



Design Fictioning of a Second-Order Kind: Runaway Cybernetics, Futures of Work, Possibilities of Engagement

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ABSTRACT

In this paper, I propose second-order design fictioning as a way of reframing the hegemonic fictions built around technology, work, and design. These forms of progress fictions are further amplified by uncritical developments in cybernetic technologies that have a complex and often problematic relationship to discourses around the politics of innovation and acceleration. Projects related to the speculation of post-work futures within a design studio and seminar are used as a heuristic to engage broader theoretical questions on the reductive ways in which the question of changes in technologies (human-machine relationships) are addressed in the context of the transition imagination towards alternative work futures. Within these projects, engaging frictions, i.e., questions concerning difference and sense-making in sites of disruption, are further problematized. To define the notion of a *second-order* in design fictioning, the paper draws on modes of engaging systemic complexity as theorised within recent discussions in *design cybernetics*, *critical cybernetics*, and Gregory Bateson's work on *meta-communicational frames*. Second-order design fictioning, as proposed here, delinks the better-known concept of design fiction—a methodological tool often used in the imagination of futures—from its preoccupation with objects, technology, and technocratically projected views of the future and innovation. It is hoped that second-order design fictioning would enable a better focus on the complex politics of the changing value frameworks (fictions) that drive these concepts.

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FRICTIONS

Crisis and disruption are never absent. However, the compound operational effect of the COVID pandemic presented scales and forms of disruption, both locally and globally, that were different from other crises in recent history. Crisis and disruption often lead to a questioning of established cultural narratives (fictions). A more technical term for such a moment of questioning is a moment of transition. Loorbach (2021) identifies that disruptions lead to transition processes when the ways in which the established regimes—i.e., dominant ways in which humanity collectively thinks, behaves, organises and structures institutions—are pushed out of equilibrium. The *transition imagination* deals with the tensions (frictions) emerging in such moments, where, on the one hand, there is a desire to return to established patterns and relations, but, on the other, there is also a desire to think of alternative possibilities. Amongst the many fictions disrupted during the pandemic were those established around work, especially those relating to technology and work.

Discussions on algorithmisation, digitalisation, automation, industry 4.0, and the changing nature of work have existed for some time. Nevertheless, COVID provoked the public to engage with the implications of these once theoretical, perhaps even distant, ideas within the contexts of their everyday present. The environmentality of technology—the feedback loops between the broader socio-political systems, technological systems and daily life that is often in the background—entered everyday consciousness as the connection to the office space, i.e., workplace, became reformulated as a connection to a computer or smartphone. The relation of these technological systems to environmental pollution and energy infrastructure was no longer only a subject for critical or scientific research but became more directly observable. The home became a workplace for some, and others became aware that their work was inseparable from a concrete context of operation. For some others, work disappeared entirely. It may seem like this disruption could provide a context to formulate a new consensus and new imaginaries around how technology could bring about new models of work. Nevertheless, a closer look at the frictions in the form of contradictions and paradoxes that emerged, which were articulated as forms of discomfort among those affected, suggests otherwise.

The Church of Work, a set of Tarot cards, invites the stakeholders who feel lost and weary amidst these disruptions to question tensions within their long-time relationship with the institution of work and visualise possibilities of reframing the notions of “progress” and “work”. *The Take Times*, a newspaper from the future, describes conflicts of the post-work future where three-day work weeks have become a norm. The abundance of free time enables one to question the very nature of our interactions with news, prompting the question: if we had more free time, would we engage with worldly events differently? *It's About Time* is a board game where time is exchanged at a time tribunal. The players experience other narratives of time existing simultaneously, which are currently overridden by capitalist time. *Vacation Images of the Everyday* uses postcards to invite people to consider how automation systems have influenced them to think of free time and vacation time within everyday practices. *Domestic Ecologies* is a “post-it play kit” that helps one reframe their relationship to household objects and the common-sense fictions built around them.

The projects mentioned above are a selection of what was produced within two semesters, i.e., from October 2020 to September 2021, in the context of a design

studio and a design seminar at Bauhaus University in Weimar. The participants engaged with the questions of post-work futures. In most projects, the speculations were prompted by the student participants' immediate post-COVID experiences and the contexts in which they resided. As such, the reflections and speculations around projects happened not only within the context of the university but also in the extended contexts of shared homes, apartments, and the city where the participants encountered other stakeholders. The concern of this paper is how these frictions can be incorporated within the context of the transition imagination and the projects that are underway reframing future challenges where citizens (workers) negotiate their everyday lives within the context of these processes. The question is posed in the broadest sense as a question of method that relates to possibilities of engagement. It was an attempt towards an extension of the critical capacities of those stakeholders who are engaged with these technologies yet operate with limited mental models of these systems.

Though not perfect or comprehensive, these projects became a heuristic to think through the possibilities of *design fictioning*. The fictioning they allude to is of a second-order kind and draws on the different understandings of 'second-order' as it appears in Gregory Bateson's work on *meta-communicational frames* as well as recent discussions in *design cybernetics* and *critical cybernetics*. While the complex relationship between fact and fiction is often misused within the current neoliberal design logic, can second-order design fictioning provide an alternative way of working beyond neoliberal common-sense fictions around technology, work, and progress? Is it possible to rethink the question of *differences*, i.e., fictions in friction, more expansively in contexts of disruption? How can fictioning of a second-order kind enable multiple stakeholders to make sense of the processes of transformation (i.e., second-order change which they are intrinsically part of) driven by accelerating cybernetic technologies while contributing to the invention of a future?

FICTIONS, FUTURES

Throughout this paper, the term *fiction* appears in relation to three meanings. In the first sense, the term fiction relates to the broader cultural narratives that influence common sense, categories of truth and norms that, in turn, influence ways of making sense of technological change. For example, contemporary fears and hopes around digitalisation and automation are bound to the growing power of cybernetic technologies, i.e., extended forms of algorithmic operations apparent in the design of various forms of organisational systems, knowledge systems, service systems. These technologies have an indivisible relationship to several problematic cultural fictions such as modernity, technology, growth, progress. The complex relationships between such cultural fictions with technology can contribute to the reinforcement of particular cultural fictions about the relationship between technology and work, that over time become hegemonic fictions that function to erase countless other possible fictions (Harari, 2019).

These cultural fictions also relate to cybernetics or how cybernetics as a field is addressed within discussions on technology, complexity, and systemic design. Posing the question from within the discipline of cybernetics, Krippendorff (2021) identifies these hegemonic fictions as part of the "social consequences of uncritical cybernetics" while Pangaro (2021) discerns them as part of another pandemic that plagues social systems, the "pandemic of AI". In the more extended context of philosophy and technology, theorists such as Yuk Hui argue for a different approach

to “technical knowledge,” i.e., ways of producing knowledge and engaging within these technical systems, which are better suited to address the complex assembled relations between socio-techno-environmental systems (Lovink, 2019). According to Hui, such a move is particularly pertinent in the context of digital technologies that are different to machines of the industrial age. The way in which the politics of these cybernetic systems contribute to particular forms of erasing difference, for example in the context of labour relations, has also been discussed by multiple authors, such as Eubanks (2019), whose empirical research elucidates how these systems actively negate the interests of the poor and the working class. Baker (2018) points out how these operations negate gender differences. Their work highlights the *de-futuring* agency these compound systems bring about. They actively *future* particular fictions aligned with the stories of modernity, progress, and capitalist models of economic growth by de-futuring others (Fry, 2020).

The second use of the term fiction relates to how design fiction is used methodologically to link the logic of produced designs (truths and values) to cultural fictions. The term appears often in design literature, particularly in speculative design, critical design, and future foresight practices and has always been a valuable method to engage the transition imagination. At present, to a greater or lesser degree, these methodological endeavours fail to acknowledge some of the drawbacks of these fictioning processes and their unwitting alliances to some problematic fictions based on modern ideas of progress, market ideas of growth and the design profession’s limited ideas about designers. As pointed out by Tonkinwise (2014), although design fictions promise to convert the relations around technology from matters of fact to a matter of concern for the public, “the public” or the “us” in these formulations is often problematic. In addition, most often diegetic prototypes¹ that are outcomes of design fictions often address differences and disruptions to create a new consensus around marketable technologies that appear as potential solutions. In other words, diegetic prototyping practices often pay insufficient consideration to the de-futuring causality at the centre of design decisions, where selecting a future, in turn, de-futures other possibilities (Fry, 2020).

The third meaning recognises the possibilities of second-order design fictioning (Perera, 2021b, Perera, 2021c).² The process of second-order fictioning has a lot to do with the understanding of the primacy of fictions (stories) within the operational processes of complex living systems when defined primarily via a communicational

1 A prototype that is often technological in nature set in a fictional world that enables one to see how it would act interact within the world. Diegetic prototypes create a suspension of the disbelief about the impossibility of certain technological systems.

2 This paper is an elaboration and extension of the idea of second-order design fiction initially presented during 2021 at the Relating Systems Thinking and Design Symposium and the conference of the International Society for the Systems Sciences (Perera, 2021b, 2021c). It should also be noted that the term second-order design fiction has also been proposed by design theorist Tony Fry and appears in his book *Writing design fiction: relocating a city in crisis* (Fry, 2022). Fry draws on the second-order cybernetic notion of “observation of observation” with reference to Heinz von Foerster and Niklas Luhmann. In my initial introduction of the term, I was unaware of the specifics of Fry’s formulation of the term, but I was aware of their work on ontological design and design defuturing that has partly informed the argument of this paper. Although both of our concepts share a significant commonality in terms of the problems they try to navigate, the respective methodological descriptions have their own distinct elements due to the difference in the situated contexts of practice. A published version of our first conversation around the concept conducted in August 2021 can be found under the title *Second-Order Design Fictions in End Times* (Perera & Fry, 2022). At present we are exploring the potential of second-order design fictioning in the context of a collective research project on technology, cosmology, politics, and contra practices.

and learning framework. Cybernetician Gregory Bateson (2002), who used such an approach, pointed out how living systems of *all kinds* share fictions (stories) and how fictions relate to “meta-patterns” within and across contexts of learning. Through forms of fiction, living systems share and extend the patterns acquired in particular contexts of learning (Bateson, 2002, pp. 12–14). Fictions in this definition are not only restricted to the human constructs of language or narrative per se. Instead, they allude to ways of engaging the more-than-human complexity of assembled psychological, social, environmental systems as they connect through patterns of action, learning, and communication. They enable a better way to understand the complex ways in which the aforementioned two types of fictions (that is, cultural fictions and design fictions) interact in complex ways.

OUTLINE

This article consists of two main sections. In the first section I theorise the design challenges related to a critical engagement with the changing relation between technology (cybernetic technologies), work, and fictions. In this section I also present a base definition to the ways in which I employ terms such as cybernetics, cyberneticisation, ontological design, the political, and the fictional. I also use this section to argue for a particular notion of “second-order” as defined through the work of Gregory Bateson. In the second section I present a practical exploration I conducted in parallel to my thinking, which took place in the context of a studio and seminar, and use this to reflect on the possibilities of second-order fictioning. I also use my observations to engage several recent discussions on cybernetics, criticality, and the possibilities of a redirective practice. These two parts do not have a linear relation with each other, but rather a reflexive one. As such the observations in the studio setting provide insights into very specific elements of the problematisation outlined in the first part. Vice-versa, the theoretical discussion in the first part is not an overarching theory that can be enfolded within the practice explorations. Both parts contribute towards explaining the central proposition made in this paper, that second-order design fictioning may provide a way to engage the broader questions related to transition imagination in the context of the changing relationships between technology and work—particularly in the context of the development of cybernetic technologies.

RUNAWAY CYBERNETICS AND THE TRANSITION IMAGINATION: CHANGING RELATIONS BETWEEN FICTIONS, CYBERNETIC TECHNOLOGIES, WORK

CYBERNETICS, CYBERNETICISATION

Hegemonic fictions around automation and digitalisation in the context of work that position these technologies as solutions to what are compound problems (i.e., psychological, biological, social, economic, political) have been the subject of critique by many scholars. A central aspect of this discussion revolves around the processes of cyberneticisation. Kousoulas & Perera (2021) refer to cyberneticisation alluding to how cybernetics has developed beyond both its first order (cybernetics of observed systems) and second-order (cybernetics of observing systems) iterations, influencing contemporary processes that extend beyond its original scope of machines and organisms to include a broader ecology of ideas and institutions.

Cybernetics emerged as a field during the 1940s, investigating the complex nature of circular causality in feedback processes as systems learn and adapt. It posited information feedback loops and communication as a way of engaging the complex relationships between different forms of living and non-living systems. The earlier forms of this discussion, identified historically as the *cybernetics of observed systems*, focused extensively on order and equilibrium in systems that could be observed from the outside such as thermometers and missiles. By the late 1970s these experiments had foregrounded the *cybernetics of observing systems* and shifted to look at how these circular processes operate in a more complex and reflexive manner across living systems that often operate in far from equilibrium conditions. These developments also indicate the shift from a first-order cybernetic interest in adaptation (adaptive behaviour) within a control circuit to its second-order interest where the questions of non-adaptation and emergence were prioritised. For example, second-order cybernetic reformulations have influenced the development of self-learning algorithms which are open to contingency, which modify and coevolve with broader semiotic processes of meaning-making across human and non-human systems. These developments have enabled technologies to become radically environmental. Cyberneticisation is marked by the radical environmental distribution of technological systems ranging “from sensorial to algorithmic environments, from bio- to nano- and geo technologies” (Hörl, 2017, p. 9).

The processes of cyberneticisation and the radical environmentality of technologies become particularly pertinent within transition imaginaries around technology and work where the technologies under consideration can no longer be imagined as an object in a factory environment, an intelligent device, or an automated service system but, in most instances, scales up toward planetary infrastructures. Choices can no longer be addressed as choices made by single agents (institution, actors) but as choices that get informed via extended technically contingent pathways (Bratton, 2019, pp. 38–39). The environmentality of these technologies presents different challenges to politics, engagement, and ethical choices.

ONTOLOGICAL COMPLEXITY, OR HOW SYSTEMS ONCE DESIGNED, KEEP DESIGNING BACK

Krippendorff (2021) attributes current problems related to hegemonic cybernetic technologies as emerging from a broader *social* history of “uncritical cybernetics” that rests on a misplaced belief in the universal applicability of mathematical conceptions of algorithms. Krippendorff’s critique addresses the many ways and levels of operation of such uncritical cybernetic practices. The multiple levels of cause and effect of these cybernetic systems that are highlighted by Krippendorff (2021) point towards their ontological complexity. On the one hand, cybernetic systems driven by self-learning algorithms predicated on market-driven values of progress and economic benefits amplify the problematic institutional and cultural fictions around their very use (positive feedback). An example is the use of algorithmic processes to automate bureaucratic processes (such as text systems or loan and banking systems), which work to achieve a low-cost artificial control of populations. Empirical research validates how these systems recursively repeat racial and gender biases (Baker, 2018; Eubanks, 2019). On the other hand, this increasing algorithmic power resets social norms and drives a convergence towards particular forms of technologically mediated consensus, that, in turn, systemically minimise human agency to deviate from these norms (a deviation reducing negative feedback). For example, improvements in self-learning algorithms

mean that tech industries are now able to exploit users' cognitive biases through algorithmic manipulation (Bria, 2015; Lyon, 2014). These processes that Krippendorff maps out within their argument speak to emerging new socio-techno-environmental relations and related feedback at multiple levels not reducible to changes only within just one of these systems.

Fry (2022) addresses how the effects of these technical systems have a compound effect regarding how they modify the primary "ontological design relation". Reframing the living relation between technical objects (technical individuals) and the extended social-environmental systems as a process of ongoing ontogenesis, Fry suggests how cybernetic systems, once designed, act in roles that actively and futurally structure psycho-social systems (Fry 2022, pp. 137–138). In other words, once designed, these technological systems futurally restructure the sense-making capabilities (or inabilities) of responding to differences at multiple levels and scales, modifying attention, memory, modes of imagining and enacting. Manifestations of these complex processes can never be clearly articulated within decision-making contexts. However, it influences the way stakeholders in transition contexts envision and respond to the changing nature of labour and work relationships.

To acknowledge the complexity of the ontological nature of the processes of cyberneticisation, or how these systems, once designed, redesign psychological, social, and environmental systems, require a different way of looking at capital and labour relationships. Marx's notion of fixed capital (or the idea of living labour and dead labour), theorised initially in relation to industrial machines, may not be sufficient to explore the complex displacement of fixed capital via digital machines. In the original theory, free time (that is exempt from labour time) is understood as both idle time and time for higher activity (Marx, 1967, as cited in Hui, 2017, pp. 26–28). The investment in fixed capital could reduce necessary labour time and increase both surplus values. Hui (2017) reminds us that fixed capital always takes on a double form. It is capital for capitalists (who then extract the surplus value) and tools for workers (tools that establish direct psychosomatic relations with and between workers and extend beyond the factory). The factory (which has now moved into smartphones, homes, and cities) characterises algorithmic governmentality that effectively modulates transindividual relations. For example the participants in the studio projects presented below discussed the absurd ways in which digitalisation in their work routines enabled them to enjoy more freedom, which they often used in trying to develop other forms of work or explore ways of self-optimisation that may enable them to find better work. Such an example reveals the complex double nature of these transindividual processes that are at once emancipatory and limiting.

ACCELERATIONIST POLITICS, DIFFERENCE, CO-DESIGNING FUTURES

This phenomenon that Krippendorff, Fry, and Hui critique takes on a more political form under the broader title of *accelerationism*. Accelerationism as politics impacts future imaginaries in specific ways. Both left-wing and right-wing variants of accelerationism amplify the problematic relationship between work, cybernetic technologies, and ideas of progress. Unlike a form of political critique motivated by techno-negation, the accelerationists engage the complex relationship between technology and capitalism in a techno-affirmative manner. The foundational thinking around accelerationism is credited to the controversial philosopher Nick Land and

their associates within the Cybernetic Culture Research Unit at the University of Warwick (1995–2003), a little researched but significant theoretical development of cybernetic theories within the 90s.³

Conceptually, accelerationism advances two material conditions. The first is an ever increasing synthesis between the material, the technological and the biological. The second is a *contra-telos*, the abandonment of the materially disadvantaged, the apotheosis of which is the abandonment of organic life itself. Land draws inspiration from Deleuze and Guattari's *Anti Oedipus* that speaks of a need to push capitalism towards an explosive tension. Land's political and economic argument positions the processes of cyberneticisation at the center of a particular celebration of capital, understood as money and consumption, and the source of addictive and more expansive unrestrained desires (Land, 2014; Plant & Land, 2014). Land describes this as follows:

If machinery is conceived transcendentally as instrumental technology it is essentially determined in opposition to social relations, but if it is integrated immanently as *cybernetic* technics it redesigns all oppositionality as nonlinear flow. There is no dialectic between social and technical relations, but only a machinism that dissolves society into the machines whilst deterritorializing the machines across the ruins of society, whose “general theory ... is a generalized theory of flux”, which is to say: *cybernetics*. Beyond the assumption that guidance proceeds from the side of the subject lies desiring production: the impersonal pilot of history. Distinctions between theory and practice, culture and economy, science and technics, are useless after this point. There is no real option between *a cybernetics of theory* or *a theory of cybernetics*, because *cybernetics* is neither a theory nor its object, but an operation within an objective partial circuits that reiterates ‘itself’ in the real and machines theory through the unknown. Production as a process overflows all ideal categories and forms a cycle that relates itself to desire as an immanent principle. (Land, 2014, pp. 294–295, emphasis added).

Land and their associates at CCRU draw methodologically on particular types of “fictions” identified as “hyperstitions” that function causally to bring about their own realities (CCRU, n.d.). Hyperstitions are fictions that, after entering the cultural frame, strengthen the apocalyptic positive feedback loops, exponentially accelerating social transformation. These new fictions become part of the “truth games” constructed by the neoliberal markets, where the conditions of possibility that sustain the operation of the market are preserved at all costs (Spencer, 2016, p. 2). Vinsel and Russel (2020) have identified how these truth games posit difference as the generation of the new. The new is considered inherently better. The task of progress is defined as moving fast and constantly producing things; innovation in technology functions as the proxy for values perceived to be lacking in society. In the context of the changing relationship

³ While accelerationism is not the direct subject of this essay, the controversial link established by Land and their CCRU associates between cybernetics (the processes of cyberneticisation), designing the future, and capitalism requires attention. To do so, Land radicalises second-order cybernetic ideas on self-organising systems that operate in far from equilibrium conditions (Land, 2014). The concrete problems of Land's controversial political position become evident in their later political work after their relocation to China, where Land presents China as an accelerated society, a “hyperstition” that arrives from the future. With its complete disregard for humans, Land's accelerationist politics has fuelled positions against human rights and supported the neo-reactionary politics of the alt-right, eco-fascist, and climate accelerationist movements.

between technology and work, one sees this as a suggestion of technological solutions for questions of work and labour—new devices, new operational and organisational systems—that are not technological problems.

The New-leftist interpretation of accelerationism does not frame the technologically driven futures of work as a celebration of capital. However, Srinicek and Williams (2015) are inspired by the power of fiction and speculation of Land and CCRU and suggest that machines and automation should be central in a project of speculation that may effectively contribute to a rethinking of “better futures of work”. The “better” here denotes freedom from the current hegemony of neoliberal work models and their ideological infrastructure that operates toward the benefit of the few at the cost of the many. Neoliberal common sense that drives these processes is identified as a fiction developed carefully via the ideology of a neoliberal market. They argue for the possibilities of a counter-hegemonic project, “a new common sense and counter fictions” that could be mobilised by those who are omitted from contemporary discussions (Srnicek & Williams, 2015). According to them, such a project would allow for the repurposing of existing technological infrastructure to free them from the ways in which this infrastructure objectifies power relations.

They argue that a participatory framework becomes the best mode of engaging these systemic complexities so that “workers involved in the technology sector who are, through their design choices, building the terrain of future politics” could effectively take part in this repurposing project (Srnicek & Williams, 2015, p. 153). In their call for a participatory project around change, a new common sense (new fiction), they ignore that such a process would require that the political left (or workers more generally)—understand this technology, value design, or identify design as something not limited to mere objects (Baker, 2018, p. 542). The reality however is far from this (Figure 1).

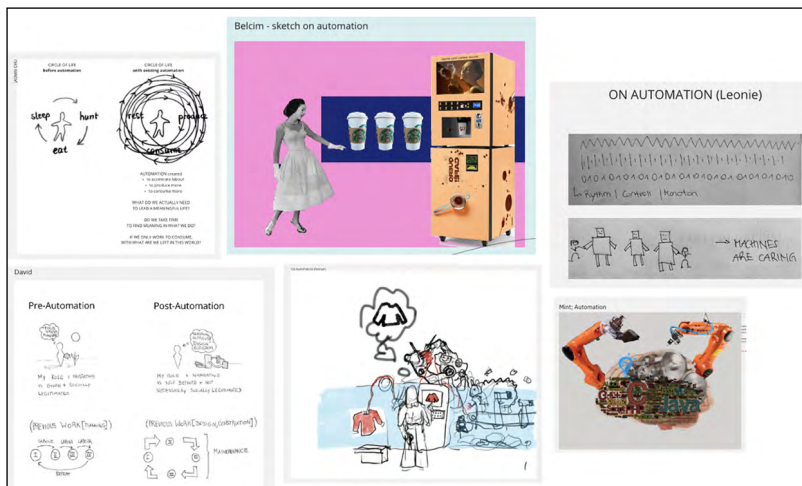


Figure 1 Multiple mental models and metaphors used by project participants to describe their understanding of the automation systems that suggest the different ways average people understand these technological systems.

They also ignore the different and unequal relations between workers and these technological systems across different contexts (Danowski & de Castro, 2017, pp. 114–115). The counter project in the New-leftist literature emerges as a utopian political fiction that calls for a new consensus around radical change while undermining the contradictions and tensions that emerge within the process of change itself (second-order change). Castro’s comments concerning the two versions of Williams and Srinicek’s (2014) manifestos elucidates this point:

Both manifestos insist on the virtues of technological acceleration without saying a word about the material conditions – energetic, environmental, geopolitical, etc.- required by the process that would, if the authors are to be believed, lead us “automatically” to the reduction of working hours (also in Bangladesh? when?), the increase of leisure time (society of the spectacle comes out of the closet!), universal income and so forth. (Danowski & de Castro, 2017: 144–115)

The limitations within the New-leftist approach towards the broader questions of difference are evident in how universalism (a counter fiction) can come to occupy differences (specific demands, ideals of the minority). Commenting on this with a note of sarcasm, Danowski and de Castro (2017) allude to how the New-left accelerationists conveniently ignore the more complex relationship between sense and difference that arrives as a *molecular* rethinking of political economy in Deleuze and Guattari’s project:

It cannot but strike us as curious that accelerationism, whose alleged main source of inspiration is a passage in *Anti-Oedipus* about the need to push capitalism into an explosive tension in the direction of evermore deterritorialization and a total decoding of laws, have opted at the same time for an *unequivocally molar, majoritarian conception of politics, economy*, and, above all, of who the virtual addressees of their message are. In general, their discourses do not mobilize any sociopolitical category aside from “capitalism,” “workers,” “global civilization,” “humankind,” or “the masses.” The existence and resistance of other collectives outside the narcissistic circuit of “Us” is ignored, or may be filed under the equally broader category of “folk.” (Danowski & de Castro, 2017, p. 115, emphasis added)

What Danowski and de Castro (2017) emphasise here is the necessity to maintain the permanent partiality of limited views as a mode of making sense of the changing nature of complex relation between technical and human systems.

I sum up this section by reemphasising certain unwitting commonalities in the new leftist version (Srinicek & Williams) and the more right-wing forms (Land) of accelerationism. These points highlight why it is essential to question how the relationship between technology and fiction is mobilised within these political frameworks. First, regardless of the differences in what each of these political visions strives to overcome, both movements are predicated upon flawed understandings of monodirectional change. As a result, they overemphasise futures that could be delivered through technologies and pay less attention to forms of life that would be erased within the same process. Second, both political agendas appeal to “the imagination” of the workers. But the notion of imagination articulated within these arguments is often too universal and pays less attention to the embodied nature of imagination bound to situated contexts. Third, in both cases, the category of the “we” is falsely constructed and, in their respective ways, reduces the question of difference as a means to arrive at a meta-narrative. As such, the existing “we”, the workers, are already taken as a given, but not as something that needs to be problematized and recomposed in the first place. What is required politically is a form of critical engagement better equipped with addressing information beyond abstract terms and engaging the ontological complexity of these entangled material systems and their recursive relations. In other words, the frictions that appear at the level of a personal relation to technologies, frictions of the socio-cultural realm, frictions between personal fictions and more political or economic fictions, are all important elements

that represent the ontological complexity of these extended techno environmental systems. Frameworks that enable a better engagement with these frictions spread across multiple logical levels are necessary.

A BATESONIAN FRAMING

Gregory Bateson was an anthropologist and cybernetician who did not explicitly use the phrase “second-order” to define their work in cybernetics. However, emerging ideas within second-order cybernetics and recursive complexity enabled Bateson to frame living systems primarily in terms of communication and learning, where feedback made it possible to trace changing forms of pattern in the living world. For Bateson, “changes in any pattern of events affect complex levels of relationship with new patterns of feedback occurring at many different levels, all of which ramify throughout that system of relationships” (Harries-Jones, 2016, p. 03). Bateson’s notion of the “second-order” emphasised recursive ordering over linear ordering, multi-level pattern over single pattern, and analogue communication over digital. Bateson’s work provides a particularly useful entry into engaging the more-than-human complexity of living systems as opposed to the better-known humanist notion of second-order reflexivity.

The tensions of the various stakeholders’ lived experiences of the changing nature of work during the COVID disruption entails such transcontextual complexity, i.e., complexity brought about by an “infinite regress of communicative contexts linked to each other in a complex network of metarelations throughout the living world” (Harries-Jones, 2016, p. 123). Transcontextual complexity denotes the complex ontological relationships between the more material structures of politics and economy and the abstract structures of patterns formation within the runaway contexts of cybernetic technologies (Harries-Jones, 2016, p. 135). The Batesonian concept of the *double bind* is one way of understanding the frictions that emerge transcontextually, across personal, social, and institutional levels in the context of runaway cybernetic systems. The double bind can explain the ongoing impasse where, despite agreement on the urgency of critically addressing the hegemony of particular cultural fictions around technology, it remains challenging to mobilise any form of action.

While the double bind concept is associated with Bateson’s work in psychotherapy, it is more widely applicable within the context of broader systemic relationships (M. C. Bateson, 2005a). Double binds are extended relationships between parties that involve contradictions between multiple logical levels (contexts) in a situation, leading to a repetitive pattern that cannot be withdrawn from or fully articulated (M. C. Bateson, 2005a, p. 13). Mary Catherine Bateson (2005a) has also been critical of attempts at instrumentalising the notion of the double bind as a problem that can be solved by attending to individuals by rational means. Double binds are not problems to be solved. Instead, they can be reformulated in ways that lead to different understandings of the problem itself by attending to the transcontextual complexity across multiple logical levels. Frames of communication where concepts and ideas can coexist at multiple logical levels enable reframing frictions in ways that provide a different mode of engaging those frictions.

SECOND-ORDER DESIGN FICTIONING

Second-order design fictioning sets up a framework to engage double binds as seen within the actions of individuals and institutions, but is never reducible to

these immediate systems, objects, events, and individuals alone. Second-order design fictioning is often, though not exclusively attached to rethinking systems and environments rather than products, services, and technologies. However, the examples presented in this paper are still more exemplary of engaging second-order design fictioning within hybrid settings between higher educational institutions and the immediate environments they are linked to. The examples described here are limited in terms of engagement and scale, providing only a starting point to think through the possibilities. The broader ambition for second-order design fictioning as a strategy is to redirect the limited ways in which technology is approached with design and innovation discussions. The multiple forms this can take beyond educational environments, remains yet to be explored.

At the start of the discussions in October 2020, the participants in the context of a design studio and a design seminar at Bauhaus University in Weimar started with a broad array of ideas on fiction, design fiction and frictions. On the one hand, these explorations were driven by discussions on the changing nature of technology (in more specific instances, cybernetic technologies) and work, engaging existing discourse but most importantly foregrounding the participants' personal experience. They started to identify what forms of frictions they were experiencing and in what ways these were related to broader cultural fictions. While they were introduced to the possibility of playing with the fictions in friction within the context of meta-communicational frames, the process was not originally introduced with a name per se. I introduced second-order design fictioning as a term later as a way of describing the process that took place. Some important characteristics of this process are explained here through project examples.

The process of second-order design fictioning pays considerable attention to second-order change, i.e., the change of change of relationships. For example, mainstream design fictioning practices often negate the existing differences in relationships to particular technologies, ways of work, and measuring work time. The project *It's About Time* (Figure 2) deals with the issue of how the predominant fiction about time—or better said, capitalist time—prefigures how people relate to time and wages. This project is critical of how automating time has created faulty norms around what forms of work are considered of greater economic value than others. What does it mean to rethink work and wages where these different time measures (of farmers, caretakers, teachers, or mothers) could exist in friction and become the framework for negotiating value in other ways? What sort of an economy would such a framework that depends on benevolence and caring for each other engender (Figure 2)? The concerns and worries of multiple stakeholders influenced by post COVID changes and the relation to work time were used to create a second-order fictioning frame that invites others to rethink the fictions that formulate their relationship to work time. The game then provided a framework that provoked and encouraged multiple groups to come together: those others at home and those in the university who were simultaneously thinking about the complex relationships between time, as well as organisational systems that are used to control workers' relationship to time. While playing the game participants were able to start finding their ways (sometimes alone and sometimes as groups) towards alternative fictions about time and to explore possibilities of projects (development of alternative systems, ways of organisation) that enabled working with other time models.



Figure 2 *It's About Time*, images from *It's About Time* by Zoe Pianarro. A short recording of one of the sessions conducted can be found at <https://www.youtube.com/watch?v=4V-VNN2dgw8>.

Placing emphasis on second-order change requires a better understanding of the ways in which technological change becomes embedded within contexts. The project *Domestic Ecologies* (Figure 3) looks at the relationship between domestic environments (particularly spaces such as kitchens) and technological objects. It focuses on how these objects program the inhabitants' relationships to domestic space in fundamental ways, prompting simple questions about how technological

gadgets and smart gadgets prompt the inhabitants of the domestic spaces to think about free time. The seemingly banal, everyday observations speak to runaway feedback loops and the problematic ways that move one towards more and more efficiency and how that efficiency then gets equated to the mobilisation of specific technologies. The project questions how these processes reprogram the very ability for care, where caring in this psycho-somatic assembly means paying attention (Figure 3). The project works to unravel problematic fictions that emerge in the frictions between the technological objects, the social systems they are embedded in, and those using these objects. It sets up a second-order framework where these tensions can enable those stakeholders to reframe these relations collectively and rethink the questions of domestic labour. Instead of a solution in the form of another design, object, or service system, the project invites a different way of reframing the problem, an invitation to start developing other fictions and changing the compound reaction to the problem.

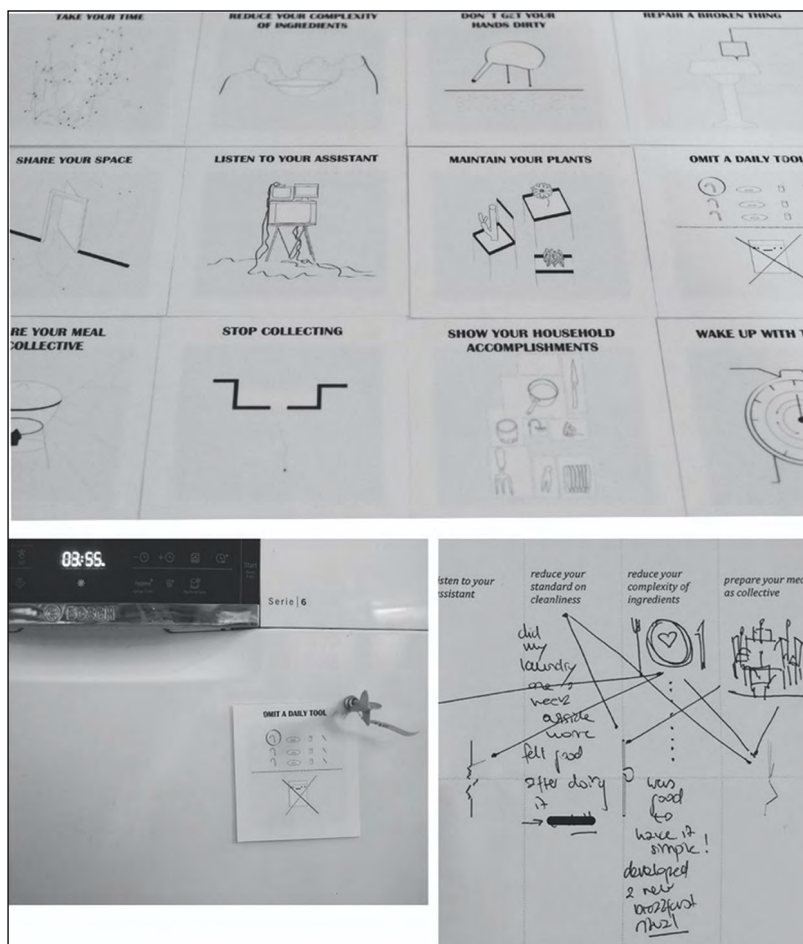


Figure 3 Domestic Ecologies, images from Domestic Ecologies by Leonie Link.

Vacation Images of the Everyday (Figure 4) plays on the term “vacation”, which is understood as exemption from work (free time) instead of the more common association of vacation images and postcards related to travelling elsewhere. The project questions the use of existing technologies within domestic environments to influence ideas of free time. The fronts of the postcards portray a conceptual sketch that grabs the attention of passers-by but at the same time leaves enough space for

personal interpretation. The cards also pose a simple question that could be answered, thereby generating a playful framework to pose critical questions on established fictions. The postcards were spread out in familiar places in Weimar, extending the discussion beyond the university premises, such as bakeries, libraries, supermarkets, cafés, post offices and dentist waiting rooms (Figure 4). The postcard format provided an easily usable tool for the inhabitants of Weimar to share stories from their everyday lives with minimal effort and enabled a reflection of established fictions. Some of the processes triggered conversations where a group would collectively arrive at ways of exploring a possible way to redirect the problematic relation to these technologies.

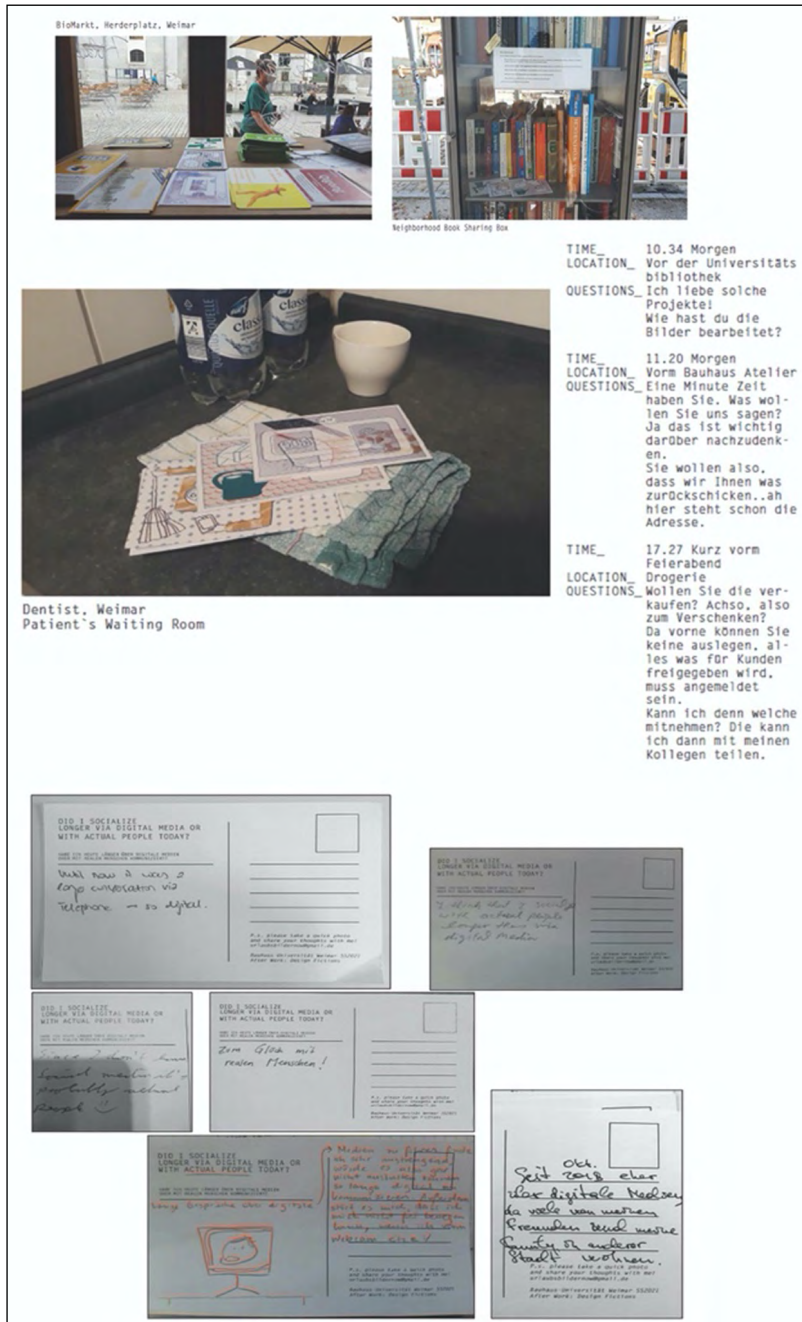


Figure 4 Vacation Images of the Everyday, images from Vacation Images of the Everyday by Jasmin Chu.

The *Take Times* (Figure 5) is based on in-depth discussions with different stakeholders and their ideas of free time in a future where a universal basic income is a possibility and work is mostly automated. The fears and concerns related to future that emerge in the stakeholder fictions become material for a new type of news media to become a framework for others to rethink their relationship to such a future. *The Take Times* invites readers to experience a fully automated future where the qualities of reading a printed newspaper, in contrast to digital formats, would become desirable (Figure 5). *The Church of Work* (Figure 6) departs from a provocative question drawing on interviews and observations related to the fears of losing and changing jobs: What if due to the extreme acceleration, most aspects of (office) work were gone, and only their ritualistic shells remained? The project addresses the disruptions at the same level as the archetypes developed concerning capitalist everyday work lives and invite stakeholders to play with the tarot deck to create ideas and stories to fill the seeming void. *The Church of Work* tarot deck—the medium itself—invites a way of moving beyond the automaticity of the programmed one-way relation between work and progress (Figure 6). For example, studies indicate that as long as the participants in co-design processes maintain specific faulty mental models, these faulty values can reappear within the system regardless of the multi-agent design process (Bath, 2014). The tarot framework allows participants to question established norms before they start to engage in futuring and fictioning. Every attempt to interpret one's future,

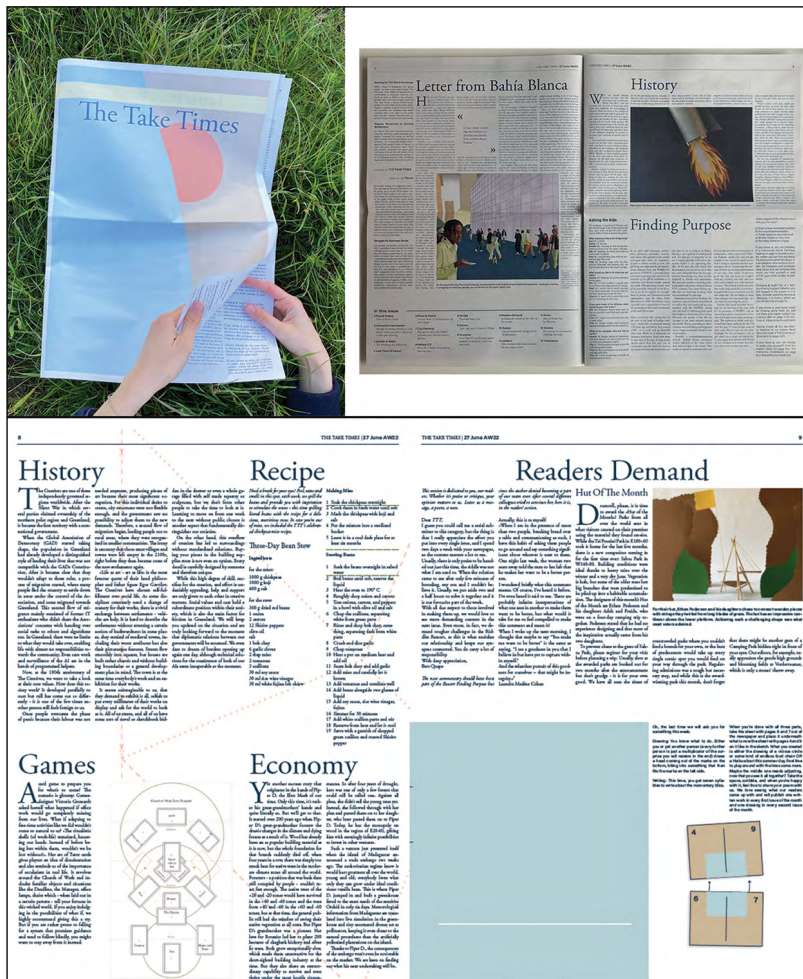


Figure 5 *The Take Times*, images from *The Take Times* by Lara Schuster. The full newspaper can be accessed at <https://www.uni-weimar.de/projekte/afterwork/lara-schuster/>.

or read the future of others, will sharpen the stakeholders' abilities to take on new perspectives and engage in a fictioning process that opens up to other fictions—multiple fictions.

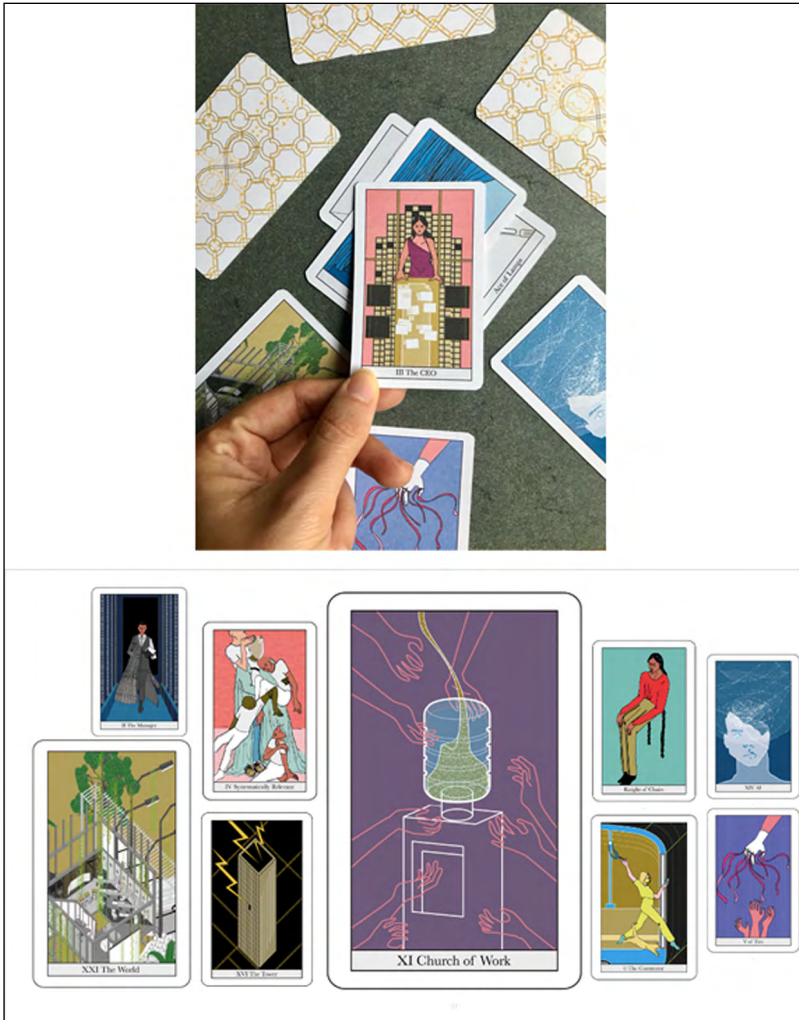


Figure 6 Work, norms, archetypes, reframing, images from *Church of Work* by Victoria Grossardt. A short recording of one of the sessions conducted can be found at https://vimeo.com/511165052?embedded=true&source=vimeo_logo&owner=133405110.

As shown in the examples, setting up the second-order design fictioning frame can be done in the medium most suitable for the community where disruptions and tensions are located. The facilitating person, institution, or organisation works with a community or participants and their frictions to identify the most appropriate medium for working within that situated context. Paying attention to that emergence enables ways of engaging mediums that prompt fictioning in those situated contexts. As such, finding that medium is part of the challenge of developing second-order design fictions. The post-it kits in *Domestic Ecologies* were used in student housing. The *Vacation Images of the Everyday* postcards were placed in all forms of public spaces. Some communities can work with playful dialogic reflection (e.g., *The Take Times*). Some communities may not be comfortable engaging in verbal exchange but could be willing to interact via short written comments (e.g., the postcards in *Vacation Images of the Everyday*). The tarot card kit or the game *It's About Time* are possible examples of working with stakeholders who hold different ontological presuppositions. Second-order design

fictioning can be used to dismantle the faulty notions of a *technological universal* that are often implicit in automation and change discussions.

Allowing stakeholders to work with second-order design fictioning, in turn, will enable them to deal with the enablers and constraints of the contexts in which these technologies are used and situated and allows a respectful engagement with these multiple ontologies. Second-order design fictioning assists in the second-order task of constantly reframing a design project's relationship to change and questioning the role of technology within the process, mainly when dealing with systemic issues.

In concluding this section, I summarise significant aspects of the observed process. These features are not meant to be prescriptive or descriptive but are to be taken as points to think through the possibilities that such a process might engender.

Second-order design fictioning attempts to de-link design fiction with market-driven fictions of technology and exposes the insufficiency in the ways in which concepts such as progress, futures, and technology are defined within institutional and organisational contexts.

Second-order design fictioning is not the name given for a product. It is a strategy of presenting a problem in ways that make its compound complexity evident. This must not be mistaken for an ability to gain "a total view" of the problem, but rather a reminder of the inability to do so.

Second-order design fictioning is not only focused on change but instead pays considerable attention to second-order change. Second-order change considers how technological changes become embedded within contexts. When design fictions are focused on change, they prioritise "disruptive innovation" as an essential condition of progress and promotes disruption for the sake of progress. Second-order design fictioning then assists the stakeholders to reframe their relation to the change itself.

Second-order design fictioning can be used to dismantle faulty notions of a technological universal that are often implicit in discussions on technological change particularly in the context of cybernetic technologies. The process can enable stakeholders to deal with the enablers and constraints of the contexts in which these technologies are used and situated and allows a respectful engagement with these multiple ontologies.

Second-order design fictioning emphasises the importance of the second-order task of constantly reframing design's relationship to change and questioning the role of technology within the process, particularly when dealing with systemic issues. The process invokes a recursive mode of continually exploring difference, helping the stakeholders create a design conversation (internal or with others) about technological change and value, and designing a meta-framework for a continuing conversation on the changing nature of those value systems.

CRITICAL PRACTICE: ENGAGING CONTEMPORARY DISCUSSIONS ON CYBERNETICS AND CRITICALITY

With the nuances of the second-order discussed in the experimental fictioning process mentioned earlier, I return to the broader question around the possibilities of critical engagement in the context of the changing technological and social relations. At the beginning of the paper, I alluded to an emerging critique of runaway cybernetic systems and a search for better ways of engaging the compound effects and affects

of these runaway systems from within the field of cybernetics itself. Discussions on critical cybernetics and design cybernetics contribute to this endeavour. They are both areas of inquiry that attempt to rethink, rework and update the notion of second-order in ways that are helpful to develop forms of critical action required in the present. Here I briefly discuss the concepts of criticality and redirective action outlined in these discussions and suggest how the second-order defined in this essay may contribute to this developing discourse.

Some forms of abstract technological critique do well to describe the absurdity of the problem but fail to suggest ways in which redirective practices can be mobilised. Krippendorff's suggestions of developing a critical discourse entangled with, and emerging from, the practice sites of cybernetics are helpful in this regard. Krippendorff's proposals are based on reformulating what cybernetics could mean as a meta-discourse, an "interdisciplinary language with social consequences" that critically redirects the consequences that uncritical cybernetics put into practice (Krippendorff, 2021). However, this agenda is limited in its overemphasis on the social and how human agency can be mobilised within these systems. In other words, while Krippendorff's argument contains a rich picture of how human or social agency might affect the design of these systems, it does not respond to the complexity of the ontological agency that these designed systems, in turn, exert on human and social agency. The ways in which technological systems, once designed, design back the same conditions in which they exist—the ontological complexity that is more-than-human and more-than-social—need to be problematised as a question that is beyond the uncritical practices of cyberneticians (engineers) who, according to Krippendorff, operate with the presupposition that their theories are better than the questions of the social system. The focus on accountability (via C. Wright Mills) and the foregrounding the notion of choices of entangled agents (labourers or the general public) is a valuable aspect of Krippendorff's approach. However, the premises of freedom and choice on which such accountable action is predicated may only work for a social system functioning within a democratic model, which is, unfortunately, not the case across many contexts of operation.

Recent discussions on *design cybernetics*, emphasising the *design relation*, provide a comprehensive framework to explore the complication related to enacting criticality. In their essay *A Proposal for the Role of the Arts in a New Phase of Second-Order Cybernetics*, Scholte (2020) recognises the importance of design cybernetics within recent endeavours to rethink *criticality* and *critical engagement*. As a broader concept, design cybernetics emerges from the work of design theorist and cybernetician Ranulph Glanville who in some ways equated second-order cybernetic modes of knowing and doing to *designerly* modes of knowing-doing (Fischer & Herr, 2019). In extension, Glanville's position alludes to how second-order cybernetics and its related notions of reflexive engagement—often explored in relation to the *conversational*—provide a better way of engaging systemic complexity (Glanville, 2014, as cited in Scholte, 2020).

The most significant contribution of this move of creating an analogy between second-order cybernetic engagement and designerly engagement is the way in which it has enabled a different value framework around the importance of designerly ways of engaging real-world problems that are not reducible to value frameworks set in place by the sciences and the humanities. However, this reformulation is somewhat limited and identified primarily within the context of a "niche group of designers" (Scholte, 2020, p. 7). Scholte argues that by not radically accepting their own analogy between second-order cybernetics and design (as evinced in semantic hedging such as "design

research as a variety of” or “the relation between”), the proponents of this position do little to speak to the more fundamental role design plays in the real world, in ways not limited to the institutionalised, professionalised understanding of design. To some extent, the approach fails to consider the broader political implications of the design relation as a primary ontological relation. While Scholte responds to this limitation by emphasising the wider role of the creative arts, a radical acceptance of the primacy of the design relation would provide better ways of expanding the notion of critical engagement of well-trained professionals, decision-makers, and ordinary people. I argue that critical engagement cannot be secured by theoretical means but by design means in the context of heuristic support, in the form of questions and argumentation tools that make a difference in practice (Ulrich, 2005). Second-order design fictioning is proposed as a response to this challenge.

In the concluding essay of the edited volume *Design Cybernetics*, Jonas (2019, p. 301) highlights the need to expand the notion of design, and debate design’s agency via a consideration of the political. The political in Jonas’s argument is not defined as the narrow operational concept of politics as a functional social system (e.g., state, government) but as related to the political that encompasses the broader critical questioning on the political dimension of these cybernetic technologies in their operational contexts. Drawing on the work of political theorist Carl Schmitt, Jonas (2019) reminds us that the “dissociative aspect of politics” that conceives the political as an area of power and conflict rather than a free, communicative space of cooperation is fundamental in considering how these cybernetic systems redesign the very systems in which they are embedded (Jonas, 2019, p. 301). Jonas argues for the need to address complexity beyond the human (taking into account the communicational and evolutionary complexity of the system), beyond the technocratic (considering the compound nature of the problem), and beyond the romantic (consensus). Seen in this light, looking beyond “harmonic tendency towards consensus” in the generation of shared meaning in sites of transition becomes a vital aspect of engaging difference. This formulation demands the gathering of difference not to be taken as given, but as something that needs to be seen as a problem in itself, and an invitation to consider what that gathering means in its transcontextual complexity.

Criticality can only arrive by language, as Krippendorff suggests. However, critical engagement emerges from within the broader contexts of communication around the design process understood in its compound transcontextual complexity. A critical practice requires traversing the relation between signifying semiotics (linguaging, deductive logic) and asignifying processes (that relate to the more-than-linguistic forms of sense-making and abductive logic) within communicational relations. Goodbun and Sweeting (2021) have highlighted how Bateson alluded to ways of traversing these signifying and asignifying aspects of meaning-making. Gregory Bateson’s approach to traversing complexity presented at a 1968 conference is as follows:

“When we wish to explore the relationship between conscious thought and other processes of computation, the deep reasoning of a body or an ecosystem, we need to know the differences in the way they compute. Biological systems, in general, compute analogically, with pattern, while the conscious mind has access to digital processes, including the possibility of negation... at whatever level it is in your mind... that the operators are stored... at that level there is no not ...”

(M. C. Bateson, 2005b, as cited in Goodbun and Sweeting, 2021, p. 162)

Bateson's work alludes to modes of working with information which are better at engaging transcontextual complexity. Such forms deal with meta-communication frames and invite different levels of abstraction to coexist (Perera, 2020, 2021a). Such frameworks allow for a deeper engagement with difference within sites of disruption and question how elements in friction that fail to fall within a clear consensus framework can prevent previous consensus (hegemonic fictions) from becoming part of the present problem.

The term "meta" is often misread as a connection to a level above or an order imposed from above. Nevertheless, as Guddemi (2020, p. 7) points out, ironically, the aboveness in Bateson comes only from below, i.e., from communication systems shared with the supposedly *lower* animals. This idea of coming from below has much to do with the "meta" and how second-order fictioning is proposed as a meta-communicational frame. The second-order, as defined through Batesonian ideas of meta-communication, enables one to question western liberal concepts such as freedom and choice. I mentioned early on that I am interested in the question of the possibilities of engaging, which falls within the grey zone between theory and practice. Clearly, the compound ontological complexity of these techno-economical systems works in such a way that choice and freedom to act cannot be taken as a democratic option. As such, while it is necessary to include the workers and general public in these debates and develop their fiction, gathering such a community is not to be seen as a solution but as a problem. In other words, as decolonial theorists such as Escobar (2018, p. 172) have argued, it is precisely setting up the conditions for such autonomy, i.e., the conditions for changing norms from within, that remains a challenge in the context of the accelerating powers of these extended technological systems. Second-order fictioning is an enabler for such second-order conditions, where different stakeholders would find their agency to tell other fictions, find ways to develop *trusting* communities, and take on the task of collectively composing other fictions.

CONCLUSION

The project's departure point, the questions concerning the changing relationship between technology and work, also speaks to many concerns related to what is identified as an extended condition of cyberneticisation. Cyberneticisation, as identified in the paper, concerns organisational processes that extend beyond machines, living organisms, and their environments to include a broader ecology of ideas, institutions, and infrastructural systems. Advances within cybernetic theories and technologies that operate and coevolve within meaning-making systems that deal with signifying and asignifying meaning-making processes have contributed to this process of ecologisation. As traditional critical theory attempts to discuss "information" in abstract terms, it fails to appreciate the materiality of these recursive relations and how they design back. Political and ethical choices emerge within a system, not so much as the result executive choices, but instead via systems of technically contingent pathways connected transcontextually. Paradoxically, this seemingly out-of-control system does not imply an end to all possibilities of critical engagement but requires better modes of engaging and re-direction. This condition presents itself as particularly problematic in the contexts of issues related to technological change and contexts in transition where most workers have no clear imaginary of the nature of these transitions. Nevertheless, they are essential stakeholders in the reimagination project against the problematic developments within the systems.

As such, engaging them in a process to rethink their relation to these technologies requires means through which one can engage their discomforts and tensions that emerge in moments of disruption.

The proposed idea of second-order design fiction is a way of expanding on the centrality of design in empowering the abilities for critical engagement. Second-order design fiction understood in this manner is not only about exploring change or possible futures as one would via extended diegetic prototypes. It is also not a conversation about speculative trends related to the changes suggested by current technologies. Instead, the term “second-order” invokes Gregory Bateson’s notion of meta-communication and transcontextual complexity that allows expanding the very notion of what “problem framing” means in design practice. Second-order design fictions matter, not because they can provide a better idea of the future of work within the increasing presence of technological systems. They matter because they enable an engagement with the unresolved tensions of the present that relate to technology and work shared across multiple learning contexts and explore possibilities of engaging these unresolved tensions in ways that attempt to address their compound onto-epistemological complexity.


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COMPETING INTERESTS

The author has no competing interests to declare.

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