used by policy practitioners.

The central aim of this research has been to articulate new ways of thinking about designing fashion policy that pushes the boundaries of what we see as possible for sustainable fashion governance. As climate impacts become more severe, this type of inquiry is important because it reminds us that there are more ways of addressing complex problems than what we tend to see in traditional governance models. My research has identified this as a rich site for further investigations, and I plan to explore these ideas further through future research and policy work. For example, the Canadian sustainable fashion non-profit organization Fashion Takes Action (FTA), in collaboration with federal and provincial governments, has recently begun collaborating on Canadian sustainable fashion policy. This represents a step in the right direction for sustainability in Canada, and validates my thinking that the policy scale was a valid intervention point on this issue. As a creative policy prompt, I hope that my research has the potential to support creative collaboration, problem solving and engagement on the development of fashion policy in the Canadian context.

REFERENCES

Adams, G. S., Converse, B. A., Hales, A. H., & Klotz, L. E. (2021). People systematically overlook subtractive changes. Nature, 592(7853), 258–261. https://doi.org/10.1038/s41586-021-03380-y

Aldrich, W. (1976). Metric Pattern Cutting for Women's Wear. John Wiley & Sons.

Basham, S. L., Radcliff, V. P., & Bryson, S. L. (2023). How to Write an Annotated Bibliography. Journal of Criminal Justice Education, 34(2), 289–297. https://doi.org/10.1080/10511253.2022.2131859

Bellacasa, M. P. de la. (2017). Matters of Care: Speculative Ethics in More than Human Worlds. U of Minnesota Press.

Chapman, O. S., Kim. (2012). Research-Creation: Intervention, analysis and "family resemblances." Canadian Journal of Communication, 37(1), 5–26. Ares.

Csikszentmihalyi, M. (1997). Creativity: Flow and the psychology of discovery and invention (pp. viii, 456). HarperCollins Publishers.

Druhle, L. (2017). Critical Atlas of Internet. https://louisedrulhe.fr/internet-atlas/

Dunne, A., & Raby, F. (2013). Speculative Everything. https://mitpress.mit.edu/9780262019842/speculative-everything/

EU Strategy for Sustainable and Circular Textiles. (2023). https://environment.ec.europa.eu/strategy/textiles-strategy_en

Fry, T. (2018). Design Futuring. https://www.bloomsbury.com/ca/design-futuring-9781350089952/

Fu, K. K., Yang, M. C., & Wood, K. L. (2016). Design Principles: Literature Review, Analysis, and Future Directions. J. Mech. Des, 138(10). https://doi.org/10.1115/1.4034105

Gauntlett, D. (2011). Making is connecting: The social meaning of creativity, from DIY and knitting to YouTube and Web 2.0. Polity Press. http://catdir.loc.gov/catdir/enhancements/fy1112/2011282023-t.html

Greenhalgh, T., & Russell, J. (2009). Evidence-Based Policymaking: A Critique. Perspectives in

Biology and Medicine, 52(2), 304–318.

Irwin, T. (2015). Transition Design: A Proposal for a New Area of Design Practice, Study, and Research. Design and Culture, 7(2), 229–246. https://doi.org/10.1080/17547075.2015.1051829

Johnson, A. (2024). What If We Get It Right? Visions of Climate Futures. https://www.penguinrandomhouse.com/books/645855/what-if-we-get-it-right-by-ayana-elizabeth-johnson/

Kamitsis, L. (1996). Vionnet: A Fashion Memoir.

Lewis, S. L., & Maslin, M. A. (2015). Defining the Anthropocene. Nature, 519(7542), Article 7542. https://doi.org/10.1038/nature14258

Lindqvist, R. (2015). Kinetic garment construction. https://www.bodyandspace.com/kinetic-garment-construction

Lockton, D., & Candy, S. (2018, June 28). A Vocabulary for Visions in Designing for Transitions. Design Research Society Conference 2018. https://doi.org/10.21606/drs.2018.558

Loveless, N. (2019). How to Make Art at the End of the World: A Manifesto for Research-Creation. Duke University Press.

McQuillan, H. (2020). Zero Waste Systems Thinking: Multimorphic Textile-Forms. https://urn.kb.se/resolve?urn=urn:nbn:se:hb:diva-23961

Meadows, D. (2008). Thinking in Systems. https://www.chelseagreen.com/product/thinking-in-systems/

Mulgan, G. (2022). Another World Is Possible. HURST. https://www.hurstpublishers.com/book/another-world-is-possible/

Opportunities for Circularity in Apparel Textiles in Canada: Workshop Report. (2024). Environment and Climate Change Canada.

Private Member's Bill C-337 (44-1)—First Reading—Textile Waste Reduction Strategy Act—Parliament of Canada. (n.d.). Retrieved December 11, 2023, from https://www.parl.ca/documentviewer/en/44-1/bill/C-337/first-reading

Reichart, E., & Drew, D. (2019). By the Numbers: The Economic, Social and Environmental Impacts of “Fast Fashion.” https://www.wri.org/insights/numbers-economic-social-and-environmental-impacts-fast-fashion

Rissanen, T., & McQuillan, H. (2020). Zero Waste Fashion Design. Bloomsbury Publishing.

Rittel, H. W. J., & Webber, M. M. (1973). Dilemmas in a general theory of planning. Policy Sciences, 4(2), 155–169. https://doi.org/10.1007/BF01405730

Roberts, J. (n.d.). Free Cutting. https://researchonline.rca.ac.uk/3060/1/FREE-CUTTING-Julian-Roberts.pdf

Roberts, J. (2010). Subtraction Cutting. https://researchonline.rca.ac.uk/4870/1/REF_Portfolio_Julian%20Roberts_PUBLIC-2021.pdf

Scales, I. R. (2014). Green Consumption, Ecolabelling and Capitalism’s Environmental Limits. Geography Compass, 8(7), 477–489. https://doi.org/10.1111/gec3.12142

Scharmer, C. O. (2016). Theory U: Leading from the Future as It Emerges. Berrett-Koehler Publishers.

Thomas, D. (2019). Fashionopolis: Why What We Wear Matters. https://www.penguinrandomhouse.com/books/554229/fashionopolis-by-dana-thomas/

Von Busch, O. (2011). Fashion Hacking as Shapeshifting.

Why do we need a Fashion Revolution? : Fashion Revolution. (n.d.). Retrieved December 11, 2023, from https://www.fashionrevolution.org/why-do-we-need-a-fashion-revolution/