Fecha de recepción: febrero 2022
Fecha de aprobación: marzo 2022
Fecha publicación: abril 2022

Transitioning Toward the Slow and Long: Developing Experiential Futures Approach Toward System Change in Fashion

Adam Cowart [1] and Donna Maione [2]

Abstract: Designing for transitions toward a desirable, sustainable, and socially just world requires design practices that consider long-term futures that extend across scalar frameworks from individuals to planetary stewardship. The applied transition design (TD) framework is valuable in understanding the web of the interconnectedness of problems before forming nested and complementary interventions. While TD has proven to be a valuable and rich source for designing systems innovation, its relative newness means it has yet to be applied to a number of industries over the longer-term duration requisite for deep systems change. We apply regenerative ecologies of interventions that focus on an extended horizon beyond the traditional temporal boundaries of a fashion design product development cycle and reflect on how long-term postures in an industry deeply entangled in wicked problems can empower actors to take action in the present.

Through a class assignment, a design brief, "The Thousand Year Closet," was presented to students providing generic archetypes to imagine variable and long-term futures, ranging from desirable to undesirable. Using ethnographic coding methods of the students' submissions and reflections, the data shows that through the materialization of radical ecologies of interventions in the future, students, even in groups with undesirable scenarios, experienced a sense of playfulness in the process of materializing radically distant futures. Other groups employed Hopes and Fears in the future in response to their emergent ecologies of interventions, providing fertile ground for mapping speculative lines of alignment and disagreement between current and future stakeholder groups. These findings emphasize the need for playfulness and future -forward empathy toward long-term ecologies of intervention.

This suggests that creating the space in a product development schedule to include openings for playfulness and empathy building, which are grounded in research, provides richer and empathetic imaginative ecologies of intervention that can contribute toward the transition to a sustainable fashion future.

Keywords: Futures - Fast fashion - Experiential futures - Transition design - Prototype -Fashion fiction - Ecologies of interventions

[Abstracts in spanish and portuguese at pages 61-63]

(1) **Adam Cowart** is a PhD Researcher and teaching fellow in the School of Design at Carnegie Mellon University studying Transition Design. He is a strategic foresight professional, and an adjunct professor of foresight at the University of Houston. He holds a BFA and MFA in creative writing from the University of British Columbia, an MBA from Simon Fraser University, and an MSc in foresight from the University of Houston. His research focuses on storytelling structures and ecosystems in futures imaginaries and design. Previous courses of instruction include: Research Methods, Futures I and II, Advanced Strategy and Planning, and Alternative Perspectives in Futures.

(2) **Donna Maione** is a PhD Researcher and teaching fellow in the School of Design at Carnegie Mellon University studying Transition Design. She holds an MS in Organizational Change Management and Certificate in Sustainability Strategies from The New School, a BA in Organizational Behavior from New York University, and an AAS from the Fashion Institute of Technology in New York City. Donna has taught classes in Sustainable Systems, Systems for Design, Research Methods, and How People Work. Her research focuses on waste reduction in textiles, drawing connections through her making practice, the design of everyday life, perceptions of waste and motivations for upcycling.

Introduction

Transition Design (TD) is an emerging transdisciplinary design practice to address complex challenges, commonly referred to as "wicked problems," that proliferate in the 21st century (Irwin, 2015). The TD framework consists of four co-evolving areas: visions for transition, theories of change, posture and mindset, and new ways of designing. Our work is situated at the point between the first and last listed areas, and seeks to materialize a rich and iterative series of connections between the two areas with a real-world systemic challenge in the form of fast fashion. Through long-term future visions and pathways to those futures, and designing for durational ecologies of interventions, we seek to evolve the framework by synthesizing methods from futures and design disciplines. In particular, TD's insistence on taking a design posture that considers deep historical roots of the complex problem space and the long-term aspirational future allow for rich insights and foresight, but require hybridity, flexibility, and creativity of methods in practical, real-world applications.

In **Section 1**, we explore the wicked problem of fashion, key trends toward sustainable clothing practices, the emerging fashion futures studies, which seek the longer view toward sustainability, and futures theories and methodologies that may support the longer view.

This leads us to two rich questions: How might we construct regenerative ecologies of intervention that exist beyond the traditional temporal boundaries of a fashion design product development project? How might we apply this long-term posture in an industry deeply entangled in wicked problems to empower actors to take action in the present?

In **Section 2**, we propose scaffolding a durational and iteratively devised experiential future –in the form of a diegetic frame-tale in which stories are nested within other stories– to cultivate a high-fidelity repository for imagining and reimagining ecologies of intervention. We call this prototype the "Thousand Year Closet." Through positioning designed objects as impetuses for material and non-material interventions within this regenerative and durational prototype, we invite participants to design, create, and act with the objects and narratives from the future, thus collapsing the experiential "gulf" that exists between the present and the future.
Finally, in **Section 3**, we share the Thousand Year Closet design brief as well as our experiences and the output from running the design brief as a student participant workshop.

Section 1

The Problem at Hand

The fashion industry has deep roots in the colonization of land and people. For example, cotton and textile industries in the United States built the structures that made the industrial era possible. Today's clothing production perpetuates and reinforces the social inequities linked to gender-based violence, modern slave labor, and unsafe work environments deeply rooted in policy and laws. The trade policies that hold up the nation-states' dominance over others trickle down to individuals and are exacerbated as they rest on top of the escalating climate crisis and resource scarcity.
Land and water use conflicts arise as arable land and freshwater become scarcer. In this context, the choice of growing food versus cotton becomes increasingly challenging and the following questions are asked: Who gets to choose who grows what? Who eats what? Who has access to water? Moreover, mismanaged land through mono-crop cotton has a high dependence on fossil fuel-based fertilizers and pesticides, reduces organic matter in the soil, reduces water retention, causes water runoff, and perpetuates a negative reinforcing loop leading to loss of biodiversity and affecting land-system changes, which are two of the nine planetary boundaries (Steffen *et al*., 2015; Stockholm Resilience Center, n.d.).
Meanwhile, the COVID-19 pandemic is showing us what happens when an industry takes advantage of vulnerable populations. The immediate halt of production orders caused workers to lose jobs with no stimulus package or past savings to fall back on. Unintended consequences fall on marginalized worker communities as global production comes to a standstill without alternative revenue-generating industries. Apparel manufacturers and fashion brands are now attempting to regain a market hold as the pandemic wains and seeking ways to return to the make and waste culture.
Thus, the wicked problem of mass-produced clothing is deeply enmeshed in social, economic, environmental, and technical spheres. However, no single solution can fully address the issue.

Fast Fashion: The Materialization of Short-term Thinking

"Fashion fades, only style remains the same." Coco Chanel
Fast fashion, a term coined in the late 1990s as a nod to the rise of the fast-food industry, aptly describes the accelerated pace of clothing manufacturing. Fast fashion is inexpensive, made of poor quality, and designed for style obsolescence. The pace of fashion has swiftly increased consumption by 400% over the past twenty years (Morgan, 2015), through the advancement of technology, allowing for the cycle of trends to move at hyper-fast speeds. The low prices of fast fashion are achieved by using poor quality material, shortcuts in the manufacturing process, and unfair labor practices. Micro-trends, meant to lure in curious trend-seeking customers, speed up the purchase cycle and render prior purchases dated and obsolete (Fletcher & Tham, 2019; Thomas, 2019). The industry thrives on impulse purchases designed to encourage super-sized consumption patterns.
Fast fashion, made in distant places, separates us from the source of the product. The remoteness of the supply chain masks environmental destruction and allows for the continuation of rapid consumption without seeing the consequences (Boehnert, 2018; Plumwood, 2008). Specifically, the energy, both human and non-human, and the material resources expended to make the items we use are hidden from the consumer's view.
On a socio-technical level, social media has played a role in the acceleration of the one-and-done wardrobe cycle. Viewed once on Instagram, the items are retired, never to be seen again on social media. On the other hand, engaging with our possession enhances our attachment, enchantment and increases the likelihood of keeping them around (Chapman, 2015; Fletcher, 2016). "Considering the longitudinal, entangled nature of usership expands our understanding of the state of use and its temporally extended nature" (Chapman, 2021, p. 134).

Toward Sustainable Solutions: Design for Sustainability

Design for sustainability is a broad and diverse design practice that has evolved over several decades. Greenwashing aside, key sustainability strategies in the clothing industry that attempt to reduce or reverse environmental implications and social injustices can be categorized into two parts. Primary sustainability principles focus on materiality and making things (Fry, 2009) as well as energy usage, while the remaining address the need for behavior change (Fletcher & Tham, 2019, Cline, 2019).

Materiality

Sustainability methods include models that aid designers and decision-makers with structures or frameworks to plan future use cases in the design phase. Specific to fashion design, the matrix toward sustainability rests on materiality omitting the usage phase since these organizations lack agency over individual usage. The solutions range from the large scale, which may be attached to cost savings or revenue creation, to designing for circularity, including disassembly and repair (Chapman, 2015; Ellen MacArthur Foundation, 2017;

Fletcher & Tham, 2019; McDonough, 2002), and often the emphasis is on materiality, which is visible and measurable. However, these mechanisms, which serve as a guide toward sustainability, are often proprietary (Lanfranchi & Cline, 2021, p. 137), lacking transparency and accessibility behind paywalls. Other methods include local, small, and slow-niche innovations toward a transition to sustainability that are not typically embraced by large organizations and mostly seen in small settings, individuals, and scholarly studies.

Circularity

Circular design's main focus is to eliminate waste and pollution through circulating products and materials and through the regeneration of the ecosystem (Ellen MacArthur Foundation, 2017). Transition to a circular economy, focuses on services and systems design from product recovery, reconstruction, and recycling materials at industry scale.

In *Cradle to Cradle* (2002), McDonough and Braungart addressed the linear model of manufacturing of extraction, production, and disposal with circular models inspired by nature's abundant flow of material and energy through nutrient cycles. The model consists of two cycles –technical and natural. Technological spheres explore regenerative textiles within a technical cycle in terms of whether they are chemical or synthetic compostable with a broad global circumference. Meanwhile, the ecological sphere includes regeneration at the earth's pace, such as bio-composting or carbon sink wool production. These tools, which measure the material, social, and environmental impact, focus on the near past to present with no mention of a future index.

Small Niches

On a small and local scale, peer-to-peer swapping and gifting cultures have gained momentum by scaling out and not up. As acts of resistance toward consumerism and to promote a cleaner planet, the Facebook group, Buy Nothing, which started on Bainbridge Island, WA, in 2013, now connects over 6,500 hyper-regional groups in 44 countries (Kaysen, 2021) and plans to expand by developing an app (Sharething Inc., 2021)

Other examples of systems involving slower human interventions include local production of animal fiber nested within bioregional fiber-sheds (Fibershed, n.d.; Pacific Northwest Fibershed, n.d.) On the local and regional scale, slow and small production methods have scalar impacts on the ecosystem with cross-cutting benefits to soil regeneration and sustainable food production.

In 2019, *The Manifesto* was created by The Union of Concerned Researchers in Fashion to address misinformation in fashion and as a call to action toward building an ecology of knowledge toward a sustainable and just system in fashion (Fletcher *et al.*, 2020). Signed by scholars, students and practitioners, this proclamation forms a globally dispersed yet tight-knit community committed to engaging others toward systemic and transformative change in the apparel industry.

Wardrobe studies is a vast field of research using ethnographic methods toward understanding cultural viewpoints, spatial mapping, material flows, the assemblage of materiality, and the human experience of wearing. In this context, studies may define wardrobe

by the physically bound space, such as a closet or a rack. Further, other researchers have conducted audits of individuals' closets or collection of clothing to better understand user behavior, usage patterns, and space utilization with goals ranging from increasing consumption to understanding ways toward reduction of consumption.
In *Craft of Use* (2016), Kate Fletcher documents clothing from the human experience of wearing. In the chapter, *Matter in Motion*, Fletcher talks about the wearers' experience and interaction with the product as a lived process rather than describing the material (2016). Meanwhile other wardrobe guides focus on sustainable and mindful consumption, which helps drive individuals' choice toward curating a wardrobe that is guilt free (Cline, 2019). Here, Cline categorized conscious consumers into three personality types as thrifters, minimalists and traditionalists, as a way to introduce different approaches to shift sustainable purchasing habits while not sacrificing a personal style.

Temporality

Recent attempts toward speculative futures in fashion blend research and activism. Fashion fictions, (Holroyd, 2020) responds to the post-growth fashion movement as an open platform to engage a diverse audience in imagining alternative social and cultural sustainable systems of a fashion future that aligns with the Earth's living system.
Additionally, Possible Future (n.d.), a consultancy firm, uses design fiction to engage clients in lively debate. In a three-part narrative thirty years in the future, they explore growth, collapse, and transformation scenarios with a storyline of backcasting intermediate milestones (Possible Future, 2019). In this context, engaging clients in future narratives create the opportunity for "retrocausality, the possibility of the future influencing the present" (Hodgson, 2013, p. 24). Here, they recognize that the clothing industry needs to move from a linear forecasting model toward imagining things in the future as a non-linear forward feed system.
Moreover, extending time into fashion trends toward slower cycles and longer horizons are needed to shift the types of design questions in which to engage: How might we imagine the future of a garment we currently wear? What might it look like twenty or a hundred years from now? How would we act differently if an item in our closet were to last 1000 years? How might a garment or the usage of garments evolve, adapt, or change over time? This project aims to add to the growing design principles for social and environmental sustainability by including new ways of designing and engaging temporality in the development and usage phase and extending our mental model toward a long horizon before planning and producing material things.

Futures Thinking and Overcoming Tempocentrism

Introduction to Futures

Futures thinking is a rich and diverse field focused on challenging tempocentricism by expanding our individual and collective temporal perspectives. Anthropologist Robert

Textor observed that "futurists frequently find people whom they judge to be not only tempocentric, but also unaware of their own tempocentrism" (Mead & Textor, 2005, p. 16). Moreover, futures thinking surfaces the relationship between inbound and outbound change, in which exogenous and endogenous change influence each other (Hines & Bishop, 2006). It is a foundational but complex relationship that echoes ontological design theory, which states that "we design our world, while our world acts back on us and design us" (Willis, 2006). The core concept of the need to enhance humanities capacity to conceive of and act in response to the future has variously been framed as futures thinking, fluency (Schultz, 1995), and literacy (Miller, 2018), among others.

Four areas of futures studies are particularly salient to challenging current tempocentric perspectives in the fashion industry and imagining more sustainable, generative, and socio-technically equitable futures to inform the theoretical and practical futures underpinnings of the Thousand Year Closet: the long now, design futures, experiential futures, and heritage futures.

Long Now

Thinking about the future involves reconsidering the boundaries between past and present by problematizing conceptions of the present as a transient moment to moment ephemeral experience. In this context, seventh generation thinking –in which the impact to the next seven generations should be considered before undertaking a course of action– has emerged from indigenous ways of knowing and being (Loew, 2014). In contemporary Western thought, Boulding (2006) proposed the 200-year present, in which the present stretches 100 years into what we might regard as the "past" and 100 years into what we might regard as the "future," thereby constituting a "present that is a continuously moving moment, always reaching out 100 years in either direction from the day we are in." More recently, the Long Now foundation has looked to imagine a long and slow future for humanity in the hopes of reversing an accelerating trend of short-horizon perspectives that is shrinking the future (Brand, 1999).

These reframings widen the temporal lens through which we view the world around us and evoke a duty of care and responsibility. This could be termed the "de-immediatization" of the present. Further, they shift and problematize ubiquitous epistemes of time. This posture of conceptualizing temporality is embedded in the TD framework. In "a world where many worlds fit" (Escobar, 2018), it stands to reason that there must necessarily be many different conceptions, paces, and flows of time *(See Figure 1)*.

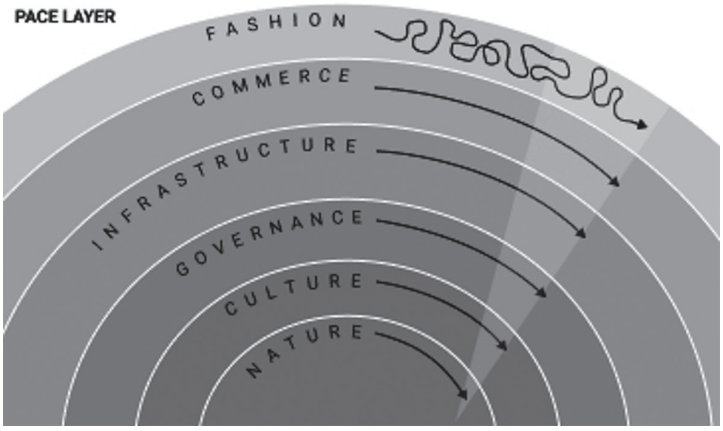

Figure 1. Pace Layering. Source: Brand (1999, p. 37).

Design Futures

In *Design and Futures*, the rich potentiality of the space between the disciplines of design and futures was defined as follows:

> It is increasingly acknowledged within the futures studies community that operating with a largely verbal and theoretical bent over the past half century has afforded too little impact on actual future-shaping behaviors. Meanwhile, those in the design community recognize a need to interrogate higher-level consequences –the futures, the worlds– that their products, systems, and other outputs help produce (Candy & Potter, 2019, p. 1).

Thus, design futures is seen as a synthesized discipline with the potential to harness the worldbuilding capabilities of futures and the worldmaking ethos of design. With a language and posture that harmonizes the two worlds, it has the capacity to disrupt problematic and short-term design processes with a futures ethos.

The "Experiential Gulf" in Futures. Experiential futures is a practice deeply associated with design futures that addresses the urgent need to "bridge the 'experiential gulf' between inherently abstract notions of possible futures, and life as it is apprehended, felt, embedded and embodied in the present and on the ground" in order to "engage people more viscerally in futures conversation" (Candy & Dunagan, 2017, p. 2). Here, to embed experiential futures practices within a larger project is to acknowledge the need to bridge the experiential gulf between the present and plausible futures. Moreover, recent research in neuroscience suggests that the brain, when compelled in laboratory settings through scenarios to imagine a future, stimulates dual cognitive functions of "constructive" and "evaluative" (University of Pennsylvania, 2021). The researchers determined that the following:

> The biggest difference between vivid and non-vivid scenarios was in vividness, but consistent with vividness affecting constructive processes, people were more likely to imagine vivid scenarios as active participants rather than observers... Both vivid and positive scenarios were associated with a greater feeling of being "actually there" (Lee *et al*., 2021, p. 5245).

Put simply, active engagement with a future scenario, rather than passive observation of the scenario, has a correlative effect on the degree of vividness, which in turn affects the constructive and evaluative processes of the brain.

Heritage Futures. A relatively recent field of study, heritage futures acknowledges and explicates the traditionally implicit role that the future plays in preservation. "Heritage futures… are concerned with the roles of heritage in managing the relations between present and future societies" (Harrison *et al*., 2020, p. 2). In this context, all attempts at preservation make the tacit assumption that someone or something in the future will value the thing being preserved. However, while preservation is typically seen as past-oriented, the maintenance of historical artefacts for cultural or sustainable intentions, the act is ultimately future-oriented. Those interested in sustainable fashion who concern themselves with reclaimed and repurposed garments can learn much from heritage futures in which "the decision to conserve and incorporate what had previously existed as merely a 'ruin' into a new development… is one which transforms the material world in particular ways…. the decision to building 'around,' 'within,' 'above' or 'below' is also a decision to build 'with' something… this is also a process of creating something out of fragments" (Harrison *et al*., 2020, p. 32).

Section 2: Proposal for Durational Frame Tale as an Ongoing Experiential Future Repository

Intention of Building the Thousand Year Closet

Here, we propose scaffolding a durational and iteratively devised experiential future –in the form of a diegetic frame-tale in which stories are nested within other stories– to cultivate a high fidelity repository for imagining and reimagining ecologies of intervention. We call this prototype the "Thousand Year Closet." Through positioning designed objects as impetus for material and non-material interventions within this regenerative and durational prototype, we engage participants to design, create, and act with the objects and narratives from the future, thus collapsing the experiential "gulf" that exists between the present and the future.

The Thousand Year Closet, in addition to bringing design futures methods explicitly into the TD framework, also draws on Chapman's (2015) work on emotionally durable objects and the ways in which an object could be valued and endure over an elongated period of

time versus being "mono" in the story it shares with its user/owner. The theory of emotional durability, in the Thousand Year Closet design brief, is extended not only to objects intended for usage but also to how frame tales could be deliberately employed containers for artifacts and experiencing the future in order to create an ongoing and generative relationship with the future space.

Widening the temporal lens in which we look at the world compels a diegetic conjuring of the area being explored, critiqued, designed or dismantled. Put simply, a widened lens reveals plausible and multiple narrative trajectories. In this context, Dator *et al.*'s Generic Archetypes (2013) (continuity, transformation, collapse, or discipline) assume the structural posture of a conventional narrative or scenario that involves a generally defined future time horizon in which the futures imaginary of individuals and groups are meant to arrive during futures formation: 25 years in the future, 2050, 2075, etc. However, what becomes apparent once we introduce radically long time horizons is that exploring each of the four archetypes as discreet and concurrent narrative units with similar time horizons is simply not enough. In essence, we will undoubtedly traverse multiple archetypes in our journey from today to 03021.

Process for Building the Thousand Year Closet

For the purposes of this paper and the Thousand Year Closet design brief, a full TD framework workshop was not run. Rather, significant research has been undertaken and embedded into the brief. This research includes the construction of an MLP on fashion, causal layer analysis, and wicked problem system mapping. The building of the design fictions as "situations" from which to materialize artifacts and experiences from the future consisted of four steps: exploring driving forces across the generic archetypes; creating generic low-fidelity scenarios; shifting from scenarios to situations using the experiential futures ladder; and constructing high-fidelity design fictions as design provocations.

Driving Forces

While many inputs can help craft compelling scenarios, including a social, technological, economic, ecological and political (STEEP) and macrohistorical analysis, driving forces are the key input for our purposes. "Driving forces are phenomena and trends in the environment that, due to their recurring nature, have a consistent effect on the future" (Fergnani, 2020). It is this "consistent effect on the future" that is leveraged in the crafting of generic scenarios for the Thousand Year Closet design brief.

	Growth	Collapse	Discipline	Transform
Forces				
Population	Increasing	Declining	Diminished	Post-human
Energy	Sufficient	Scarce	Limited	Abundant
Economics	Dominant	Survival	Regulated	Trivial
Environment	Conquered	Overshot	Sustainable	Artificial
Culture	Dynamic	Stable	Focused	Complex
Technology	Accelerating	Stable	Restricted	Transformative
Governance	Corporate	Local	Strict	Direct

Table 1. Seven Driving Forces Matrix. Source: Dator et al. (2013).

Constructing Generic Archetypes as Temporally Expansive Storyboards for Long-Term Futures Formation

With driving forces framed within the context of the four archetypal scenarios, iterative and combinatory storyboards can be constructed, designating specific time horizons to each archetype defined building block. These generic futures *(see Appendix)* create a repository of framing or organizing narratives from which long-term pathways into the future, which reflects shifting dynamics in which multiple archetypal futures play out, can be constructed. By considering such a dramatically elongated trajectory, these scenarios can exist both within a defined temporal horizon as a pluralizing convention or lined up both vertically and horizontally to create a sort of choose your own adventure storyboard. The multidimensional storyboard then forms a series of narrative arcs, not simply a scenario but scenarios (plural), from which situations are articulated and then artifacts and experiences from the future are devised, either at the end of the narrative trajectory constructed or at any generative place along the timeline in which a speculative materializing is to situated. However, while these radical time horizons could make one construe this exercise as largely academic, our assumptions and anticipations of the future are based on 1000s of years of history. The future as unknowable should not be confused with the future as unimaginable.

Experiential Ladder

The Experiential Futures Ladder is then used to move from low-fidelity scenarios to high-fidelity situations. The Thousand Year Closet is not intended to be a museum where objects are preserved because of some perceived historical value. It is an active and ongoing site of utility. The act of preservation should not be confused with the construction and mental models of durability *(See Figure 2)*.

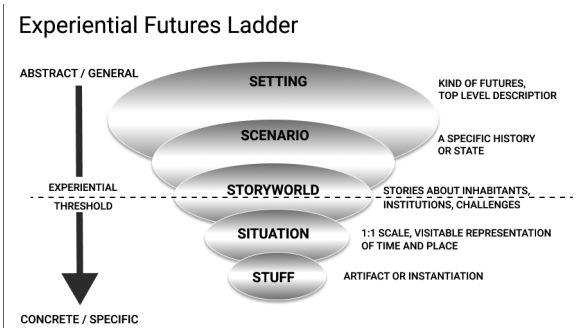

Figure 2. Experiential Futures Ladder. Source: Candy and Dunagan (2017).

Design Fictions as High-Fidelity Situations

The general scenarios that achieve high fidelity in the design fiction process and materiality in the artifact creation process are predominantly positioned temporally within the next 200 years. The design fictions then must thread the objects through unknown and unknowable centuries to arrive at a distant future in which they have endured. The creation of design fictions as situations is a deliberate choice because "narratives can also be utilized as agents of subversion, further enriching the user-object relationships, keeping the interaction sufficiently ambiguous by delivering an ebb and flow of ever-changing fictional realities that sustain enquiry" (Chapman, 2015, p. 128). Here, projecting our durational, frame-tale prototype well into the future, employing "ever-changing fictional realities" through the lens of archetypal scenarios which will deliver the "ebb and flow" we seek to "sustain enquiry" of the artifacts within a future's archive (Chapman, 2015).

The four design fictions listed below are approximately mapped onto a specific generic archetypal scenario (see Appendix for complete design fictions).

The Ship of Theseus Sweater: This is a discipline future in which clothing is hyper-module and meant to last forever, with incremental pieces being replaced or regenerated and applied through a variety of techniques.

Dà zhìdù lùn: This is a collapse future in which clothes are seen as symbols and extensions of national and natural identity. Here, ecological collapse has triggered a backlash in the developing world and the re-appropriation of garments as culture and spiritual heritage.

Caster Culture: This is a transform future in which physical clothing has been replaced by holographic projections.

Forage Fashion: This is a continuation future in which ingenuity in foraging "100 mile" fashion clubs make use of local, sustainable resources in the face of ongoing ecological degradation and collapse.

Criteria for Experiential Futures

Experiential futures can be challenging to assess, and a scorecard was thus developed that drew on several bodies of work. Here, the overarching beginning-middle-end organizing

concept was inspired by Aristotle's dramatic structure and the monomythical narrative structure commonly referred to as *The Hero with a Thousand Faces* (Campbell, 2008). Both provide a helpful meta-narrative framework for assessing experiential futures due to their ubiquity in storytelling practices in film, television, and beyond. Inspiration for experiential future's construction was also drawn from The Future's of Everyday Life: Politics and the Design of Experiential Futures (Candy, 2010) as well as Designing an Experiential Future: The People Who Vanished (Candy & Dunagan, 2017). Finally insights were gleaned from the practical playwright exercise book, *Playwriting in Process* (Wright, 1997). This scorecard was developed to guide students through a narrative arc and to provide insights into what to look for in a successful futures experience as well as what to consider during the design of an experiential encounter *(See Figure 3)*. This guide, while not exhaustive, provided a critical base from which to work and consider the narrative(s) encounters with the future.

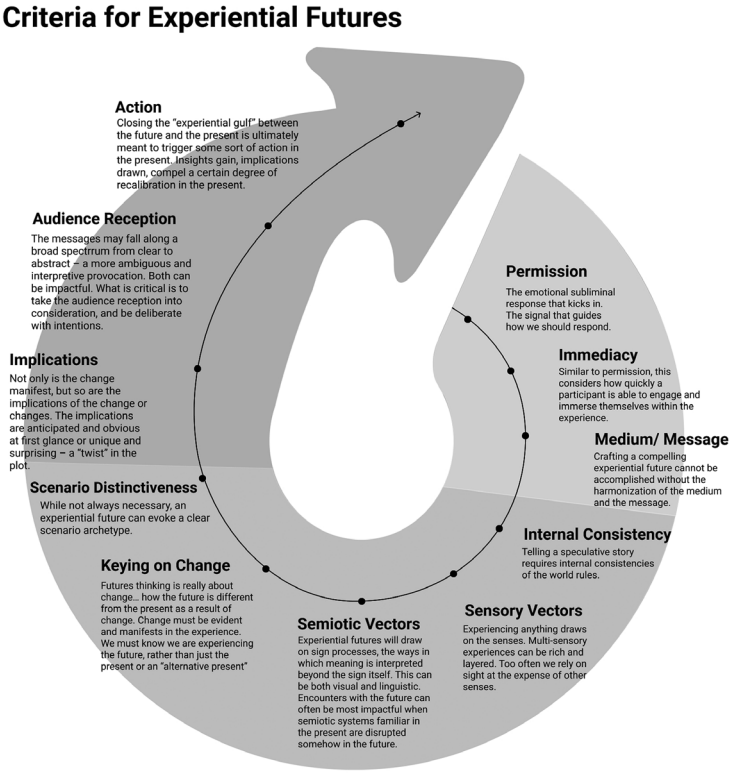

Figure 3. Criteria for Experiential Futures.

Final Note on Design Brief Production

As a final note, within this workshop setting, we deliberately employed the generic archetypes to imagine variable and radically long-term time horizons. This was done purposefully to provide participants with rich and various futures from which to materialize artifacts. As part of a TD framework workshop, the preferred future is singularly drawn upon. This distinction is critical to consider as this design brief materializes undesirable as well as desirable futures.

Section 3: Assignment: The Thousand Year Closet Design Brief

The students were presented with the Thousand Year Closet design brief *(see Appendix)* with two weeks' time to manifest the outcome. The deliverable of the assignment was a group presentation in the gallery-style form and a 500-word rationale describing the scenario and group reflection of the process.

Methods

Using ethnographic coding methods, we examined photographs and texts from the class presentations of eight groups of students as well as the written material from their reflections. The material was obtained from the course instructor through the CANVAS learning management system. The process of coding was conducted in three steps. Initially, interpretive and descriptive tagging was added to the images and text sections into individual thought units as guided by our research question. As codes were added, we discussed how the codes represented particular expressions of the presentation or reflection and added additional codes when the initial codes and tags did not effectively represent the expression. Additionally, during our coding process and discussion, we looked for patterns, similarities or differences. Overall, we identified several patterns and variations worth noting in the data. The resulting chunking of meaning helped to form a grounded theory (Charmaz, 2006; Strauss, 1990) and narrative around this data set, which was then used to draw further inspiration toward the development of the assignment and to expand the knowledge to a broader audience. Further, two overarching thematic considerations we will address in the conclusion of the paper is: scalability and relationality to the TD framework and methodology; and the capacity of the synthesis of experiential futures and ecologies of intervention to catalyze stakeholders. First, we explore two illustrative examples from the student projects before turning to these two overarching patterns in the data.

Examples

Of the eight student-team experiential future interventions, two have been selected as representative of the body of work to be expanded upon.

CompoClothes

CompoClothes is an experiential future derived from a growth/continuation scenario. In this future narrative, fast fashion is still a common practice in the world. However, extending the metaphor of clothes as disposable commodities, CompoClothes is a monthly delivery service of fully compostable and recyclable clothing *(See Figure 4)*. In this future space, subscription services allow both flexibility while maintaining rationing controls. The most compelling and high-fidelity facet of this project is the expiration date tags, indicating the best before date of the clothes in question. This both surfaces the usually invisible social construction of fashion as dated and out of style, while simultaneously offering up a tangible implication for clothes that are truly made for the moment and aligns the pace of materiality with the cultural shifts in style and trend. This is the manifestation of sustainability without durability. Further, this experiential future was highly effective as a future instantiation in which audiences can interact and engage with. As a mechanism for domesticating the future in the present, it served a dual purpose of problematizing the present in terms of our current patterns of fashion and ecommerce consumption as well as proposing a speculative sustainable solution.

Figure 4. CompoClothes Artifacts (2021). Photography: Chris Han, Jasmin Kim, Rachel Legg, Maggie Ma, and Eric Zhao.

Caster Culture

Caster Culture is an experiential future derived from a transformation scenario. In this project, students used projections to engage an audience with a future in which clothing is a projected or holographic representation that covers the body. Here, a series of rotating images and patterns were played along the projected outline of a human body. Conceptually, this experiential encounter materialized a future in which the thoughts in our heads are made visible and act as our bodily coverings, bringing to life a future in which the emotional and physical vulnerability of citizens is manifest. Citizens in this future world are not only "naked" by present terms but also revealing the inner workings of their minds through the patterns and images expressed. They are quite literally wrapped in their emotions *(See Figure 5)*.

Figure 5. Still Images of the Caster Culture Video Clips. Image credit: Tate Johnson, Elysha Tsai, Elena Crites, and Se A Kim.

The experience itself was the projection shifting images slowly. Moreover, this prompt allowed for a more abstract engagement in which audience members had to puzzle through what this future artifact may be. The bodily outline provided a useful affordance, and most audience members took turns standing in front of the projection and commenting on the interplay of patterns and images and how they interacted with whatever the audience member was wearing at the time *(See Figure 6, 7 y 8)*.

Figure 6. Students Engaging with Projected Images. Photography: Donna Maione.

Highlights from the Work of Other Groups

Figure 7. Left: In a Collapsed Future, a Student Demonstrates the Mobility of The Human Shell Adaptable for a Nomadic Lifestyle. Right: Reclaimed Materials used for Storage Pouches Inside the Shell. Photography: Left –Bon Bhakdibhumi, Jenny Liu, Jubbies Steinweh-Adler, Nicole Yu, Ruomin Xin; Right– Donna Maione.

Figure 8. In a Discipline Future, Clothing is Custom Fit and Made Through Spray Technology. Photography: Donna Maione.

Discussion and Conclusion

Discussion

Scaling: Learnings Toward Positive Systems-level Change and Transitions

The use of articulating Hopes and Fears of future generations emerged as an unexpected method of analysis of design fictions in the process of constructing an experiential future. It is a core method used in TD to allow stakeholders to voice their aspirations and concerns for the future, map lines of affinity and misalignment across stakeholder groups, and is a largely speculative activity used in this context. The usage of this method reveals an opportunity to more fully empathize with the future in a generative way that surfaces possible implications of the proposed intervention being materialized. Additionally, its usage in the future, post ecologies of intervention systems, also presents the opportunity for stakeholder groups to re-engage with their original Hopes and Fears mapping. This could be an area of rich exploration for practical applications of the TD framework: mapping current Hopes and Fears for the Future to those that emerge after ecologies of intervention are introduced to imaginatively explore the impacts and implications of their proposed interventions.

Catalyze: Towards Collective More Sustainable, and Desirable Long-term Futures

Through materializing ecologies of intervention, the experiential future emerged as multiple and decidedly undecided while avoiding the collapse of stakeholder voices, which can often happen in the pursuit of a shared vision for the future. The future instantiations were a plurality of perspectives, worldviews, and plausible radically distant futures that elicited emotions, insights, and implications from the audience.

Finally, a large number of student participants –even those materializing artifacts from the collapse archetypal scenario– reported the fun they had throughout the process of materializing radically distant time horizons. Here, it should be noted that a method that allows an element of playfulness to co-exist with unravelling wicked problems supports richer and more imaginative explorations of potential ecologies of intervention. Methods and mechanisms that sustain enquiry become critically important over the long time horizons necessary to transition systems.

Conclusion

From moment to moment, no one can say with certainty what will happen. The future cannot be known and can only be anticipated and imagined. Further, the complexity of the world aggravates the challenge of anticipating the future. And yet, the need to understand the needs of future generations and consider the implications of our actions now on the not-yet-now is greater than ever. This constitutes a crisis of imagination and societal transformation as well as a tension that is difficult to resolve: if the future is unknowable, how can we possibly be definitive and purposeful stewards for future generations?

Speculative design and experiential futures provide methods and tools to unlock imaginaries constrained by this seeming paradox. The TD framework and methodology draws on transdisciplinary theories and methods to address wicked problems and transition away from undesirable historical and current trajectories into preferred futures. Once the historical antecedents and systemic mapping of the wicked problem have been done and long-term visions and ecologies of intervention have been co-constructed along with an articulation of stakeholder hopes and fears, we as researchers and changemakers are left with the following question: what now?

This paper has ultimately sought to address that question through the lens of the wicked problem of fast fashion and leveraging design futures' capacity to worldbuild and worldmake, and high-fidelity design fictions and experiential futures as methods to translate and domesticate ecologies of intervention and aspirational long-term visions into materialized artifacts and instantiated encounters with the future to trigger insights and catalyze action in industry and social innovation spaces.

Finally, intervening in complex, wicked systems problems is unpredictable but critically important to the future of humanity. Through instantiating and experiencing possible futures, we can contribute to the transition towards preferred futures.

References

Boehnert, J. (2018). *Design, ecology, politics: Towards the Ecocene*. Bloomsbury Academic.

Boulding, E. (2006). *Building a global civic culture: Education for an interdependent world*. Syracuse University Press.

Brand, S. (1999). *The clock of the long now: Time and responsibility*. Basic Books.

Campbell, J. (2008). The Hero With a Thousand Faces. New World Library (2nd ed).

Candy, S. (2010). The Future's of Everyday Life: Politics and the Design of Experiential Futures.[Doctoral dissertation, University of Hawai'i at Manoa]. ResearchGate.

Candy, S., & Dunagan, J. (2017). Designing an experiential scenario: *The People Who Vanished*. *Futures*, *86*, 136-153. https://doi.org/10.1016/j.futures.2016.05.006.

Candy, S. & Potter, C. (Eds.). (2019). *Design and futures: Vol. I*. Tamkang University Press.

Chapman, J. (2015). *Emotionally durable design: Objects, experiences and empathy* (2nd ed.). Routledge, Taylor & Francis Group.

Chapman, J. (2021). *Meaningful stuff: Design that lasts*. The MIT Press.

Charmaz, K. (2006). *Constructing grounded theory*. Sage Publications.

Cline, E. L. (2019). *The conscious closet: The revolutionary guide to looking good while doing good*. Plume.

Dator, J.; Sweeney, J.; Yee, A. & Rosa, A. (2013). Communicating power: Technological innovation and social change in the past, present, and futures. *Journal of Futures Studies*, *17*(4), 117-134. http://www.futures.hawaii.edu/publications/futures-theories-methods/DatorTISJFSRpt.pdf

Ellen MacArthur Foundation. (2017). *A new textiles economy: Redesigning fashion's future*. https://emf.thirdlight.com/link/2axvc7eob8zx-za4ule/@/preview/1?o

Escobar, A. (2018). *Designs for the pluriverse: Radical interdependence, autonomy, and the making of worlds*. Duke University Press.

Fergnani, A. (2020, June 26). 4 archetypes, Shell, 2x2: Three scenario planning methods explained and compared. *Predict*. https://medium.com/predict/4-archetypes-shell-2x2-three-scenario-planning-methods-explained-and-compared-d2e41c474a37

Fibershed. (n.d.). *Fibershed – We develop regional fiber systems that build soil*. Retrieved November 4, 2021, from https://fibershed.org/

Fletcher, K. (2016). *Craft of use: Post-growth fashion* (1st ed.). Routledge. https://doi.org/10.4324/9781315647371

Fletcher, K. & Tham, M. (2019). *Earth logic fashion action research plan*. The JJ Charitable Trust.

Fletcher, K.; Grose, L.; Rissanen, T. & Tham, M. (2020). *Union of concerned researchers in fashion – Concerned researchers; Manifesto*. https://concernedresearchers.org/manifesto/

Fry, T. (2009). *Design futuring: Sustainability, ethics, and new practice* (English ed.). Berg.

Harrison, R.; Desilvey, C.; Holtorf, C.; Macdonald, S.; Nadia Bartolini; Breithoff, E., Fredheim, H.; Lyons, A.; May, S.; Morgan, J. & Penrose, S. (2020). *Heritage futures: Comparative approaches to natural and cultural heritage practices*. UCL Press.

Hines, A. & Bishop, P. (2006). *Thinking about the future: Guidelines for strategic foresight*. Social Technologies.

Hodgson, A. (2013). Towards an ontology of the present moment. *On the Horizon*, *21*(1), 24-38. https://doi.org/10.1108/10748121311297049

Holroyd, A. T. (2020). *Fashion fictions*. Retrieved February 2, 2021, from https://amytwiggerholroyd.com/Fashion-Fictions

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

Kaysen, R. (2021, October 22). Inside the world of buy nothing, where dryer lint is a hot commodity. *The New York Times*. https://www.nytimes.com/2021/10/22/realestate/buy-nothing-facebook-group.html

Lanfranchi, M. & Cline, E. L. (2021). *Cotton: A case study in misinformation*. Transformers Foundation. https://www.transformersfoundation.org/cotton-report-2021

Lee, S.; Parthasarathi, T. & Kable, J. W. (2021). The ventral and dorsal default mode networks Are dissociably modulated by the vividness and valence of imagined events. *The Journal of Neuroscience*, *41*(24), 5243-5250. https://doi.org/10.1523/JNEUROSCI.1273-20.2021

Loew, P. (2014). *Seventh generation earth ethics: Native voices of Wisconsin*. Wisconsin Historical Society Press.

McDonough, W. & Braungart, M. (2002). *Cradle to cradle: Remaking the way we make things* (1st ed.). North Point Press.

Mead, M. & Textor, R. B. (2005). *The world ahead: An anthropologist anticipates the future*. Berghahn Books.

Miller, R. (Ed.). (2018). *Transforming the future: Anticipation in the 21st century*. Routledge Taylor & Francis Group

Morgan, A. (Director) (2015). *The true cost* [Film]. Life is My Movie Entertainment Bullfrog Films. https://truecostmovie.com/learn-more/environmental-impact

Pacific Northwest Fibershed. (n.d.). *Pacific Northwest Fibershed Producer Stories*. Retrieved November 4, 2021, from http://www.pacific-northwest-fibershed.com/producer-stories

Plumwood, V. (2008). Shadow places and the politics of dwelling. *Australian Humanities Review*, *44*. http://press-files.anu.edu.au/downloads/press/p38451/pdf/eco02.pdf

Possible Future. (2019, September 20). The future of the fashion industry: Our design fiction series. *Medium*. https://medium.com/possiblefuturefr/the-future-of-the-fashion-industry-our-design-fiction-series-2c9ea11ce191

Schultz, W. (1995). *Futures fluency: Explorations in leadership, vision, and creativity* [Doctoral dissertation, University of Hawai'i at Manoa]. Academia.

Sharething Inc. (2021). *Buy nothing project*. http://buynothingproject.org

Steffen, W.; Richardson, K.; Rockström, J.; Cornell, S. E.; Fetzer, I.; Bennett, E. M.; Biggs, R.; Carpenter, S. R.; de Vries, W.; de Wit, C. A.; Folke, C.; Gerten, D.; Heinke, J.; Mace, G. M.; Persson, L. M.; Ramanathan, V.; Reyers, B. & Sörlin, S. (2015). Planetary boundaries: Guiding human development on a changing planet. *Science*, *347*(6223), 1259855. https://doi.org/10.1126/science.1259855

Stockholm Resilience Center. (n.d.). *The nine planetary boundaries*. Retrieved October 25, 2021, from https://www.stockholmresilience.org/research/planetary-boundaries/the-nine-planetary-boundaries.html

Strauss, A. L. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. Sage Publications.

Thomas, D. (2019). Fashionopolis: The price of fast fashion—And the future of clothes. Head of Zeus.
University of Pennsylvania. (2021, May 18). What happens in the brain when we imagine the future? *ScienceDaily*. www.sciencedaily.com/releases/2021/05/210518205451.htm
Willis, A.-M. (2006). Ontological designing. *Design Philosophy Papers*, *4*(2), 69-92. https://doi.org/10.2752/144871306X13966268131514
Wright, M. (1997). *Playwriting-in-process: Thinking and working theatrically*. Heinemann.

Appendix

The Thousand Year Closet: Design Brief From the Future

Overview
The purpose of this project is to bring to life a radically distant future in an industry synonymous with short-term thinking: fashion. Fast fashion has exacted a devastating toll on the planet –both ecologically and socially. Thus, the following questions have to be asked: What will the future of fashion look like? How do we take such a wicked problem and materialize futures to challenge, disturb, and delight others?
The Thousand Year Closet is a durational and iteratively devised experiential future to cultivate a high-fidelity repository for imagining and reimagining ecologies of intervention. Through positioning designed objects as impetus for material and non-material interventions within this regenerative and durational prototype, groups will design, create, and act with the objects and narratives from the future, thus collapsing the experiential "gulf" that exists between the future and the present.

Objectives
- Move rapidly down the Experiential Futures Ladder where the Setting, Scenario, and Situation have been pre-defined, and bring the future to life with artefacts from the future.
- Stretch futures thinking to an extreme and (almost) unimaginable time horizon to challenge students in both their design practice and how they bring methods from Futures I to assist them.
- Have fun –the upside to materializing radically long time horizons is it invites a certain existential playfulness!

About the Future
In this project, you will be prompted to challenge your assumptions and biases about the future by exploring how tempocentrism, to be overly centered in one's own time, has shaped your perceptions about the future. This will be achieved by exploring and materi-

alizing radically distant time horizons through the durational frame tale prototype of the Thousand Year Closet.

About the Closet

The Thousand Year Closet is a durational prototype, conceived of as a pre-constructed "Situation" in experiential futures parlance. While many prototypes are intended for short term learning and iteration, the durational intentionality of the closet is to exist as an ongoing site of exploration and challenge the ever-changing cycles of fashion. The prototype also acts as a frame tale –a story in which many stories can exist and new stories can emerge over time.

About the Content

The design fictions included in this brief have been constructed using the Generic Archetypes (Dator) as well as the Experiential Futures Ladder (Candy). These narrative provocations map loosely to each of the generic scenarios at various stages in the history of the Thousand Year Closet to support groups to engage in higher fidelity stories from the future in order to inform and catalyze their own artifact construction.

Process

Working in teams, students will review the Thousand Year Closet design fictions, explore radically long time horizons iteratively, and bring to life artefacts from this very long-term future. Teams are asked to document their process and share back.

1. Review design brief
2. Using the Thousand Year Closet as your "Situation," ideate around artifacts for that future. Consider the methods you have learned in Futures I, and use one or more to deepen into the future space you have chosen. Examples of helpful methods are: STEEP analysis, Hopes & Fears, Layers of change, Three horizons, Three generation personas, CLA, Critiquing future visions, and Dator's alternative futures, among others.
3. Choose one artifact or experience from the future to materialize.
4. Share in class in a manner that allows others to interact with it without commentary.
5. Present in class.
6. Summarize and reflect on the project presentation. Include images with a brief description and rationale for the scenario and reflect on the process by answering what you did well? What did you question? And what would you do differently? (500 words) Submit to Canvas.

The Experiential Ladder

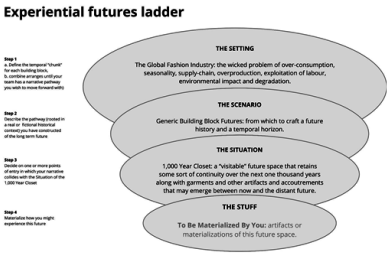

Figure A. Experiential Ladder Setting with the Thousand Year Closet.

Generic Fashion Futures Scenarios

These future fashion scenarios are derived from driving forces and Dator's generic futures in order to construct low-fidelity, high-level scenarios that can be used as building blocks to construct radically long distant futures.

Growth

In a fashion future where: population and demand for fashion is increasing at a steady pace; energy needs globally are sufficient to meet consumption, more particularly in relation to the fashion industry; economics and profit drive the fashion industry focus with the environment as a concern; culture is ever shifting, changing, and constantly evolving, driving rapid shifts in trends and inspiration is drawn from any and everywhere; technology is an area of increasing influence addressing eco-modern solutions for the design, manufacturing, and distribution of clothing; Corporations oversee the overwhelming share of these activities.

Collapse

In a fashion future where:
The population has plummeted and overall demand, typically fueled by a growing population, is no longer needed. Energy consumption is also declining, driven in part by less availability, causing disruptions throughout the fashion value chain. The economic activity of fashion is focused more on survival and functionality than on "frivolous" desires. Ecosystems throughout the world are overwhelmed and often unable to sustain the life forces traditionally nourished within them. Both culture and technology are stable if not stagnant. Culture does not excite as much as it once did as it acts almost exclusively as transactional, surface escapism. Technology is present, but not transformational. Local

structures of governance must be negotiated with as large, central infrastructure (corporate or federal) are unable to manage the constantly evolving situation on the ground from place to place. This results in regulatory environments that are either vacuums in which anything goes, or tightly constrained in order to maintain some sense of order.

Transform

In a fashion future where:
People, technology, and the environment are deeply entangled, in which clothing is seen as simply part of that entanglement in which body, tech, and the natural world are fluid. Life flourishes, but is synthetic and some wonder if it is even life any more. Energy consumption is not a concern for anyone, and the pursuit of economic success is viewed as silly, completely upending any monetary and transactional processes once in place. Culture evolves and shifts rapidly, able to keep pace and inform the values and worldviews of a global population that is evolving on a daily basis. Governance systems are no longer ambient, but rather emergent and at cause, addressing decision making issues in an anticipatory fashion before melting away again.

Discipline

In a fashion future where:
The population has been reduced gradually, in a controlled manner, through wider access to education and maternal health, leading to dramatic reductions in clothing production and a renewed focus on recycling fashion materials. Limited energy availability creates constraints and the economic activity that consumes the bulk of the energy are tightly regulated, limiting manufacturing and transportation availability in the supply chain. Culture is focused on the utilitarian and the functional. Technology is tightly regulated by a controlling government system that is widely seen as necessary.

Criteria for Experiential Futures

Experiential futures can be challenging to assess qualitatively. This criteria scorecard below provides insights into what to look for in a successful futures experience as well as what to consider during the design of an experiential encounter. This list is not exhaustive but provides a critical base from which to work and consider the narrative(s) in encounters with the future.

Arc	Criteria	Description	Questions to Ask
Beginnings	Permission	Permission is the emotional response that kicks in as soon as the experience is engaged with. It is the "signal" that guides how we should respond. In film, an action movie will begin with a high paced and suspenseful scene; a horror movie starts at night with ominous music. All of these initial interactions give us as an audience "permission" to engage a certain way.	What did this experiential future give me permission to think/feel? Did it give me permission at all? Or was I left to intuit how I should react?
	Immediacy	Similar to permission, this considers how quickly a participant is able to engage and immerse themselves within the experience.	How quickly did I "get it"? Did it make sense right away? Did it need to be figured out? How frictionless was the process of figuring out the experience with the future? Was friction deliberately designed into the experience?
	Medium/ Message	Crafting a compelling experiential future cannot be accomplished without the harmonization of the medium and the message. Sending an email from the future, a future in which it is explicitly stated that email no longer exists as a communication method, creates dissonance in terms of user experience.	Does the channel or medium in which the future is conveyed make sense? Is it consistent and aligned with the message? Does the medium and message support each other? Does the message work with the medium, perhaps in a clever way due to technology constraints, or does it work against?
Middles	Internal Consistency	Telling a speculative story (in fact, telling any story) requires internal consistencies of the world. It requires rules. Consider a movie almost everyone has seen—Avengers Endgame. Imagine for a moment, in the penultimate final fight scene, when it looks like all is lost, suddenly Superman and Wonder Woman appear out of nowhere and beat Thanos up, saving the day. As an audience, you would feel cheated. DC Comic characters were not part of this world!	How consistent are the rules of the world? Does the experiential future "cheat" at all? Are there any plot or character "gaps" that are unexplained that need to be?
	Sensory Vectors	Experiencing anything draws on the senses. Multi-sensory experiences can be rich and layered. We rely on sight at the expense of other senses too often.	How sophisticated and deliberate have the senses been considered in crafting the experiential future? Does it privilege, balance, or create rich tensions between taste, touch, smell, or hear as well as see? How many

			senses does the experience engage with? How impactful? Does the intersect of sensory stimuli enrich the experience?
	Semiotic Vectors	Experiential futures will necessarily draw on sign processes, the ways in which meaning is interpreted beyond the sign itself. This can be both visual and linguistic. Encounters with the future can often be most impactful when semiotic systems familiar in the present are disrupted somehow in the future.	How intentional and impactful has the semiotic system been designed? What are the signs, the meanings associated with those signs, and the coding of meaning? How has the experiential future used semiotic systems in the future to disrupt the present?
	Keying on Change	Experiencing the future is in some respects different from experiencing the present. Futures thinking is really about change … how the future is different from the present as a result of change. Change must be evident and manifests in the experience. We must know we are experiencing the future, rather than just the present or an "alternative present."	Is there a marked and obvious difference between the present and the future, even if it is subtle or reveals itself slowly over time?
	Scenario Distinctiveness	While not always necessary, an experiential future can evoke a clear scenario archetype.	Does the experience evoke a clear, archetypal scenario? The stuff of a specific future formation? Is the experience a hybrid of discipline, collapse, and transform and, if so, does it "work" or is it trying to do "too much"?
Ends	Implications	Not only is the change manifest, but so are the implications of the change or changes. The implications are a) anticipated and obvious at first glance or b) unique and surprising—a "twist" in the plot.	Does the experiential future materialize the implications of one or more change(s)? Does it surface implications in the minds of the audience?
	Audience Reception	Experiential futures can be designed to convey a clear message to an audience. Other experiential futures are more abstract, drawing on a more ambiguous and interpretive provocation. Both spectrums can be impactful. What is critical is that the designers of the experiential future take audience reception into consideration, and be deliberate in their intentions. If the designers wish to convey a specific message, then that message should be clear to the audience.	Engage with others on their experience. Was it quite similar or very different? How wide-ranging was the interpretation of the experience? Was it "clear" to some, but "confusing" to others?

	Action	Closing the "experiential gulf" between the future and the present is ultimately meant to trigger some sort of action in the present. Insights gained and implications drawn compel a certain degree of recalibration in the present.	Does the experience compel any sort of new knowledge (epistemic or ontological) that compels action in the present? Were there any "ah ha" moments? Or did the experiential future fall into the space of passive consumption of entertainment: i.e., the "that's neat—what's for dinner" category?

Provocations: Design Fictions for the 1,000 Year Closet

The following design fiction artifacts have been constructed drawing on each of the generic scenario building blocks through a heuristic series of narrative pathways. The resulting narratives are meant to allow workshop participants and interested parties to experience a facet of a distant, possible future. These encounters with possible futures at a fidelity higher than the average scenario allows participants to engage more deeply with a specific future and to aid in the process of materializing these vividly drawn futures.

Discipline

The Ship of Theseus Sweater. N gently rubbed their thumb over the almost imperceptible nub along the back of the neckline where, 100s of years ago, the sweater label had simply disintegrated off. This would have been at a time before brands had blockchain built into the threaded materials and before regrowth technology could be applied to stuff like labels and the programming of mycelium textiles to grow into letters and numbers as well as shapes and colors. N still marveled over how microscopic mushrooms could tell the difference between a medium and large pencil skirt!

The label once would have borne the bold label SoT along with a simple, elegant ancient looking boat. Ship of Theseus was the name. One of the first truly sustainable clothing brands, launched just over 1000 years ago, in 02025, and still in conservator operations today –the brand had long ago stopped making any more clothes. They simply maintained the garments they had created long ago, and had more than just a cult status. To have a SoT garment in your closet was a status symbol, to the extent status symbols still existed, but it meant so much more. A SoT garment was a living memory and proof that the past had made the future. And a good one at that –both the garment and the future!

The brand had been inspired by the 3,000-year-old thought experiment first mentioned by Heraclitus in 401, later by Plato, and then more formally documented by Plutarch, in which the Ship of Theseus, an old and preserved ship, returns to Athens from Crete. Over time, each piece of the boat is replaced: an oar here, a plank there, until none of the original pieces of the ship remain. So, the question is asked: if the original ship no longer

exists, is it the same ship or is it a new or different ship? The thought experiment had been considered any number of ways, including versions where the pieces of the old discarded ship are gathered up and made into a second ship.
SoT had taken this concept and applied it to high end garments, meant to last, well, forever. Using an intricate and proprietary weaving of fabrics (called, in homage to the Ship of Theseus, fabric "planks") garments could be preserved, grown bigger, shrunken down, change colors and also allow for shifting preferences in style (longer sweaters vs. short sweaters for example). Each micropanel had embedded indicators.
It was this, the embedded indicators, that allowed SoT to maintain some order over the garments and to keep track as to how many garments were still in operation, and what percentage of the garments were original, second, third, fourth generation and beyond.
N's sweater had been marvelously well preserved for at least the last 15 generations. N had started wearing it regularly, constantly even, a few years back. It was their favorite sweater. So, when a little tear appeared along the front, N had simply grabbed a growth repair kit, left it overnight, and in the morning the old micro-panel was shriveled up on the ground and the new one had taken its place. N had no idea that this shriveled up panel had been the last original piece of the garment … It had been 1000 years!
And now they held a pretty cool, formal, old-school document in their hand. A letter of all things! And in it was a certificate from SoT. At the top was the ship N imagined had once been attached to their favorite sweater. It was a certificate of renewal:
We would like to congratulate you on the formal renewal of your SoT sweater. Please accept our regards, and this certificate, which you are welcome to hang somewhere in your closet or personal living space, that your sweater is now 100% replaced as of September 22nd, 03026. As to the question of whether this is the same sweater we made 1000 years ago, or if it is now a different sweater –well, that might take another thousand years to figure out!
Sincerely,
SoT

Wrapping You in Spatio-Temporal Continuity for One Thousand Years. Along with the letter and certificate, N noticed they had included a brand new label! Gently, they removed the adhesive strip at the back of the label, not actually adhesive but rather it activated the living fibrous connectors, and applied it gently to the neck of the sweater, over where that nub had been. The sweater and the new label slowly bonded together. N watched the sweater with delight. They decided in that moment that, yes, now this was a new sweater.

Collapse

Dà zhìdù lùn. It was now impossible to tell whether the dress had originally been fitted for a female or male body. During the 2100s, dresses in particular became immensely popular with just about everyone.
The Dà zhìdù lùn brand was never really a brand at all. It was a place-based movement, a revolution in a way, that started nowhere in particular. Most economics anthropolo-

gists agree a primary driver of this was the ongoing famines, the lack of available food, driven by climate change, environmental degradation, and the disastrous policies of governments in what was referred to as "the developing world" to prioritize agriculture for industry rather than for food.

"Food not Fashion" became a sort of rally cry to many. Laborers, long overexploited, put up little resistance to the dismantling of their livelihoods –they couldn't afford food for their families anyway, and were starving, so why bother?

It appeared to emerge spontaneously. Perhaps it started in 02092, when a group from the Bangladeshi AVRPAC (Augmented Virtual Reality Performance Artist Collective) created a series of experiences taking immersive footage from North American waste management facilities where mass amounts of clothes were being incinerated, and documented the journey of the clothes from the wastelands of cotton and fiber fields to where dyes ran like toxic blood through streams and rivers that were bloated and dead like the hard, scarred veins of junkies. Then, it went through the burnt-out wreckage of manufacturing plants where women and children, malnourished from lack of food, worked even as the world collapsed down upon them. And then, it went back to the burning clothes. All of this juxtaposed with images of war, internment and concentration camps –bodies through history that were piled high.

What became clear to so many so quickly was the consumption and desecration of their land. Many in the developing world began to see the manufacturing of goods as an extension of themselves. When clothes burned, bodies burned. When precious metals were extracted, it was like an organ in the body being removed without consent, gifted to others while the original host body withered and died.

"You drape yourselves in the dried corpses of our lands. You have sucked nature from its home so that you may look good for a fleeting moment in time."

Mass uprisings demanded justice for the depletion and the destruction of nature simply so that an affluent few could look good.

"The corpses of our spirits belong to us!"

Demands and international legal treatise went out, demanding the "repatriation" of the ancestors of many countries.

From these repatriation efforts, the Dà zhìdù lùn movement was born. The movement was inspired by a Buddhist tale from the fourth century, in which a man spends the night alone in a house while on a trip. A demon brings a corpse into the house. Another demon appears, and they argue over the corpse. The man unfortunately becomes involved in the argument. One of the demon's rips off his arm and replaces it with that of the corpse. Then more body parts are ripped off and replaced. Until eventually the man's whole body is replaced, and he watches as the demons fly off with his body, which is no longer his body. He is left to wonder if he is himself still or someone else.

Designers and clothing manufacturers in the developing world took this story to heart, relying purely on old clothes, the skins of the dead, to craft and recraft new garments.

"Who are we?"

"The lost souls of capitalism!"

"What do we want?"

"Our corpses back!"

The dress was, according to the records in the closet, from Cambodia. There was also a scarf from Vietnam, and a t-shirt from India. The clothes had unique characteristics that were meant to reimagine them as being "home" in some way. It was a rebirth of corpses.
While in developing countries, this trend was initially dismissed as poorly made "Frankenstein" clothes, over time there was a surge of interest in what could be produced locally. Local artisan manufactures produced stunning, high-quality garments. As the clothes aged over decades and centuries, and the glut of old fashion clothing diminished and then disappeared altogether, small local fiber makers appeared.
In the Western World as well, this movement took off as there really was no choice. Several efforts at the mass production of synthetics had fallen apart, after local environmental degradation became evident to all. In 2321, Pittsburgh was abandoned all together and residents relocated en masse as the groundwater made living there toxic.
However, food still competes with fashion. With most agriculture produced within the safety of domes, hard decisions have to be made about priorities. With the sharp decline of the human population, down to about 3.8 billion in 03019, the need for mass production of garments is limited. In many of the large, abandoned cities, companies sprung up to harvest anything worth repurposing.
"After Us!" has become the latest rally cry, in which a loose collection of grassroots organizations are planning the ultimate demise of humanity, and looking to design a generative world after humans. Others look to revitalize dwindling communities.
As for the dress, whether it had been intended for a male or female was now entirely irrelevant. While it resided in this closet, it was safe and secure. But perhaps time was running out. Its future would be to return to an earth more plastic than soil to slowly decompose along with whatever traces of humanity remained.

Transformation

Caster Culture. The four silver bracelets, and the matching silver necklace, a fashion caster from 02056, was so old-school and antiquated it put a smile on anyone's face who saw it. Although unable to upload new fashion over the last 200 years, it still worked! Sometimes, the casting got a bit hazy and maybe a little see-through, but the overall shape and cut of the projected outfit still held pretty firm.
In the 02030s, drought and famine triggered a need for radical shifts in fashion and clothing. Perhaps the silliest was "Google Modesty." With the rise of sustainable cities in deserts in the United States and Africa, several of these cities attempted to outlaw clothes altogether. The moral and environmental costs were simply too great. Instead, a proposal for total nudity was put forth, along with Google glasses or contacts that would project clothing onto all inhabitants. Trying to enforce eyewear on a citizenry proved impossible and new options were considered.
The fashion caster became a viable alternative. First tested in these same desert cities because there was not the same need to keep the human body warm, it basically projected a high-resolution hologram around an individual's body, making it appear as if they were dressed. In order to maintain the integrity and consistency of the fashion casting, a ring

around each ankle and wrist, and a necklace around the throat, was worn. Later versions would do away with this, as people found it a bit cumbersome (how soon they forgot how once they had to wear clothes that actually covered their whole body!).
Because of the adoption and usage in the desert, the first major innovation in fashion casters was UV protection. In the late 02100's, the first temperature-controlled casters were introduced. At first, there was a narrow ability to influence temperature, so the caster worked only in early Fall and late Spring. Winter still required some type of covering, or simply stay indoors. By the mid 02200's, casters that could withstand fairly harsh conditions was introduced.
Customization also emerged as an important feature in fashion casters. Individuals and groups would design their own outfits. Designer houses attempted to enforce copyright protections on everything from proprietary stitching to material manifestations (special types of fabrics). Highly customized outfits became popular, prompting "coding circles," a technological version of knitting circles, to emerge.
Eventually, even the perpetual glossiness of casters' clothing images fell out of fashion, prompting decay algorithms to emerge in the outfits, so that they would appear to age over time. It was called "character casters" and was a trend that became popular in the 02500's.
Bespoke casting became multi-generational, passed down, sometimes fought over in the court of law. Some people scratched their heads –how could a three-year legal battle ensue over ownership rights of someone's great grandmother's sweater? Was it not just an image? It was not really the same sweater, downloaded into a new caster, was it?
Of course, there were those who experimented and molded their casters. The use of casters by women whose religion compelled them to cover their heads or faces made it publicly unpopular to make facial covering mods at first. It was seen as religiously insensitive. But over time values shifted, and some people enjoyed casting images of animals, or aliens, or fantastical creatures like orcs or fairies, over their own faces. In many respects, this was how the virtual or the physical world melded together –not through any elaborate nano technology, but rather through the ability to match the virtual representation of self with the physical, real-world representation of self. What started more generically as an attempt to mitigate the environmental and social degradation wrought by the fashion industry ended up as a catch-all device for forming and morphing identity.
More recently, of course, casters have been replaced by nano-telepathic life systems. Nano bot swarms can interpret human thinking and desires and differentiate between daydreaming and actual covering preferences, fluidly taking on whichever clothing preferences manifest in the minds of humans. Fashion is no longer patterns of consumption but rather riding the waves of a fabricated reality.

Continuation

Forage Fashion. Above their heads, the thick concrete slabs of the overpass muffled the impatient, slowly moving afternoon traffic jam that inevitably formed. Beneath the overpass, it felt like a different world. Heavy shadows filled the space and made the soft, briny earth not so much blacked out as a pattern of confusing shades and subtle shifts in light.

This made it hard to make out much of anything, let alone the dark, soft mushrooms they sought out. Even the little lights they carried didn't help much.
The Hundred Mile forage club, if nothing else, was a persistent group! With fast fashion and overconsumption continuing at pace, and the environment an afterthought, they, along with many other groups locally and globally, had come up with their own means to offset the devastation wrought. Increasingly, clubs like the forage club were popping up, and started by asking: what is around us? The answer was found not just in the thrift shops and by encouraging folks to dig stuff out of attics that would just rot eventually but also in local ecosystems and where fibers could be extracted in a sustainable way.
Several mushrooms proved to be a malleable material for clothing repair and renewal. The mycelium threads contain an eco-memory that binds worn material with embroidery-like strokes. Additionally, certain plants could be turned into a sort of light, fluffy, and airy wool that was becoming popular in knitting circles.
What was important was the sensitivity to location, which was an emerging awareness that what was needed most was often nearby. A shirt with its original materials sourced from around the world of petroleum-based fibers was, on closer inspection, really a very decadent and unnecessary item that remains intact for centuries, yet buried below the surface it leaches toxins when suffocated under rubbish and overgrowth. Most cities around the world had everything they needed!
Many foraging clubs worked as collectives engaging human-mycelium collaborative design, creating bespoke regenerative mended styles from foraged garments and biomaterials. For this group, the task at hand was mending several centuries-old garments that were laid out carefully, at this very moment, on the mending table of the closet the foragers had maintained for generations. They were laid out expectantly like sick patients waiting for organ transplants.
"Over here!" one of the members called out, unable to suppress their excitement. The others gathered round and in the dim light, took in the massive cluster of mushrooms. It was an excellent haul! Above them, as if to punctuate the excitement, a horn blared. In that moment, all the members of the forager club could imagine what was happening above them. Someone in their car, going nowhere, was honking their horn for no other reason than to vent their frustration at the lack of forward movement –the act of going nowhere. It was impossible for the group not to feel a little bit smug as they carefully harvested the mycelium threads and mushrooms and chatted quietly about what to do next.

Resumen: Diseñar para las transiciones hacia un mundo deseable, sostenible y socialmente justo requiere prácticas de diseño que consideren futuros a largo plazo que se extiendan a través de marcos escalares desde los individuos hasta la administración planetaria. El marco de Diseño para la Transición aplicado (TD) es valioso para comprender la red de interconexión de problemas antes de formar intervenciones anidadas y complementarias. Si bien TD ha demostrado ser una fuente valiosa y rica para diseñar innovación de sis-

temas, su relativa novedad significa que aún no se ha aplicado a una serie de industrias durante el requisito de duración a más largo plazo para cambios profundos en los sistemas. Aplicamos ecologías regenerativas de intervenciones que se centran en un horizonte extendido más allá de los límites temporales tradicionales de un ciclo de desarrollo de productos de diseño de moda y reflexionamos sobre cómo las posturas a largo plazo en una industria profundamente enredada en problemas perversos pueden empoderar a los actores para actuar en el presente.
A través de una tarea de clase, se presentó a los estudiantes un resumen de diseño, "El armario de los mil años", que proporciona arquetipos genéricos para imaginar futuros variables y de largo plazo, que van desde lo deseable hasta lo indeseable. Usando métodos de codificación etnográfica de las presentaciones y reflexiones de los estudiantes, los datos muestran que a través de la materialización de ecologías radicales de intervenciones en el futuro, los estudiantes, incluso en grupos con escenarios indeseables, experimentaron una sensación de alegría en el proceso de materializar futuros radicalmente distantes. Otros grupos emplearon Esperanzas y Temores en el futuro en respuesta a sus ecologías emergentes de intervenciones, proporcionando un terreno fértil para trazar líneas especulativas de alineación y desacuerdo entre los grupos de partes interesadas actuales y futuros. Estos hallazgos enfatizan la necesidad de diversión y empatía hacia el futuro hacia ecologías de intervención a largo plazo.
Esto sugiere que crear el espacio en un programa de desarrollo de productos para incluir oportunidades para la construcción de la alegría y la empatía, que se basan en la investigación, proporciona ecologías de intervención imaginativas más ricas y empáticas que pueden contribuir a la transición hacia un futuro de moda sostenible.

Palabras clave: Futuros - Moda rápida - Futuros experienciales - Diseño de transición - Prototipo - Ficción de moda - Ecologías de intervenciones

Resumo: Projetar para transições em direção a um mundo desejável, sustentável e socialmente justo requer práticas de design que considerem futuros de longo prazo que se estendem por estruturas escalares de indivíduos a administração planetária. A estrutura do projeto de transição aplicada (TD) é valiosa para entender a rede da interconexão de problemas antes de formar intervenções aninhadas e complementares. Embora o TD tenha provado ser uma fonte valiosa e rica para o projeto de inovação de sistemas, sua relativa novidade significa que ainda não foi aplicado a uma série de setores durante o requisito de duração de longo prazo para mudanças profundas nos sistemas. Aplicamos ecologias regenerativas de intervenções que se concentram em um horizonte estendido além dos limites temporais tradicionais de um ciclo de desenvolvimento de produto de design de moda e refletimos sobre como as posturas de longo prazo em uma indústria profundamente enredada em problemas perversos podem capacitar os atores a agir no presente.
Por meio de uma tarefa de classe, um brief de design, "The Thousand Year Closet", foi apresentado aos alunos fornecendo arquétipos genéricos para imaginar futuros variáveis e de longo prazo, variando do desejável ao indesejável. Utilizando métodos de codificação etnográfica das submissões e reflexões dos alunos, os dados mostram que, por meio da materialização de ecologias radicais de intervenções no futuro, os alunos, mesmo em gru-

pos com cenários indesejáveis, experimentaram uma sensação de ludicidade no processo de materialização de futuros radicalmente distantes. . Outros grupos empregaram Hopes and Fears no futuro em resposta às suas emergentes ecologias de intervenções, proporcionando um terreno fértil para o mapeamento de linhas especulativas de alinhamento e desacordo entre os grupos de interessados atuais e futuros. Essas descobertas enfatizam a necessidade de alegria e empatia voltada para o futuro em relação a ecologias de intervenção de longo prazo.
Isso sugere que criar o espaço em um cronograma de desenvolvimento de produto para incluir aberturas para a ludicidade e a construção de empatia, que são baseadas na pesquisa, fornece ecologias imaginativas de intervenção mais ricas e empáticas que podem contribuir para a transição para um futuro de moda sustentável.

Palavras chave: Futuros - Fast fashion - Futuros experienciais - Projeto de transição - Protótipo - Ficção de moda - Ecologias de intervenções