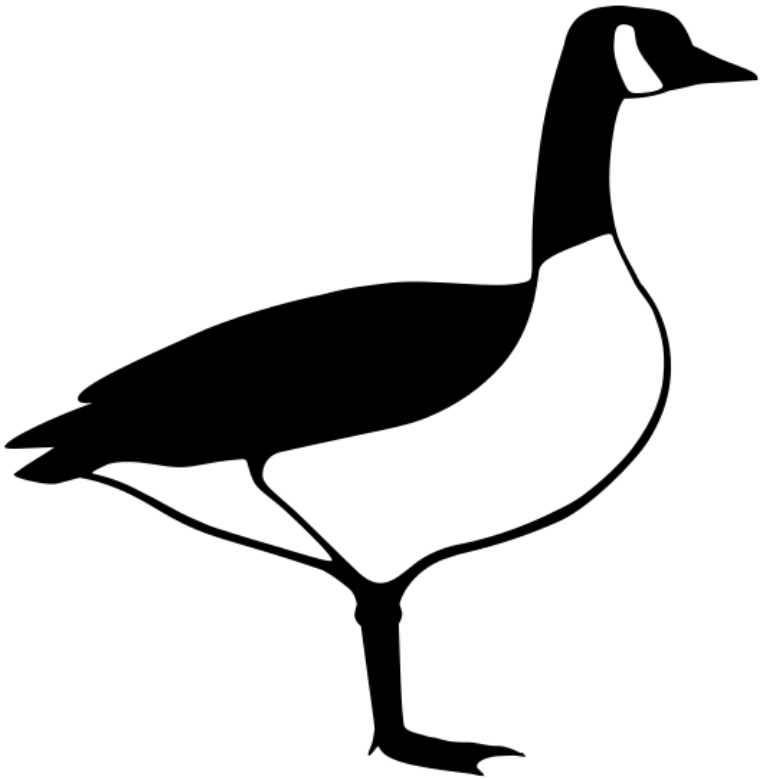
#commonize studio:
Commons-making through studio experimentalism



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Front matter

Cover image: ‘Goose’ by Mary B (2017)

Back cover image: ‘Goose attacking human’ by G.K. Lay (2023)

Declaration

The work presented in this thesis is my own, and has not been submitted for the award of a higher degree elsewhere. To the best of my knowledge, it does not contain any materials previously published or written by another person except where due reference is made in the text. Excerpts of this thesis have been published in the following manuscripts, cited here in chronological order of publication date.

Sacks, J., & Coulton, P. (2020). *Addressing the elephant in the cloudless sky: Designing a commonised mobile network infrastructure*. MobileHCI 2020. https://github.com/floe/cloudless-skies/blob/master/position_paper_1.pdf

Galabo, R., & Sacks, J. (2021). A commons creation framework for co-designing new commons. *14th International Conference of the European Academy of Design, Safe Harbours for Design Research*, 467–474. https://doi.org/10.5151/ead2021-135

Jacobs, N., Brewer, S., Craigon, P. J., Frey, J., Gutierrez, A., Kanza, S., Manning, L., Munday, S., Pearson, S., & Sacks, J. (2021). Considering the ethical implications of digital collaboration in the Food Sector. *Patterns*, *2*(11), 100335. https://doi.org/10.1016/j.patter.2021.100335

Mullagh, L., Cooper, R., Thomas, L., Sacks, J., Lloyd Jones, P., & Jacobs, N. (2021). Designing for a pandemic: Towards recovery and resilience. *Strategic Design Research Journal*, *14*(1), 161–174. https://doi.org/10.4013/sdrj.2021.141.14

Sacks, J. (2021, April 18). *#commonize: Using commonized design to create a post-capitalist economy*. Design and Economics. https://www.youtube.com/watch?v=Np2l8-yHFx4

Sacks, J. (2021, October 15). *Training workshop 5: More-than-human commoning*. XVIII Biennial IASC Conference "Our Commons Future". https://2021general.iasc-commons.org/training-workshop-5/

Sacks, J. (2022, October 28). *#commonize studio: Creating design briefs for disruptive economics*. Deep Commons 2022: Cultivating ecologies of solidarity and care beyond capitalism, patriarchy, racism and the state. https://www.deepcommons.net/conference-2022

Sacks, J. (2022). *User research to design a more-than-human food commons*. DRS2022: Bilbao. https://doi.org/10.21606/drs.2022.219

Sacks, J., & Coulton, P. (2022). Governing with nature: Applying more-than-human design to the management of shared urban green space. In G. Bruyns & H. Wei (Eds.), *[ ] With design: Reinventing design modes* (pp. 3624–3624). Springer Nature Singapore. https://doi.org/10.1007/978-981-19-4472-7_250

Sacks, J., & Galabo, R. (2022). A framework for infrastructuring commons creation. In G. Bruyns & H. Wei (Eds.), *[ ] With design: Reinventing design modes* (pp. 1016–1036). Springer Nature Singapore. https://doi.org/10.1007/978-981-19-4472-7_67

Sacks, J., Galabo, R., & Nthubu, B. (2022). Botswana blood commons: Visualizing blood services as a public-commons partnership. *Proceedings of the Participatory Design Conference 2022 - Volume 2*, 84–93. https://doi.org/10.1145/3537797.3537815

Sacks, J., & Wernli, M. (2022). Co-design of the pluriversal Commons Model Canvas. *Proceedings of the Participatory Design Conference 2022 - Volume 2*, 227–230. https://doi.org/10.1145/3537797.3537840

Sacks, J., & Wernli, M. (2022). *Reframing and rendering commoning with a pluriversal commons model canvas* [Unpublished].

Craigon, P. J., Sacks, J., Brewer, S., Frey, J., Gutierrez, A., Jacobs, N., Kanza, S., Manning, L., Munday, S., Wintour, A., & Pearson, S. (2023). Ethics by design: Responsible research & innovation for AI in the food sector. *Journal of Responsible Technology*, *13*, 100051. https://doi.org/10.1016/j.jrt.2022.100051

Mullagh, L., Cooper, R., Thomas, L., & Sacks, J. (2024). Design reactions. In R. Cooper & L. Mullagh (Eds.), *Design and Covid-19: From reaction to resilience*. Bloomsbury.

Abstract

Commons are shared resources governed by the communities that depend on them and are arguably the most ancient and enduring form of economy in human civilisation. Yet, we know little about the practicalities of making them. To address this challenge, I collaborated with several design researchers engaged in commons-making and began answering the question: What do communities need to make commons?

While the commons literature presents robust concepts that describe how successful commons operate, few of these concepts are used by design researchers. Part A of this thesis seeks to answer the question: What does the commons literature offer commons-making researchers?

Studio, the signature pedagogy of design, provides the epistemological foundation for commons-making research, yet studio pedagogy remains poorly documented. Part B of this thesis seeks to answer the question: What does the design research literature offer commons-making researchers?

I named my practice #commonize studio, a studio that designs commons, as a bridge between these questions. 'Commonize' defines a proactive process of commons-making; 'studio' treats economics as a design subject, economy design.

#commonize studio translates the theoretical foundation developed in Parts A and B into reflective practice in Part C of this thesis, responding to the question: How can these two literatures support commons-makers? This empirical research layers several methodologies together, primarily action research performed through the lens of diverse economies, into a methodology called studio experiments for commons-making. Performing #commonize studio generated multiple insights for commons-making researchers, in particular the role of scaffolding, coaching, and infrastructuring.

Finally, I argue for making the 'generative turn' in commons research, a transition from purely analytical research of existing commons to generative research about commons-making. Future research may further expand the two fields opened up by this research, which are studio experimentalism as a design methodology and commons-making as a distinct research approach.

Acknowledgements

The word ‘commons’ shares the same Latin roots as ‘community’, which, in short, is derived from the Latin for ‘with obligations’ (*com munis*). To be part of a commons or community is to recognise we are bound together in mutual obligation. This PhD thesis has been shepherded into existence by a community I wish to acknowledge my obligation to.

I cannot truly express the scope of my gratitude, or my sense of mutual obligation, to my parents, Mom (Terry) and Dad (Harley). You are my model for unconditional love as I make my way in this world. In August 2020, I flew back to your house, expecting to wait out the not-yet-named pandemic for a few months and then return to the UK in the early spring. We know what happened next. I spent the next two years in your spare bedroom, a gift of time after living abroad for the majority of my adult life. I had no physical contact with anyone in my department or the academic world I was supposed to inhabit, and so you became the sounding board for every trial and tribulation of my PhD journey. You say you still can’t explain my PhD even after proofreading this thesis, so it seems I still have some work to do before writing a bestseller novel. Mom and Dad, you are infused in this thesis from start to end.

There would be no thesis without the three people who walked this journey with me, the three ‘commons-makers’ as I call you in this thesis: Dr Rosendy Galabo, Dr Markus Wernli, and Dr Badziili Nthubu. I hope I have honoured our work together in this thesis. I believe in you and your work, no matter what ups and downs you face in your journeys. Who knows, the path we have initiated may someday change the world!

Finally, I need to acknowledge my two supervisors, Prof Paul Coulton and Prof Rachel Cooper, for unflinchingly supporting my sometimes-unconventional ideas, opinions, and approaches. You never, ever asked me to ‘tone it down’ or ‘be less political’ or be other than myself. I don’t take it for granted. I initiated a PhD expressly to explore difficult, uncomfortable questions, and you helped me do it.

Contents

List of figures

List of tables

Glossary (Acronyms)

ALI	Ada Lovelace Institute
ARtD	Action Research through Design
CBPP	Commons-Based Peer Production
CMC	Commons Model Canvas
DRS	Design Research Society
EAD	European Academy of Design
IAD framework	Institutional Analysis & Development framework
IASC	International Association for the Study of the Commons
IASDR	International Association of Societies of Design Research
IIPP	Institute for Innovation and Public Purpose
IoFT	Internet of Food Things
J-PAL	Jameel Poverty Action Lab
LARP	Live Action Role Play
NBTS	National Blood Transfusion Services
NIE	New Institutional Economics
ODI	Open Data Institute
PD	Participatory Design
PDC	Participatory Design Conference
SES framework	Social-Ecological Systems framework
SME	Small and Medium-sized Enterprise
UKRI	United Kingdom Research and Innovation

Glossary (Terms)

Agonism	The inherent necessity of constant conflict, struggle, and pluralism that characterises democracy
Capitalocentrism	The tendency to define all alternatives in their relationship to capitalism
Commons	A shared resource governed by the community that depends on that resource
Commoning	The social practices of sustaining a commons
Commonised design	An approach to design that requires both political and economic agency in line with commons design principles
Commonize	To place a resource under community governance
Counter-hegemonic	Critiquing, confronting, or dismantling the legitimacy of the status quo, often labelled counter- or anti-capitalist
Diverse economies	Research methodology that advances a political economy based on recognising, describing, and performing existing ethical economic practices
Infrastructuring	Creating resources that intentionally enable adoption and appropriation beyond the initial scope of the design
Institutioning	Engaging with institutions as active sites of change rather than inert backdrops in design processes
Kgotla	Indigenous governance system of Botswana that is a forum for both village development and civil justice
More-than-human design	Design approach that asks us to design for non-human species alongside humans
Pluriversal design	Design approach that engages with multiple worldviews, particularly worldviews outside the Global North
Queering	Destabilising or multiplying meanings that were previously viewed as fixed
Scaffolding	Teaching approach to providing support and guidance to learners as they integrate new concepts or skills
Scopus	Citation database owned by Elsevier

Prologue

Commons are all around us, they always have been, if we're willing to see them. This thesis is about a way of living in the world, the commons or commoning, that is both ancient and still-being-discovered.

On the next page are two works of art that I hope set the scene for the research to come. They are works created by two generations of Britons, separated by centuries yet connected through time by their resistance to capitalist enclosure of humanity's shared 'common wealth' (Hardt & Negri, 2009).

The first work (Figure 1) is an English folk poem from the 17th century, often referred to as 'The goose and the common'. Between the 17th and 20th centuries, UK Parliament (n.d.) enacted 5,200 bills that enclosed one-fifth of England. Today, half of England's land area is owned by less than one percent of the population (Shrubsole, 2020).

The second work (Figure 2) is an image from Freeman's Wood in Lancaster UK, appearing in an article in *The Guardian*. The article abstract reads:

> For years, Lancaster locals treated Freeman's Wood as common space – until its Bermuda-registered owner submitted a development plan, and erected fencing to keep them out. Now the commoners are fighting back. (Garrett, 2016)

The original image caption reads: 'A poem painted on a defaced "no trespassing" sign.'.

English folk poem, 17th century

They hang the man and flog the woman
That steal the goose from off the common,
But let the greater villain loose
That steals the common from the goose.

The law demands that we atone
When we take things we do not own,
But leaves the lords and ladies fine
Who take things that are yours and mine.

The poor and wretched don't escape
If they conspire the law to break.
This must be so but they endure
Those who conspire to make the law.

The law locks up the man or woman
Who steals the goose from off the common,
And geese will still a common lack
Till they go and steal it back.

Figure 1. English folk poem, 17th century, often referred to as 'The goose and the common'.

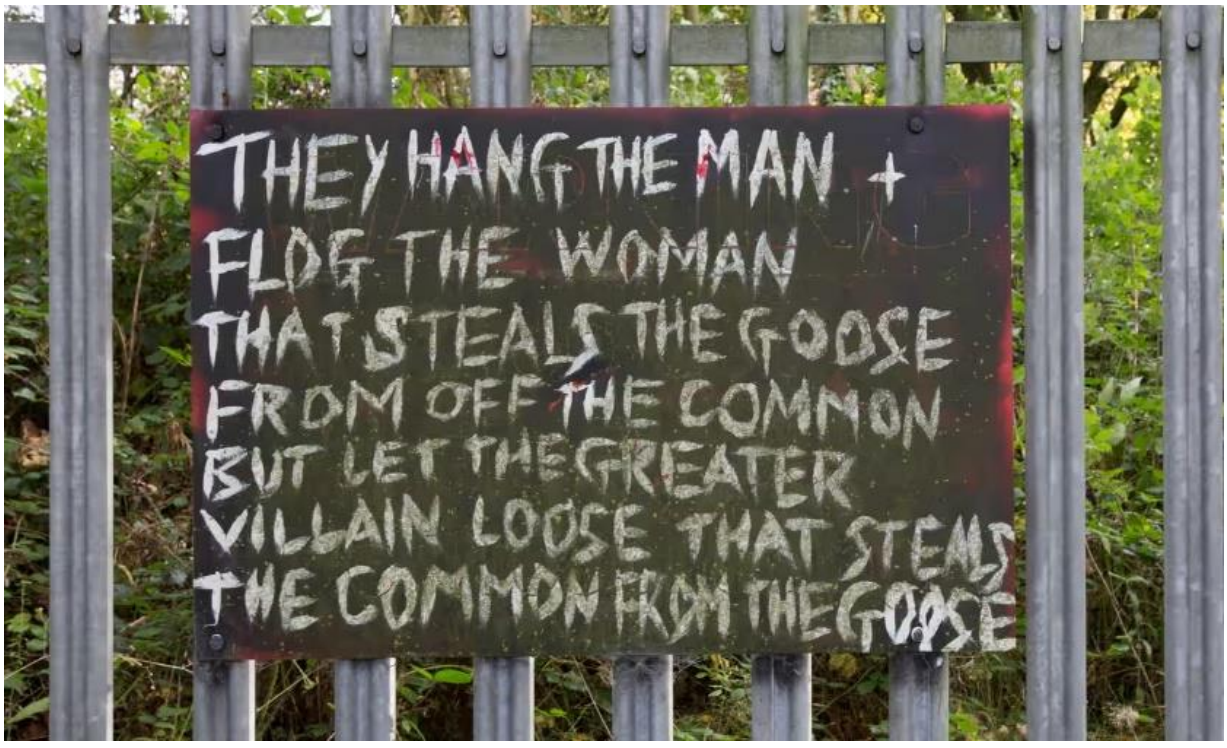


Figure 2. Freeman's Wood, Lancaster UK, 2016 (Garrett, 2016).

Introduction

‘How is work created, assigned, and completed on large-scale, crowd-powered systems like Wikipedia? And what design principles might enable these federated online systems to be more effective?’ This is the beginning of a 2009 paper titled, ‘Coordinating tasks on the commons: Designing for personal goals, expertise and serendipity’ (Krieger et al., 2009). Despite using the term ‘commons’ in the title, the authors appear either unaware or dismissive of the rich commons literature, including seminal works by Ostrom (1990) on commons governance and Benkler (2006) on crowd-powered systems like Wikipedia. The authors also appear to be unaware or dismissive of the ‘design principles for managing commons’, first published by Ostrom in *Governing the Commons* in 1990. Moreover, those reviewing this paper also appear to be equally unaware or dismissive of this literature at the time. Would the authors have benefitted from this knowledge? The research question that has driven me since the beginning of this research and persists today is: *What do communities need to make commons?* More specifically: What do communities need to make *counter-hegemonic* commons? This research could support researchers interested in most types of commons-making, but, as I detail in ‘Chapter 1.13. Politics of the commons’, my research focus is how communities make what we might otherwise label counter-capitalist or anti-capitalist commons.

Fast forward to the 2020s, and there is a small but productive cohort of design researchers engaged with the commons literature. This cohort, mostly working in participatory design (often referred to as PD) at European universities, has initiated what I have termed ‘the generative turn’ in commons research, moving from analysis of existing commons to research into the making of commons, or commons-making. Researchers in this cohort have also bypassed the rich commons literature, reducing it to a handful of performative references. Is the 50+ years of commons literature, knowledge about what has made generations-old commons successful, useless to those of us interested in commons-making? I argue that it is worth trying to make this knowledge useful to design researchers, and I make some of the first attempts to do so in the form of #commonize studio, a studio that designs commons.

This thesis is also a bridge between worlds, between commons research and design research. Commons research is historically rooted in the social sciences, e.g. economics and political science. Scholars in these fields generally turn to scientific pedagogies and epistemologies. The enduring outputs of such commons research are analytical constructs used to code how a commons functions over time. These constructs are diagnostic, used primarily to understand and make sense of an existing commons. They show us what to look for in a

successful commons, but they do not show us how to get there. In 'Part A: Commonize', I review a number of the key constructs from the commons literature and show how they might be useful to design researchers. The principal research question underpinning Part A is: *What does the commons literature offer commons-making researchers?*

In the same way that commons literature is inaccessible and dismissed by design researchers, design pedagogy and practice is inaccessible and dismissed by commons scholars. In 'Part B: Studio', I review what defines studio pedagogy, the signature pedagogy of design, and I identify how this studio pedagogy contrasts with lab pedagogy to support commons-making. An emergent gap from performing this review is the absence of theory on what forms studio experimentation, the 'cultural analogue' (Farías & Wilkie, 2018a) to lab experimentation. This research unwittingly became a novel foray into what studio experimentalism might mean and how studio experimentalism might better serve researchers engaged in commons-making, rather than attempting to shoehorn our research into the container of the lab. The principal research question underpinning Part B is: *What does the design research literature offer commons-making researchers?*

The result of Parts A and B was naming my research practice #commonize studio, a type of 'poststructural intervention' (Gibson-Graham, 2003) unto itself, part of the diverse economies methodology guiding this research. 'Commonize' (or 'commonise'), a word I created from this research, contests the binary choice we are often presented with between the state (nationalise) and the private market (privatise). Commonize gives shape to a proactive process of commons-making governed by neither the state nor the private market. 'Studio' seeks to destabilize the understanding of 'the economy' as a singular reified object of study and, instead, treat economics as a design subject, 'economy design' perhaps, which we frame and shape like any other design subject. For clarity, #commonize studio refers to how I named and communicated my research practice rather than a physical place or formalized organization.

In 'Part C: #commonize studio experiments', I apply my observations from Parts A and B in a set of experiments that include a comparison group, pilot experiments, and field experiments. Meeting the call for 'thick descriptions' (Gibson-Graham, 2014) from diverse economies scholars and 'exemplary processes of inquiry' (Binder & Brandt, 2008) from design research scholars, I have documented #commonize studio's experimental processes as finely as possible within the parameters of this thesis. The value of #commonize studio's experiments lies more in process than end result. These end results often failed to meet my likely-naïve goals; yet, these failures are crucial because they narrow the field, ever so incrementally, and direct our gaze to avenues of exploration that may be more fruitful. The principal research question underpinning Part C is: *How can these two literatures support*

commons-makers? This research question also reflects a shift from theoretical research in Parts A and B to the needs of practitioners, commons-makers, in Part C.

In the final section, 'Contributions and conclusion', I outline four contributions that this research makes to the fields of commons, design, and diverse economies research. The first contribution is studio experimentalism as a potential methodology to guide both commons-making and other design research. The second contribution is the methods and discourse created by #commonize studio that support this generative turn in commons research. The third and fourth contributions are more granular in nature, enriching the commons and diverse economies literature through this 'research through commoning'. Concluding the research, I identify three indispensable capacities for researchers interested in further commons-making research: scaffolding (Part A), which is the construction of commons-makers' knowledge in order to pursue commons-making independently; coaching (Part B), which is the role of researcher as a critical friend to commons-makers; and infrastructuring (Part C), which is the use of reflection-in-action to respond to the complex and evolving needs of commons-in-formation.

Part A: Commonize

Part A asks: *What does the commons literature offer commons-making researchers?* The commons literature dates back to the 1970s and offers Nobel Prize-winning research on how successful commons operate, yet almost none of the concepts (e.g. frameworks, models, tools) from the commons literature are being used by design researchers engaged with commons-making. Before dismissing the commons literature as useless, I ask: Could any of this literature be useful in some way? Could this literature help design researchers, and the communities they work with, become more effective in commons-making, even just a little bit?

In Chapter 0, 'Defining and communicating commons', I review how I have defined and communicated commons during this research process as #commonize studio. Sharing these definitions serves two purposes: (a) to situate commons for those who are less familiar with this research area, and (b) to initiate sharing by other researchers about how they define and communicate commons so we can improve our practice collectively.

In Chapter 0, 'Design research and commons literature', I ask: How do design researchers engage with the commons literature? I respond to this question by performing a systematised review of the design research literature to understand who design research scholars are citing for their understanding of commons and how they are in turn defining commons. I also use this systematised review to evaluate which concepts from the commons literature design researchers are using. While the review finds that design researchers are not engaging with most concepts from the commons literature, the review does find that design researchers are generating novel contributions to the commons literature in the development of 'infrastructuring' and 'institutioning'.

In Chapter 0, 'Commons literature concepts', I revisit the commons literature to answer the question: What concepts from the commons literature might be useful to design researchers? I start with the design principles for managing commons, which are referenced by several design researchers, and then introduce other concepts from the commons literature that #commonize studio uses in its experiments: analytical frameworks, action situations, choice levels, and institutional grammar.

In Chapter 0, 'Making the generative turn', I return to the commons literature to ask: What discourse from the commons literature might be useful to design researchers? The earlier

review of design literature finds that design researchers are engaged in the 'politics of the commons' (Kioupkiolis, 2019), particularly counter-hegemonic commons, but lack language to articulate this politics as a commons-making process. In response to this question, I perform a systematised review of the term 'commonism' as a counter-hegemonic politics of the commons. From this review, I created the term 'commonize' to support what I have called the generative turn in commons scholarship, moving from analytical research on extant commons to generative research for commons-making.

Political position statement

I make two position statements in this thesis that also happen to engage with the very gaps and challenges identified in the thesis. This first statement is a statement about my politics, a gap observed in the commons-making literature. I state in the Introduction (p. 3) that my political interest is counter-hegemonic commons-making. Counter-hegemony is an unwieldy word, defined in the Glossary as 'Critiquing, confronting, or dismantling the legitimacy of the status quo, often labelled counter- or anti-capitalist'. In short, counter-hegemonic politics asserts that there is a diversity of valid economic systems, or economies, besides capitalism. The most profound impact of my political position on this thesis was the use of diverse economies as the research methodology for framing my research process and making sense of my research outputs. While I tried to present the research outputs so that others could make sense of them in other ways, the analysis in this thesis remains limited to the action research for diverse economies framework (Chapter 8.6). Chapter 4.2 further reviews how this political position inspired me to review how other researchers named this counter-hegemonic politics of the commons, leading to the creation of the word 'commonize'. Finally, I frame experiment success and failure in terms of the diverse economies framework, starting with an experiment I deem a failure, the comparison group in Chapter 0, through to reflection in the Epilogue.

Defining and communicating commons

What is a commons? How did #commonize studio define commons? Before moving forward, I'd like to start with some definitions and the rationale behind those definitions. If there's one lesson learned from performing #commonize studio, it's that every person holds a different understanding of commons. Also, I want to present how #commonize studio communicated commons to others in the hopes it will spur others to do so. Absent from all of the design research papers in the review (Chapter 0) is how design researchers explained commons to the communities with whom they worked. In the spirit of studio

experimentalism, one 'data set' that is needed and missing is how to explain commons to various audiences.

The version most commonly used by #commonize studio is:

> *A commons is a shared resource that is governed by the community of actors (not the state or private market) who depend on or are affected by that resource.*

The next question people usually ask is, 'Can you give me some examples?' The types of examples #commonize studio provides have changed over time. Early on, #commonize studio drew on categories found in a variety of scholarship, e.g. 'digital' commons like Wikipedia and 'natural resource' commons like forests. Resonating with Helfrich's (2013) call to ditch 'common categorization', #commonize studio later referred to commons 'dimensions' to emphasise that commons contain many of these features (digital, physical, knowledge, etc.), even if one dimension might be more prominent. This approach is exemplified in a presentation slide (Figure 3) from #commonize studio's Hack4Blood project.

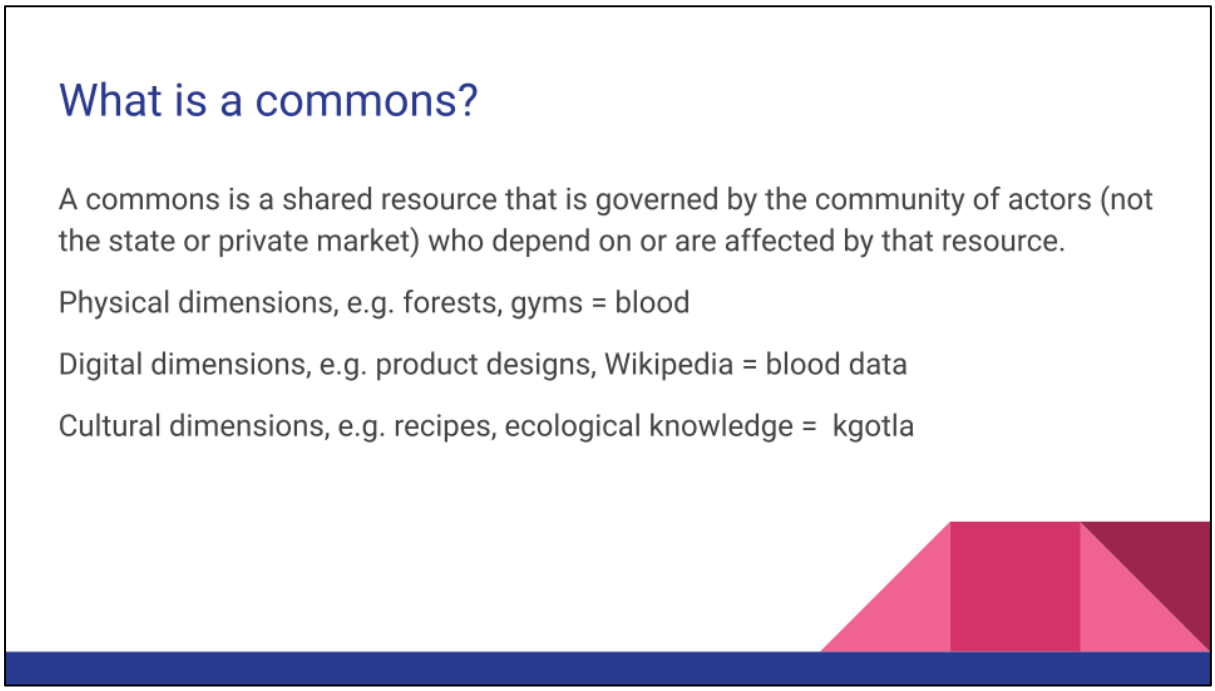


Figure 3. The commons definition #commonize studio employed in the most recent studio project in this thesis, Hack4Blood.

In projects taking place beyond this thesis, another working definition is:

> A commons is a shared resource governed by a community rather than the state or the private market. Commons can be anything from a community farm to a mobile app,

and most commons nowadays will consist of a physical, a digital, and a cultural dimension.

These definitions will satisfy some and infuriate others. The word 'resource' is increasingly problematised in commons scholarship (Escobar, 2015; Esteva, 2014; O'Donovan, 2015) because the term resource 'transmogrifies them [commons] into economic goods, commodities, imposing on them a regime of public or private property and the corresponding norms' (Esteva, 2014, p. i155). What alternative words should we use? Bollier (2021) has offered 'self-organized social systems', though #commonize studio did not try this term in any projects so far. The next deliberate word choice is 'rather than the state or the private market'. One learning point from early studio projects was that the use of the word 'market' proved confusing to people. The full title of Bollier and Helfrich's first book is *The Wealth of the Commons: A World Beyond Market & State*, a phrasing that is repeated in several papers in this review; however, markets are ancient and not unique to capitalism. 'Private' has been added to modify the word 'market' to clarify that we mean private capitalist markets.

A second approach to defining commons has been a formula, a more visual way to present the commons. This approach to presenting commons as a formula is derived from the German discourse made accessible by Euler (2016). The formula originally developed by Meretz (2012) is:

Commons = Resources + Communities + Rules & Norms

Two versions of this formula used by #commonize studio are:

Commons = Resource + Community + Rules

Commonized resource = Resource + Community + Rules

The first version is a simplification of Meretz's formula. The second version is an attempt to more clearly connect commons as an alternative to the 'market and state' by building on the term commonize.

Finally, I'd like to present three definitions by influential commons scholars. You will see that they are variations on a theme, the same theme that is captured in the formula above. Communicating commons means trying different wordings because every person processes knowledge differently.

- Bauwens: 'The commons are three things at the same time: a resource (shared), a community (which maintains them) and precise principles of autonomous governance (to regulate them).' (Manouvrier, 2019)

- Vivero-Pol: 'It's a collective way of managing a resource. So you have a resource, you have a community that is managing that resource and you have the governance.' (Schweizer, 2021)
- Bollier: 'a shared resource, co-governed by its user community according to the rules and norms of that community' (Bauwens et al., 2019, p. 3; Bollier, 2011)

These three definitions define commons as a living entanglement between resources (commons), people (community or commoners), and rules.

Design research and commons literature

How do design researchers engage with the commons literature? In my initial surveys of the design research literature, I noticed that design researchers were not using any of the concepts from the commons literature, concepts that I thought might be useful. I followed up this anecdotal observation with a systematised review of the design research literature to understand how design researchers have been engaging with the commons literature so far. I was particularly curious to know which scholars design researchers sourced their understandings from, how they were defining commons, and which concepts, if any, they used from the commons literature to support their commons-making research.

1.1. Systematised review design

This review is, to my best knowledge, the first of its kind. Entering this new territory came with challenges. The two principal challenges in conducting this review were:

- What qualifies as design research? Design research is published in many journals and conference proceedings.
- How to perform a keyword search for 'commons'? The term 'commoning' produces relevant results; however, 'commons' is problematic. Most databases search 'common' as well, generating millions of irrelevant results.

The systematised review entailed five steps:

1. Keyword selection
2. Journal identification
3. Journal search using Scopus
4. Search expansion to conference papers
5. Search expansion using the DRS digital library

Keyword selection. The search across all steps used two keywords, 'commoning' and 'commons'. For all searches, records were limited to appearance in title, abstract, or keyword. While 'the common' is used in a limited number of papers, this term was too generic to generate useful results; however, several papers using this term were included in the review because they used one of the other keywords.

Journal identification. A subjective decision in such a review is which research qualifies as design research. A first search for 'commoning' in Scopus in the title, abstract, or keyword fields yielded over 600 records, and the top five journals by number of records were primarily geography journals: *Antipode* (radical geography); *International Journal of the Commons* (which skews towards social sciences); *Capitalism, Nature, Socialism* (political ecology); *Geoforum* (human geography); and *Environment and Planning E* (human geography). I would have needed to create a highly contestable rubric to assess these abstracts as being design research or not. A search using 'commons', which Scopus searches as both 'common' and 'commons' yielded 3.5 million results. To address this challenge, I limited results to design journals, which reasonably means any records found can be presumed to be design research. Presence in these journals also signifies a level of mainstream acceptance in the design research community. But what constitutes design journals? I used two design research rankings papers as a basis for selecting the 'top' design research journals. Friedman et al. (2008) ranked journals based on how scholars identified leading journals in the design field. Mansfield (2016) produced a more recent ranking based on the 2004 UK Research Excellence Framework (REF), ranking journals based on the articles submitted by academics for review as part of the REF. Between these two rankings, I ultimately searched 16 journals.

Journal search using Scopus. I searched these 16 journals using Scopus, once using the term 'commoning' and once using the term 'commons', anywhere in the title, abstract, or keyword fields. The search using the term 'commoning' generated nine records (Table 1).

Table 1. Scopus results for 'commoning' in top design research journals.

Friedman et al. (2008)	**Records**	**Mansfield (2016)**	**Records**
Design Studies	1	Art History	–
Design Issues	–	The Design Journal	–
International Journal of Design	–	Design Issues	–
The Design Journal	–	Oxford Art Journal	–
Journal of Design History	–	Applied Ergonomics	–
Journal of Design Research	–	Visual Culture in Britain	–
Engineering Design	–	Third Text	–
CoDesign	5	Journal of Design History	–
Artifact	–	Performance Research	2
Journal of Engineering Design	–	Design Studies	1

The search using the keyword ‘commons’ is less precise. There were many more records, but most records contained ‘common’ rather than ‘commons’. Examples of ‘common’ in abstracts that were eliminated from the review include:

- common causes
- common patterns
- common phenomenon
- common desires
- common needs
- common challenges
- common methods

After filtering out these irrelevant records, the search using the term ‘commons’ generated 11 records (Table 2).

Table 2. Scopus results for 'commons' in top design research journals. Total column indicates the total records found and Commons column indicates the total records that contained 'commons' rather than 'common'.

Friedman et al. (2008)	**Total**	**Commons**	**Mansfield (2016)**	**Total**	**Commons**
Design Studies	64	1	Art History	17	–
Design Issues	4	–	The Design Journal	41	3
International Journal of Design	23	–	Design Issues	4	–
The Design Journal	41	3	Oxford Art Journal	12	–
Journal of Design History	8	–	Applied Ergonomics	176	–
Journal of Design Research	22	–	Visual Culture in Britain	4	–
Engineering Design	–	–	Third Text	21	–
CoDesign	12	3	Journal of Design History	8	–
Artifact	–	–	Performance Research	49	–
Journal of Engineering Design	–	–	Design Studies	64	1

Search expansion to conference papers. I knew from previous research and experience that many relevant papers are contained in the Participatory Design Conference (PDC) proceedings, which are published by the Association for Computing Machinery (ACM). I performed the same Scopus search limited to conference papers. The search using the term 'commoning' yielded 16 records, which were all reviewed. The search using the term 'commons' yielded over 5,000 records. To narrow these results, I further limited the search to 'ACM International Conference Proceedings', which I knew contained PDC papers, and 'Conference on Human Factors in Computing Systems Proceedings' (CHI conferences), where I also knew some papers existed. These two conference proceedings yielded 66 records, of which 25 were relevant (they contained the word 'commons' rather than 'common'). Future reviews might expand this search to other conference proceedings. I noticed that my own conference papers for the European Academy of Design (EAD), International Association of Societies of Design Research (IASDR), and Design Research Society (DRS) did not show up in Scopus results, which led to the final step.

Search expansion using the DRS Digital Library. To search these other conference papers, I searched the DRS Digital Library using the same two terms. This search yielded four records from DRS '16, when there was a track theme named 'The politics of commoning and

designing', and one record from DRS '22. Finally, I added three journal papers I have cited in previous papers that are outside the 16 top journals used. These three papers contain the term 'commons' but not 'commoning' and were published in other journals.

This review generated 43 records across all steps, which are listed in full in 'Appendix 1. Designing commons database' so that future researchers may adapt this emergent database for their own research. The two tables above convey the concentration of results in a single journal, *CoDesign*. The other concentration is authorship, which I visualise in a world cloud (Figure 4). The four largest names (and number of papers authored) –Teli (9), Marttila (4), Seravalli (3), and Baibarac (3) – represent 41 percent of the papers in this review. One implication of this concentration is a type of path dependence. Modern design research on commons has, on one hand, inherited a healthily complex understanding of commons developed by this scholar group. On the other hand, negation of commons literature concepts by this scholar group has removed it from design research discourse. Tellingly, the three papers that do engage with the design principles for managing commons are by none of these top-producing authors.

Figure 4. Word cloud representing authorial concentration in systematised review.

1.2. Sources for understanding commons

The first part of this systematised review was observing how design researchers understand commons. Which scholars do they draw their definitions from? Is this the reason why design researchers do not use any concepts from the commons literature?

The review found five scholars most commonly cited by design researchers (Table 3):

- Ostrom (25 papers)
- Bollier and Helfrich (15 papers)
- Benkler (11 papers)
- Hardt and Negri (10 papers)
- Linebaugh (9 papers)

Table 3. Most cited commons scholars by design researchers.

Source	Records	Ostrom	Bollier/Helfrich	Benkler	Hardt/Negri	Linebaugh
CoDesign	7	3	5	2	2	3
The Design Journal	2	-	-	1	-	-
Design Studies	1	1	1	-	1	1
PDC proceedings	13	8	4	3	3	3
ACM conferences	3	1	1	1	1	1
CHI conferences	9	5	-	2	-	-
DRS Digital Library	5	5	2	-	2	1
Manually added	3	3	2	2	1	-

Based on Papadimitropoulos's (2017, 2020) work that aims to surface and categorize the politics of the commons, this short list represents the full spectrum of commons politics. Ostrom and Benkler belong to the neoliberal category, Bollier and Helfrich belong to the reformist category, and Linebaugh and Hardt and Negri belong to the counter-hegemonic category. Beyond these most frequently cited scholars, the pool of papers in this systematised review cover many seminal critical works in the commons literature, with two or more papers citing literature about:

- Marxist/postcapitalist commons (De Angelis, 2017; Harvey, 2012)
- Urban commons (S. Foster & Iaione, 2019)
- More-than-human commons (Bresnihan, 2015)

In short, design researchers engage with a robust diversity of the commons literature. The popularity of Bollier and Helfrich, Linebaugh, and Hardt and Negri indicate a widespread interest in counter-hegemonic commons. The two most popular references are Ostrom's books, which contain all but one of the key commons concepts I review later. We cannot assume that all authors are reading these books in full, but this does mean that design researchers are aware of the literature that contains these concepts. Below are the definitions that these authors provide about commons that inform design research.

Ostrom. While most papers cite *Governing the Commons*, few papers draw from this book for explaining commons. Ostrom's early definitions of commons are directed towards peer economists and remain obtuse, so this decision is understandable. The most concise definition from *Governing the Commons* is: 'a natural or man-made resource system that is sufficiently large as to make it costly (but not impossible) to exclude potential beneficiaries from obtaining benefits from its use' (1990, p. 30). Ostrom produced a simpler definition in *Understanding Knowledge as a Commons*, cited by some papers, as 'a resource shared by a group of people that is subject to social dilemmas' (Hess & Ostrom, 2006, p. 3).

Bollier and Helfrich. The collective works by Bollier and Helfrich, who write for a more lay audience than Ostrom, are cited next most frequently. The trilogy by this duo includes: *The Wealth of the Commons: A World Beyond Market & State* (2012); *Patterns of Commoning* (2015); and *Free, Fair, and Alive: The Insurgent Power of the Commons* (2019). Many papers also cite Bollier's earlier book, *Think like a Commoner* (2014). The authors offer a number of definitions of commons over the years. The most frequent verbatim citation among the papers in the review comes from the last book *Free, Fair, and Alive*: 'Commons are living social systems through which people address their shared problems in self-organized ways.'.

Benkler. Benkler shows up repeatedly because many of these papers engage with digital commons, an area opened up by Benkler in *The Wealth of Networks: How Social Production Transforms Markets and Freedom* (2006). In this book, Benkler coined the term 'commons-based peer production' (or CBPP), which the author defines as 'an emerging innovative model of production characterized by peer-to-peer collaboration for the creation or maintenance of shared resources, which are freely accessible and reusable by anyone.' (Benkler et al., n.d.). The term 'peer-to-peer' or 'peer-based' has been picked up by numerous scholars and is included, for example, in Helfrich's (2013) outline for a 'commons-creating peer economy'.

Hardt and Negri. Commonwealth by Hardt and Negri (2009) adds another layer to commons articulated as 'the common'. The most frequently cited definition by design

researchers is: 'This common is not only the earth we share but also the languages we create, the social practices we establish, the modes of sociality that define our relationships' (2009, p. 139). The common again moves away from commons as inert resources to commons (whether we call it commons, commoning, or the common) as an ensconcing reproducible 'mode of sociality'. This concept bears resemblance to what other scholars conceive of as habitus (Bourdieu, 1977, 2008) or social imaginary (Castoriadis, 1987).

Linebaugh. Linebaugh is a popular reference among these papers for originating the term 'commoning' in *The Magna Carta Manifesto: Liberties and Commons for All* (2008). The sentence frequently quoted by design researchers is:

> To speak of the common as if it were a natural resource is misleading at best and dangerous at worst — the commons is an activity and, if anything, it expresses relationships in society that are inseparable from relations to nature. It might be better to keep the word as a verb, an activity, rather than as a noun, a substantive. (2008, p. 279)

1.3. Design researcher definitions

How do design researchers define commons in their own language? Few papers include original definitions by design researchers. Instead, authors tend to present the definitions above in their literature review. Several papers do paraphrase scholarly definitions, offering some insight into designerly language.

'Towards commons design in participatory design' (Marttila et al., 2014), is credited with originating interest in commons research in the participatory design field (Bettega et al., 2022) and is cited by nine papers in this review. The authors do not offer their own definition but instead present Hess and Ostrom's (2006) definition for commons quoted earlier. This early participatory design paper recognises the living entanglement between commons, people, and rules presented by modern scholars above, which has influenced future participatory design research. In this respect, design research has leapfrogged commons scholarship, starting with a complex understanding of commons that has taken commons scholars decades to develop.

Another frequently cited design research paper is a workshop abstract, 'Commoning design and designing commons' (Botero et al., 2020). In this abstract, the authors offer the following definition: 'Commons are often referred to as resources or resource systems that are nurtured and shared by heterogeneous groups of people. Such resources are vulnerable

to social dilemmas and require that the community develops various mechanisms and rules to sustain them' (2020, p. 178).

I also looked at papers co-authored by Teli, the most prolific design researcher in this review, to see how definitions might have evolved over time. An early definition, drawing on Ostrom and Bollier, is:

> More specifically, the commons is a third-way institutional arrangement to manage specific resources, be they natural or digital, that is neither the state or the market, but rather a collective effort of the people directly interested in managing the resources through means that are based on democracy more than on hierarchies. (Teli et al., 2015, p. 19)

In a more recent paper, Teli and co-authors offer this much shorter definition, citing Bollier and Helfrich (2019, p. 17) as inspiration: 'Commons are living social systems through which people address their shared problems in self-organized ways.' (Bettega et al., 2022, p. 134). The authors go on to synthesise definitions by commons scholars with more accessible language into arguably the best definition offered by design researchers so far: '1) a collectively managed resource, the commons; 2) a group managing the resources, the commoners; and 3) the practices of managing something together, the commoning practices.' (Bettega et al., 2022, p. 134). This terminology is drawn from De Angelis's (2017) definition of commons: 'social systems that comprise three elements: common resources, governed by a community of commoners who also regulate their own relations, and processes of commoning, of social cooperation or communal doing.'.

Alongside these definitions, a handful of scholars offer their own versions. Marttila (2016) defines commoning as 'as an ongoing collective action for meeting shared goals and needs'. Two scholars invoke the term 'value production', a term associated with CBPP as championed by Benkler. Seravalli (2018, p. 2) writes: 'Today, the concept of commons is used to describe different kinds of initiatives where sharing (of different kinds of resources) and collaboration (among participants) enable processes of value production and the management and preservation of different kinds of resources.' Schaeper et al. (2022) relate value production in commons to co-design: 'Commons can be understood as deeply collaborative arrangements for value production based on participatory principles that resonate well with the idea of co-design aspirations.'.

Finally, several papers engage in the 'politics of the commons' (Kioupkiolis, 2019) or the 'political economy' of commons (Bettega et al., 2021; Lyle et al., 2018), in their definitions. Baibarac and Petrescu (2017, p. 229) define a '"new commons" movement, which is concerned with communal management of land and resources as a project of resistance to

privatisation and globalisation'. A variation on this definition is '*activist/practitioner movement*, which treats commons as a vehicle for social change and democratic governance' (Marttila et al., 2014). These definitions of commons and the popularity of counter-hegemonic commons scholars for sourcing definitions indicate a discipline-wide interest in counter-hegemonic commons.

1.4. Engagement with commons concepts

Which concepts from the commons literature do design researchers use? The only concept from the commons literature found in the systematised review was the design principles for managing commons. Nearly one quarter of the papers mention the design principles, though only three papers conduct any form of empirical research using the design principles, which are reviewed in more detail below:

- 'Sustaining Open Data as a Digital Common – Design Principles for Common Pool Resources Applied to Open Data Ecosystems' (Linåker & Runeson, 2022)
- 'Social Commoning as a Way to Transition towards Alternative Systems by Design' (Schaeper et al., 2022)
- 'Algorithmic Food Justice: Co-Designing More-than-Human Blockchain Futures for the Food Commons' (Heitlinger et al., 2021)

The first two papers present a similar methodology. In these papers, the authors explore how the design principles might inform a future design of a hypothetical commons.

Linåker and Runeson (2022) consider how the design principles might be revised to inform future open data ecosystems (ODE). The authors perform this thought experiment in three steps. First, they review what other scholars observe about similar ODEs, primarily Wikipedia and Drupal, using each principle as a lens for this review. Second, they apply these observations to three ODE cases. Third, they revisit and revise the design principles for ODEs based on these observations. The important insight of this process with respect to ODEs is that the 'brain time' to manage the commons is the limited resource that requires governance.

Schaeper et al. (2022) consider how the design principles might inform the design of a marine protected area (MPA) in South Africa. The authors undertake this analysis in three steps. First, the authors use the design principles as a lens to review the current state of the MPA based on the literature. Second, they politicise stakeholder definitions for the MPA, expanding stakeholders to include local communities and non-human 'ocean ecosystem, fish, seabirds, & marine species'. Third, they revisit the design principles and propose revisions

based on this revised stakeholder understanding. The result of this process is a set of 'Starter questions for using commoning in the context of systemic design', an approach to commons-making that mirrors 'Design questions for data commons' (Bloom et al., 2021) by commons scholars.

In design research terms, these papers might be considered research for design. Neither paper entails direct commons-making but rather a preliminary stage of design research, working through how the design principles might be adapted for use in future commons-making. A gap left by both papers is how to translate such 'starter questions' into meaningful interactive infrastructure for communities, a gap that #commonize studio explores.

In the third paper, Heitlinger et al. (2021) employ game design and speculative design methods to explore how the design principles might support posthuman design (Forlano, 2017) of decentralised autonomous organizations (DAOs). The authors develop these speculative DAO prototypes through three workshops with members of a city farm. In the first workshop, participants map stakeholders using four categories — human, creature, natural environment, infrastructure — an approach to politicising stakeholders similar to Schaeper et al. (2022). Participants identified the 'matters of care' (Puig de la Bellacasa, 2017) for the more-than-human stakeholders, an approach used in other design research papers (Fritsch et al., 2022; Huybrechts et al., 2022). In the second workshop, participants turned these matters of care into scenarios related to each of the design principles through live action role play. In the third workshop, participants developed paper-based DAO prototypes based on the scenarios, each of which tokenised different caring behaviours, e.g. caring for soil health, waste, or other stakeholders. This research stands as the most robust attempt in design research to engage with the design principles. This research is also dependent on long-term research partnerships and deep expertise. Echoing a call among participatory design researchers (Baibarac et al., 2021; Botero et al., 2020; Marttila et al., 2014), how might we translate this research into infrastructure for other designers and communities?

Why are the design principles for managing commons, which seem a natural fit for design research, under-utilised by design researchers? The remaining papers that cite the design principles do not develop them in any way to support commons-making (Cila et al., 2020; Franz & Elzenbaumer, 2016; Krieger et al., 2009; Marttila, 2016; Marttila et al., 2014; Seravalli, 2018). In their early and influential paper, Martilla et al. (2014) dismiss the design principles as a generative foundation for design research: 'Although these design principles were not intended to provide a model for designing a commons, they can help PD [participatory design] to develop a more nuanced understanding of design agency and its interplay with multiple mechanisms of collective action.'.

This opinion stands in contrast with how other scholars are using the design principles to design commons. In the *International Journal of the Commons*, for example, Poblet and Sierra (2020) use the design principles to guide design iteration of a Spanish app and mutual help community called uHelp, while Sinner et al. (2022) use the design principles to guide an action research project with Māori communities to create water catchment commons. In the *International Journal of Integrated Care*, Robert et al. (2021) use the design principles to explore a speculative commons called CO-SHARE (Co-design of Services for Health and Re-entry). The scholars in these three papers do not describe themselves as design researchers, yet they are performing design research. Making the generative turn in commons scholarship may, therefore, entail building a sense of community among these disparate researchers.

1.5. Contribution to commons scholarship

An emergent observation from the review was that design researchers are developing their own methodologies for commons-making that feed back into commons scholarship. The systematised review revealed several important contributions, specifically the development of 'infrastructuring' and 'institutioning'. These two terms do not appear in any papers in the *International Journal of the Commons*, marking a unique and important contribution by design research to the generative turn in commons scholarship.

Infrastructuring

Infrastructuring is the more robust and developed term of the pair. The following definition by Le Dantec and DiSalvo (2013, p. 247) captures the gist of infrastructuring in design: 'Infrastructuring, then, is the work of creating socio-technical resources that intentionally enable adoption and appropriation beyond the initial scope of the design, a process that might include participants not present during the initial design.'. A pithy explanation that nicely materialises these otherwise enigmatic 'resources' is: 'activities that aim to redesign components, relations, and routines' (Penuel, 2019).

Scholars in this review most commonly cite the foundational work of Star (Bowker & Star, 2000; Star & Ruhleder, 1994), who describes infrastructure as a 'fundamentally relational concept' or 'relational property' that 'becomes infrastructure in relation to organized practices' (Star & Ruhleder, 1994, p. 113). As a relational concept, infrastructure is about how something becomes infrastructure and for whom. Papers in this review cite a diverse but consistent group of scholars for developing their lenses on infrastructuring, in particular:

- Design Things (Binder et al., 2011; Björgvinsson et al., 2010, 2012)
- Publics (DiSalvo, 2009; Le Dantec & DiSalvo, 2013)
- Alignment (Hillgren et al., 2011; Karasti, 2014)
- Strategies and tactics (Bødker et al., 2016, 2017)

Healy and Krogh (2022, p. 79) propose a new term, 'architecturing', as a subset of infrastructuring activity that is 'concerned with building [physical] structures that dictate how and by who or what something can be used'. This idea of architecturing is similar to 'commonist affordances' proposed by Miyazaki (2019). The experimentation with language is welcome and important at this developmental stage of commons-making, helping to render visible the many ways in which the politics of counter-hegemonic commons are formed, contested, and reproduced.

Institutioning

Institutioning is a newer and less developed concept than infrastructuring in design research. Most papers cite 'Institutioning: participatory design, co-design and the public realm' (Huybrechts et al., 2017) as the seminal paper originating this term. The authors develop this term based on Castell (2016), who calls the process 'institutional framing'. Castell has in turn drawn this term from Schön and Rein's (1994) three-level model of policy frames, institutional action frames, and metacultural frames. Castell's design case for institutional framing happens to be a classic commons, though this term is not used. Castell's design case is a 'community-led initiative' where people 'share common problems and resources which may be a ground for collective action' and resolve these collective action problems through 'collective processes started and led by residents to improve living conditions in the place where they live' (2016, p. 309). Huybrechts et al. (2017, p. 151) carry forward the model developed by Castell and advance the term institutioning to 'draw attention to institutions as active sites of change which play a role in framing PD and Co-Design processes, rather than existing as inert backdrops.'. The authors consider institutioning to be politicised work, 'comprised of gradual processes of altering (consolidating or challenging) existing frames of institutions'.

Development of this term involves a consistent group of scholars building out the field together, most often including: Cibin, Foth, Huybrechts, Lyle, and Teli (Cibin et al., 2019; Foth & Turner, 2019; Huybrechts et al., 2022; Teli et al., 2018, 2022). Each paper explores different dimensions of institutioning, but these papers are consistent in pursuing institutioning in the manner set out by Huybrechts et al. (2017). That is, institutioning is about institutions as organisations, or 'institutions as actors' (Lodato & DiSalvo, 2018, p. 11).

Teli et al. (2022) discuss intermediation as a form of institutioning, particularly how designers can avoid creating separate 'designerly spaces' for design activities and instead support the institutions involved to embed these practices in ways that make sense to them. Teli et al. (2018, 2022) also discuss 'institutioning the common' to articulate 'the combination of these perspectives, looking at how the institutioning work in PD practices can actually intersect with practices and processes nourishing the common' (2018, p. 2). The authors also point to the need for a more 'refined theoretical toolbox' to engage with 'vertical and horizontal movements that define the process of institutioning' (2018, p. 10).

#commonize studio has adopted institutioning based on how design researchers define this term, but this meaning conflicts with how commons scholars from the social sciences define institutions. A pithy definition by North (1990, p. 5), who received the 1993 Nobel Prize in Economic Sciences for his work on institutional change, is 'institutions are the rules of the game'. A more informative definition by North (1991) is: 'Institutions are the humanly devised constraints that structure political, economic, and social interaction. They consist of both informal constraints (sanctions, taboos, customs, traditions, and codes of conduct), and formal rules (constitutions, laws, property rights).'. Ostrom advances this definition of institutions in *Governing the Commons*:

> 'Institutions' can be defined as the sets of working rules that are used to determine who is eligible to make decisions in some arena, what actions are allowed or constrained, what aggregation rules will be used, what procedures must be followed, what information must or must not be provided, and what payoffs will be assigned to individuals dependent on their actions. (1990, p. 51)

This definition is important to new institutional economics (NIE), where much of Ostrom's work is situated. Foth and Turner (2019) are the only design researchers in this review who explore NIE. While they do provide rationale for limiting institutioning to formal institutions, most commons scholars understand institutions from the same NIE lens as Ostrom.

The ramifications of choosing the design research definition of institutioning are not yet visible for #commonize studio. Using the term 'institution' in this way removes it from being used to describe the spectrum of rules, norms, and customs that commons researchers intend. In #commonize studio experiments, we tended to use words like 'rules' or 'customs' to name this wider spectrum of institutions. This compromise has thus far felt appropriate and certainly less daunting than trying to convince communities that institutions are the 'rules of the game'.

1.6. Scaffolding

The term scaffolding is not mentioned in any of the papers in this systematised review, yet many authors speak about processes that could be considered scaffolding. Marttila and Bottero (2017) propose the role of the installed base for commons-making, which several other papers cite (Lyle et al., 2018; Seravalli, 2018; Seravalli et al., 2017). This term comes from Star, who, in reference to infrastructuring, explains that 'Infrastructure does not grow *de novo*; it wrestles with the inertia of the installed base and inherits strengths and limitations from that base.' (Star & Ruhleder, 1994, p. 113). Where does this base come from, and how do design researchers modify it? Several papers describe a multi-year collaborative process with communities (Barbosa et al., 2016; Heitlinger et al., 2021; Marttila, 2016; Seravalli, 2018), often aimed at developing 'guiding principles' (Marttila, 2016, p. 4076) or 'shared values and interests' (Bettega et al., 2021, 2022). Martilla (2016, p. 4076) suggests that design researchers 'should work through infrastructuring a "commons culture"'. These processes seem to fall under metacultural frames rather than institutional frames.

Foth and Turner (2019) correlate policy frames with infrastructuring and institutional frames with institutioning, while metacultural frames are correlated with 'commoning' (Figure 5). However, people must first see themselves as commoners engaged in commoning for this metacultural frame to work. The experience of #commonize studio accords with the experience of the design researchers above, where developing a 'commons culture' is paramount to commons-making. We might call this 'metaculturing' or 'base installation', but the term 'scaffolding' is probably a more useful starting point.

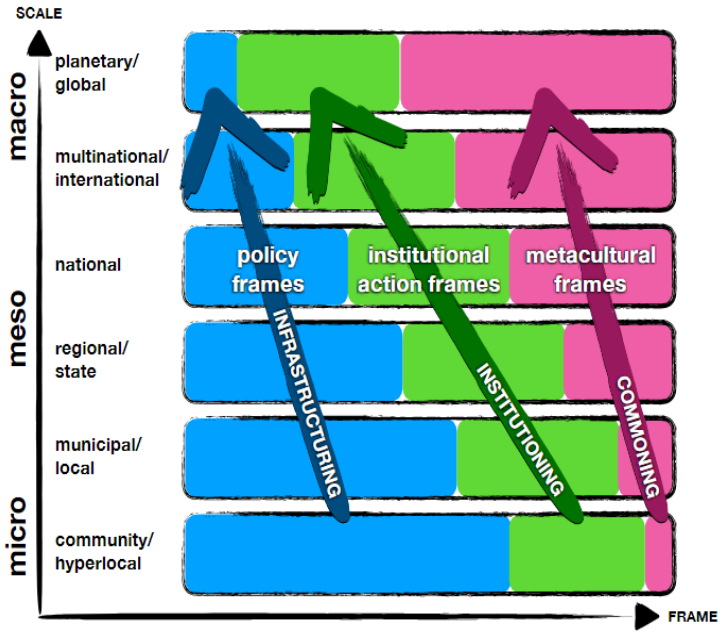


Figure 5. 'Design's triad across scales and political framing' (Foth & Turner, 2019).

What is the difference between infrastructuring and scaffolding? Cozza and De Angeli (2015) provide the most thorough comparison between infrastructuring and scaffolding within design research. They draw principally on Orlikowski (2006) for scaffolding and Star (Bowker & Star, 2000) for infrastructuring (Table 4).

Table 4. Features of scaffolding and infrastructuring (Cozza & De Angeli, 2015, p. 111).

Scaffolding	**Infrastructuring**
Temporary	Embedded
Flexible	Transparent
Portable	Reach or scope
Numerous forms	Taken-for-granted
Heterogeneous	Linked with conventions of practice
Emergent	Standardized
Generative	Built on an installed base
Dangerous	Visible upon breakdown
Constitutive	Incremental

The authors summarize the relationship between the two concepts as: 'Scaffolding enables the socio-technical infrastructuring. However, the occurrence of this turning point cannot be planned or predicted' (Cozza & De Angeli, 2015, p. 111). How do we know when we've made the turning point between scaffolding and infrastructuring? In addition to being unplanned and unpredictable, my own practice as #commonize studio found this boundary to be moveable and fuzzy.

One way #commonize studio attempts to delineate these two processes is by using the term scaffolding as it is generally employed across education, drawing on key theorists like Bruner (1978) and Vygotsky (Vygotsky & Cole, 1978):

> …a metaphor to describe the type of assistance offered by a teacher or peer to support learning. In the process of scaffolding, the teacher helps the student master a task or concept that the student is initially unable to grasp independently. The teacher offers

> assistance with only those skills that are beyond the student's capability. (West et al., 2017, p. 20)

Benson (1997, p. 126) offers the metaphor of scaffolding as 'a bridge used to build upon what students already know to arrive at something they do not know'. The bridge metaphor is useful because, in the tradition of critical pedagogy (Freire, 2014), a bridge is two-way, meaning that this process can move in the student-to-teacher direction too.

The experience of #commonize studio has been that scaffolding, in the most conventional use of that term, has been critical to commons-making. Time spent scaffolding exceeded what was anticipated in most studio projects. The papers in this review do not use this term but discuss this challenge using other language. #commonize studio wove scaffolding into infrastructure, e.g. the discourse used in infrastructure like the commoner persona (versus user persona), and increasingly approached scaffolding as a dedicated activity. Naming scaffolding as a process also directs the designer's gaze towards the politics of the commons, seeking first to develop an 'installed base' or shared 'metacultural frame' called commoning from which infrastructuring may emerge.

Commons literature concepts

In the previous review of how design research engages with commons literature, we saw that the design principles have found some traction in three papers, but other concepts have not. In this section, I briefly review several long-standing concepts from the commons literature that I believe may be useful to design researchers and that have informed #commonize studio experiments. We might also call these concepts the raw materials for scaffolding, infrastructuring, and institutioning in commons-making. #commonize studio has pursued one approach. In making this generative turn, these raw materials can be transformed in countless ways by others.

1.7. Design principles for managing commons

The design principles for managing commons are the most known concept from the commons literature among design researchers and more broadly.

Ostrom (1990, p. 90) first articulated these eight design principles in *Governing the Commons* after years of research (Table 5). The principles have largely remained intact after decades of interrogation by scholars. Foster and Iaione (2019; 2022) have developed different principles for the 'urban commons', which several design researchers reference but don't use, so these principles will be considered complementary to rather than a substitution

for the design principles for managing commons. The design principles provide a checklist of sorts for what a functional commons must contain, but a community must still figure out how to use these design principles to make commons.

Table 5. Design principles for managing commons, as originally articulated by Ostrom (1990, p. 90). At this time, Ostrom used the term 'common-pool resource' (CPR), which we will treat as synonymous with commons.

Principle	Description
1	Clearly defined boundaries: Individuals or households who have rights to withdraw resource units from the CPR must be clearly defined, as must the boundaries of the CPR itself.
2	Congruence between appropriation and provision rules and local conditions: Appropriation rules restricting time, place, technology, and/or quantity of resource units are related to local conditions and to provision rules requiring labor, material, and/or money.
3	Collective-choice arrangements: Most individuals affected by the operational rules can participate in modifying the operational rules.
4	Monitoring: Monitors, who actively audit CPR conditions and appropriator behavior, are accountable to the appropriators or are the appropriators.
5	Graduated sanctions: Appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and context of the offense) by other appropriators, by officials accountable to these appropriators, or both.
6	Conflict resolution mechanisms: Appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials.
7	Minimal recognition of rights to organize: The rights of appropriators to devise their own institutions are not challenged by external governmental authorities.
8	Nested enterprises: Appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises.

I have rephrased this language in several papers by synthesising several posts from the website *Medium* to reflect how these principles are explained today to mass audiences (Table 6). A short explanation of each of these principles follows below.

Table 6. Design principles for managing commons based on language in Medium posts (Sacks & Galabo, 2022).

Principle	Description
1	Define clear group boundaries.
2	Rules need to fit local circumstances.
3	Those affected by the rules can participate in modifying the rules.
4	Rule-making rights of community members are respected by outside authorities.
5	Rules are enforced by effective and accountable monitoring.
6	Use graduated sanctions for rule violators.
7	Provide accessible, low-cost means for dispute resolution.
8	Commons may be part of nested ecosystems within larger commons.

Define clear group boundaries. A frequent misinterpretation of commons is that commons are 'resources that can be shared by all members of society' (Dinnage et al., 2022). Historically, most commons are not shared by all members of society. Even when a resource could be shared by all of society, there are many examples where such commons are limited by certain commoners. For example, credit rating data is shared between vendors and credit rating agencies but not with you.

Rules need to fit local circumstances. The essence of this principle is that rules should make sense for the community involved. The nature and scope of rules for a regional delta will look different than rules for a neighbourhood toy library. While this principle might feel obvious, the language of this principle counters tendencies to create singular solutions, which you have likely encountered under the banner of terms like 'rationalize', 'streamline', or 'unify'.

Those affected by the rules can participate in modifying the rules. This principle resonates strongly with co-design principles and proved to be a good starting point in #commonize studio partner discussions. The word 'modifying' differentiates commons from most co-design projects because it means that commoners have the ongoing ability to govern, not just participate in the design phase of a project.

Rules are enforced by effective and accountable monitoring. Commons that endure generations depend on more than goodwill. Huron (2015, p. 974) notes, for example, that

housing cooperatives are initially sustained by a 'core of members who remember the fight to purchase the building in the first place', but that 'Someday the people who are committed to the commons may die, or move out, or change their minds.'. Designing methods for monitoring and enforcing rules is important to combatting the inevitable fading of such collective memory. Monitoring and enforcement are typically undertaken by the commoners, rather than outsourced beyond the community.

Use graduated sanctions for rule violators. In the commons literature, there must be enforceable consequences for violating rules. Since rules are monitored and enforced by peer commoners, enforcement must feel fair to all commoners. Similar to the households most of us grew up in, successful commons generally deploy escalating punishments for rule violation, starting perhaps with a 'free pass' and escalating to expulsion from the community.

Provide accessible, low-cost means for dispute resolution. Disputes will arise. A defining feature of most Indigenous governance systems is a freely accessible means for dispute resolution. These systems often take the form of village meeting space, such as the Botswana kgotla in the Hack4Blood #commonize studio project (Chapter 1.72), ensuring that 'conflicts could be transformed before escalating' (Moumakwa, 2011, p. 2).

Rule-making rights of community members are respected by outside authorities. Commons are defined by possession rather than ownership. A simple example of this difference is the staff kitchen, which staff usually have the right to manage but rarely own outright. Most commons do require outside authorities to permit their right to exist, or at least not to actively deny that right. This design principle is in tension with counter-hegemonic commonism. How can we make commons that may challenge or threaten the state's monopoly on legitimacy?

Commons may be part of nested ecosystems within larger commons. Ostrom reminds us that 'complexity is not the same as chaos' (2010, p. 644). Ostrom's early work on police forces found that 'Metropolitan areas with large numbers of autonomous direct service producers achieved higher levels of technical efficiency' (Ostrom & Parks, 1999, p. 290). A commons may not only be nested within larger commons, but it may also overlap with like-minded commons. Ostrom's original language was that commons may be nested in other 'enterprises'. From #commonize studio's counter-hegemonic perspective, the purpose of commons-making is to nest commons within other commons, rather than subjugate commons to capitalist systems.

1.8. Analytical frameworks

Commons scholarship is rooted in social sciences and accordingly emphasises scientific analysis of 'institutions for collective action'. The Institutional Analysis and Development (IAD) framework (Figure 6) and the Socio-Economic Systems (SES) framework (Figure 7) are enduring analytical constructs for commons researchers. The purpose of both frameworks, and the numerous iterations they have spawned, remains the same: to analyse institutions for collective action.

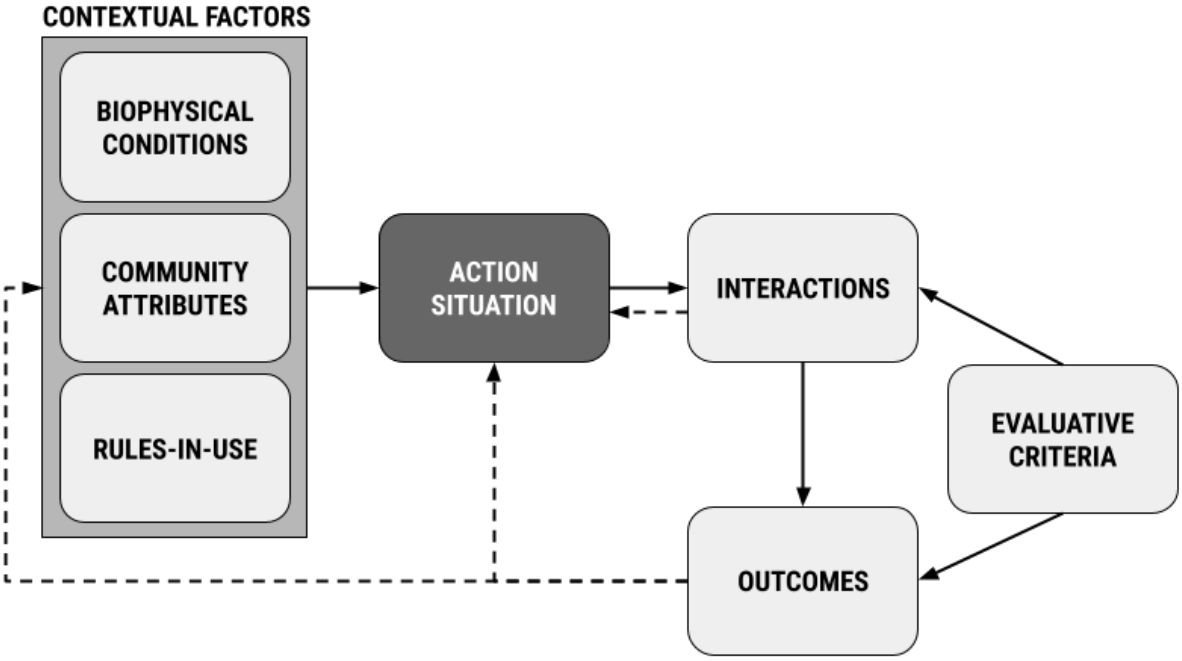


Figure 6. Institutional Analysis and Development (IAD) framework as presented in Sacks and Galabo (2022). Source: (Ostrom, 2010, p. 646; Ostrom et al., 1994, p. 37).

The IAD framework is explained in two papers (Galabo & Sacks, 2021; Sacks & Galabo, 2022). The excerpt below comes from 'A framework for infrastructuring commons creation' (Sacks & Galabo, 2022):

> The IAD framework is one of most robust and respected frameworks in commons scholarship for understanding commons infrastructure. The IAD framework was first published by Ostrom (1990). Since the initial publication of the IAD framework, scholars, including Ostrom, have adapted the IAD framework and created additional frameworks (see Cole, Epstein & McGinnis (2019) for coverage of the principal frameworks over time). This paper uses the revised IAD framework by Ostrom (2010, p. 646) as it is both clear and respected. As the name implies, the IAD framework provides a framework for analysing the development of 'institutions' that communities

use to govern and sustain a commons. In economics, 'institutions' are not physical buildings but rather 'the prescriptions that humans use to organise all forms of repetitive and structured interactions' (Anderies & Janssen, 2013, p. 28), which can range from social norms to artefacts.

We can divide the IAD framework into three sections: contextual factors, action situations, and interactions and outcomes. The three contextual factors on the left side are the foundation for a commons: resources (Biophysical Conditions) people (Community Attributes), and formal and informal rules (Rules-in-Use). The Action Situation in the middle of the framework can be thought of as a co-design scenario where 'two or more individuals are faced with a set of potential actions that jointly produce outcomes' (Anderies & Janssen, 2013, p. 43). The actors in a commons likely face multiple action situations that they must resolve to sustain the commons. The three boxes on the right side depict Interactions and Outcomes resulting from the Action Situation. The dotted lines leading from Outcomes back to the Contextual Factors and to the Action Situation illustrate the iterative nature of the IAD framework. People learn from the outcomes of their interactions in an action situation, which may alter their behaviour in the future and/or lead to changes to the contextual factors.

From a design perspective, the IAD framework succeeds at system visualization reasonably well. From my experience, once people know what these words mean, the flow and interaction between the elements of the IAD framework appear logical.

The Socio-Ecological Systems (SES) framework (Figure 7) is presented in 'User research to design a more-than-human food commons' (Sacks, 2022a) without significant explanation. The framework was developed years after the IAD framework in response to several concerns, namely the desire to standardize commons analysis and to account for the complexity of ecological systems (McGinnis & Ostrom, 2014; Ostrom, 2009).

The SES framework is a visible relative of the IAD framework. The contextual factors have been transformed into four overall variables. Biophysical context becomes resource systems and resource units, community attributes becomes actors, and rules-in-use becomes governance systems. Interactions and outcomes have been rolled into the action situation, which is now a set of focal action situations. The major innovation of the SES framework is the development of second-tier variables that researchers can use to code data from their institutional analysis (Table 7).

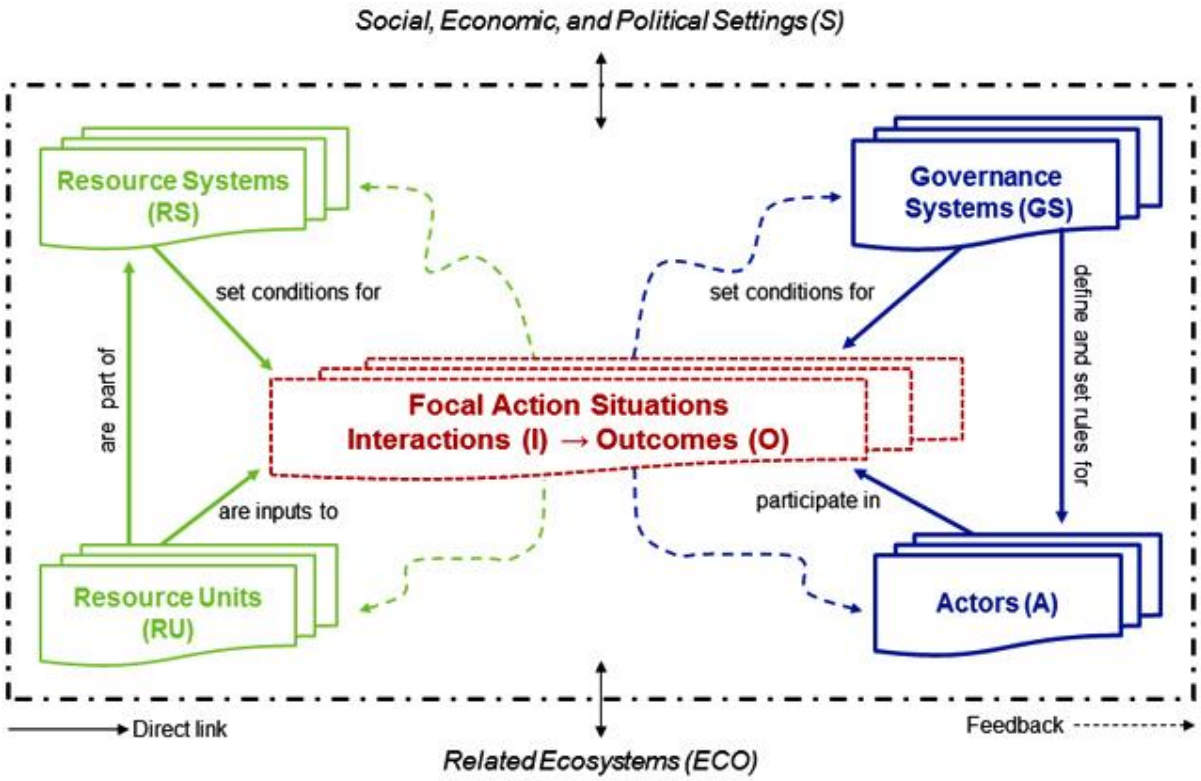


Figure 7. Socio-Ecological Systems (SES) framework (McGinnis & Ostrom, 2014).

Table 7. A selection of second-tier variables in the SES framework. Scholars code observations against these variables (McGinnis & Ostrom, 2014; Ostrom, 2009).

Resource Units (RU)	**Actors (A)**
Resource unit mobility	Number of relevant actors
Number of units	History or past experiences
Spatial and temporary distribution	Technologies available
Governance Systems (GS)	**Interactions (I)**
Network structure	Information sharing
Property-rights systems	Networking activities
Operational-choice rules	Monitoring activities

Later, Cole et al. (2019) propose a Combined IAD and SES (CIS) framework (Figure 8). While the CIS framework was not directly used in any studio experiments, the simplified representation may prove useful to other design researchers. As designers, we can appreciate that these frameworks are all forms of system design; that is, they each attempt to visualize and make sense of commons as a system. Commons scholars typically use these frameworks to analyse and diagnose how a commons functions, and how a commons changes over time.

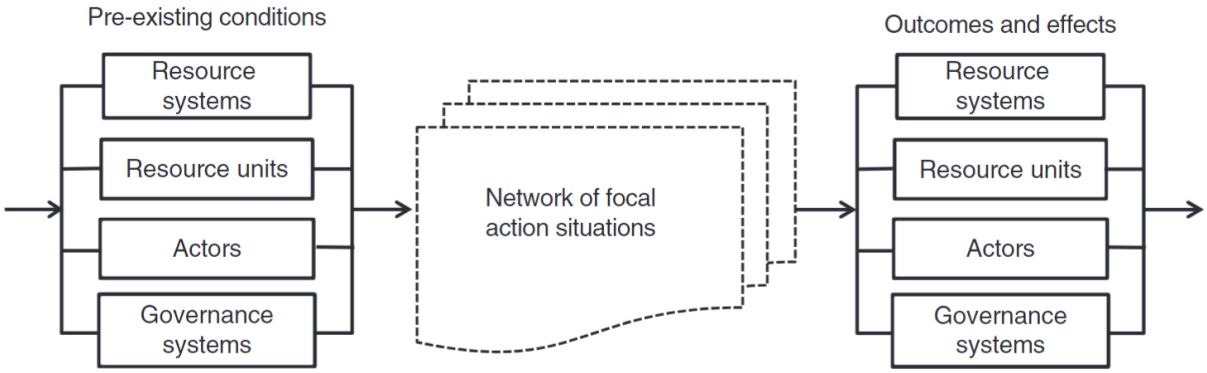


Figure 8. Combined IAD-SES (CIS) framework, which seeks to visualize the recursive nature of the IAD framework alongside the variable categories of the SES framework (Cole et al., 2019).

There have been numerous proposed adaptations of these frameworks over the years, which is to say that these frameworks are discursive rather than prescriptive. Nevertheless, these frameworks all seek to visualize the key components of commons, as understood by social scientists. These frameworks all pose the same challenge to design researchers: They represent complete and functional systems but don't tell us how to get there.

1.9. Action situations

The IAD and SES frameworks visually treat all of the elements with equal weight. The action situation is in the centre of both frameworks, but the boxes are the same size. A clear learning outcome from #commonize studio is that the action situation is the most important feature of these frameworks for commons-making. If we were to re-draw these frameworks based on where to focus commons-making energy, the action situation would enlarge greatly in size. The commons literature for the action situation is grounded in game theory and rather obtuse. The most accessible visual framework for the action situation (Figure 9), shows how the actors in an action situation interact and make decisions based on seven types of rules.

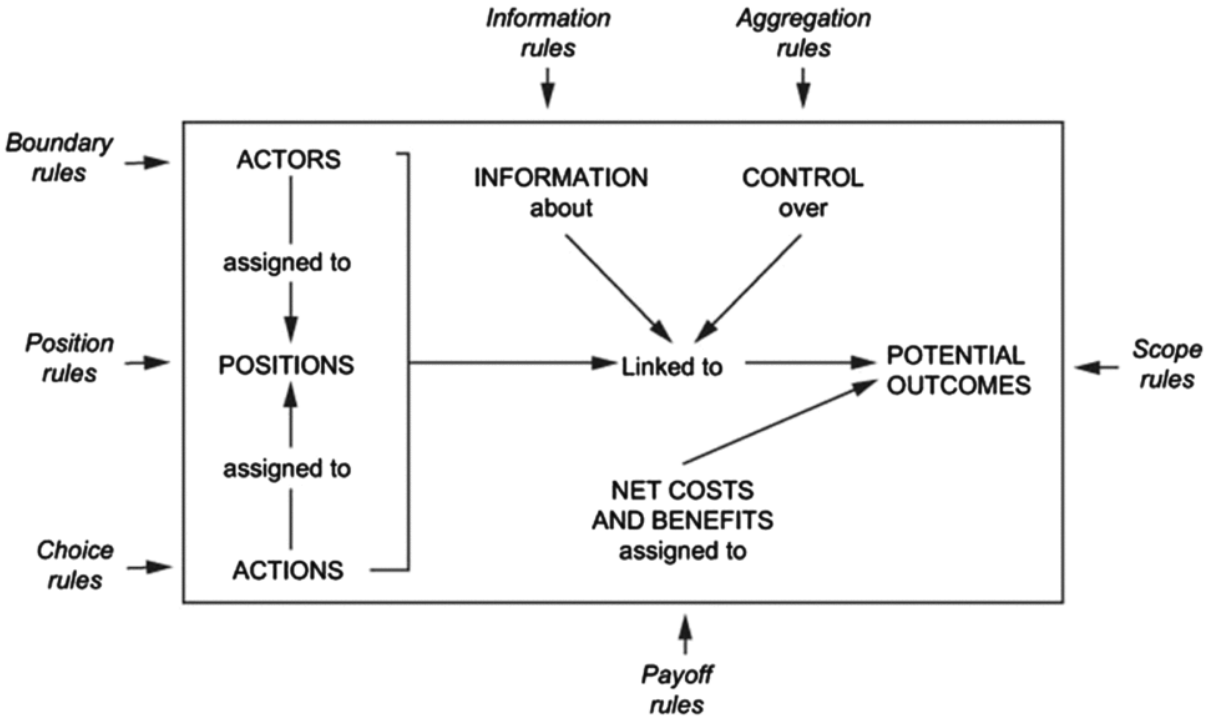


Figure 9. Diagram that shows how seven rule types enter the action situation (Ostrom, 2005, p. 189).

The language used here is confusing but describes the mundane. I had planned to use the action situation rules in several experiments, but the projects moved in different directions. I will, therefore, summarize the seven rules of the action situation here but not expand on them.

- Position rules determine what positions commoners can hold in the commons
- Boundary rules determine how commoners enter or exit the commons
- Choice rules determine what each commoner's options are in a given situation
- Aggregation rules determine how decisions are made by the community
- Information rules determine who can know what in a group
- Payoff rules determine rewards and sanctions for behaviour
- Scope rules determine what range of outcomes commoners can expect if they comply with the rules

What mattered most for the #commonize studio experiments recorded in this thesis was the centrality of action situations as the locus for all commoner interaction. Based on feedback from more recent projects, we might also refer to action situations as 'collective action situations'.

1.10. Choice levels

Choice levels describe how commons governance takes place at multiple levels. The following explanation of choice levels comes from 'A framework for infrastructuring commons creation' (Sacks & Galabo, 2022):

> The rules guiding the action in the action situation take place at three levels of 'choice' (Ostrom, 1990, p. 53). We use the term 'choice levels' in this paper, though 'arenas of choice' (McGinnis, 2011, p. 52) is an alternative term. Choice levels describes how different groups of people are involved in different types of decision-making. If you think about an association or community group, maybe one you are part of, you may participate in rulemaking for a specific committee as well as vote on group-wide issues. The three choice levels are:
>
> - Constitutional choice rules determine who can participate in managing a commons,
>   - Collective choice rules determine how decisions are made, and
>   - Operational choice rules address everyday management.
>
> These three choice levels are shown as cascading because constitutional choices affect who can participate in making collective-choice rules, and collective-choice rules affect who can modify operational-choice rules. Operational-choice rules tend to change more easily and more often, while changing constitutional-choice rules is more difficult and less frequent.

In 'Botswana Blood Commons: Visualizing Blood Services as a Public-Commons Partnership' (Sacks et al., 2022), we exemplify these choice levels in the context of a speculative public-commons partnership between the central government and the Indigenous village governments called kgotla. In this speculative system, the kgotla federate to form a Kgotla Association that participates in a partnership with the government called a Blood Service:

> In this example, each kgotla (constitutional-choice level) might elect a group of people to participate in the Kgotla Association (collective-choice level), and one person from this group may then participate in regular Blood Service meetings (operational-choice level). In other words, choice levels help us concretely identify who is involved in which decisions.

Similar to the language of the IAD framework and action situation, choice levels describe ideas that we all know and experience but may not name or have words for. A source of

friction in many community organisations, frictions you have probably experienced, is confusion or disagreement over who should be making which decisions, i.e. choice levels.

1.11. Institutional grammar

Institutional grammar was not overtly used in studio projects in this thesis, so I will keep this review brief. I do wish to present it here because, in combination with the other concepts presented, you now have an overview of the most valuable concepts from the commons literature for commons-making.

Institutional grammar addresses the different types of rules that commoners create to sustain commons. The word 'grammar' is invoked because rules are constructed of distinct units, the way language is constructed of verbs, nouns, etc. This institutional grammar applies to the seven action situation rules. Institutional grammar is organised around an acronym, ADICO, explained in Table 8. Institutional grammar was originated by Crawford and Ostrom (1995) and has since developed into its own research area.

Table 8. Institutional grammar summary.

- A = Attributes = Which commoners does this rule apply to?
- D = Deontic = What type of obligation or permission is this? A suggestion or requirement?
- I = aIms = What action is this rule addressing?
- C = Conditions =Under what circumstances does this rule apply? When and where?
- O = Or else = What are the consequences for not following the rule?

An 'institutional statement' is the equivalent of a sentence. An institutional statement can contain any combination of these grammar elements. There are three types of institutional statements:

- Rules (ADICO)
- Norms (ADIC)
- Strategies (AIC)

The difference between these three statements is the full (or less-than-full) presence of ADICO. Rules contain all of ADICO, norms contain ADIC, and strategies contain AIC. The absence of 'O' ('Or else') is a common cause for commons failure. Commoners don't follow rules because the rules are either unenforced or enforced inconsistently or unfairly. Similar to the action situation rules, institutional grammar gives design researchers a starting

framework to guide thinking about what types of rules are important for commons-making as well as for diagnosing problems during commons-making.

Making the generative turn

Making the generative turn means more than moving between research epistemologies. This generative turn also requires language and concepts that capture the intersection of these worlds. Infrastructuring is one discourse example that has been developed by design researchers that may be brought into this generative turn. As I close out Part A, which focuses on what the commons literature can bring to commons-making, I finally disclose the etymology of the word 'commonize'.

Across all of the literature review performed in Part A, I observed that design researchers and commons scholars alike struggled to succinctly describe the politics of counter-hegemonic commons, or 'to grope for words to name what's actually new' (Steger, 2009, p. 1). Design researchers have proposed terms like 'new commons' (Baibarac & Petrescu, 2017) or 'activist/practitioner movement' (Marttila et al., 2014). Commons researchers have produced more articulate but decidedly un-catchy phrases like 'commons-creating peer economy' (Helfrich, 2013) and 'commons-centric society' (Bauwens et al., 2019). *What discourse from the commons literature might be useful to design researchers interested in counter-hegemonic commons?* These observations prompted me to conduct a second systematised review around the use of the term 'commonism'.

1.12. Systematised review summary

The review entailed searching both Scopus and Google Scholar for the term 'commonism' followed by snowballing, and a repeat of the search using the terms 'commonized' and 'commonist'. I scanned over 400 records, most generated by Google Scholar, and read 52 records in full. Of these 52 records, 17 records contained identifiable articulations of commonism (Table 9). In 'Appendix 2. Commonism systematised review database', I present an expanded table of all records alongside quotations that each inform the understanding of commonism as a counter-hegemonic politics of the commons.

Table 9. Most relevant records reviewed with definitions of commonism, as of 2020, organized chronologically.

Author/s	Year	Record Title
Dyer-Witheford	2007	Commonism
Dyer-Witheford	2009	The Circulation of the Common
Pusey	2010	Social Centres and the New Cooperativism of the Common
Laermans	2011	Artistic Collaboration and the Promises of Commonalism
Siefkes	2011	The Emergence of Benefit-Driven Production
Hitchcock	2011	Commonism
Neary & Winn	2012	Open Education: Common(s), Commonism and the New Common Wealth
Kunkel	2013	Speculations ("The Future is Commonist")
Shantz	2013	Commonist Tendencies: Mutual Aid Beyond Communism
Teivainen	2014	Brazilian Socialist Roots and Global Commonist Horizons in the World Social Forum
Parker	2015	Taking Power Back: Putting People in Charge of Politics
Bell & Scott	2016	Reimagining Citizenship: Justice, Responsibility and Non-Penal Real Utopias
Brie	2017	Karl Polanyi in Dialogue: A Socialist Thinker for our Time
Parr	2017	Birth of a New Earth: The Radical Politics of Environmentalism
Gielen	2018	Common Aesthetics: The Shape of a New Meta-Ideology
Swinnen & Bauwens	2018	Commoning Art, Democracy, and the Precariat, a Dialogue
Fuchs	2019	Appropriation of digital machines and appropriation of fixed capital as the real appropriation of social being: Reflections on Toni Negri's chapter

In short, scholars seek to mark commonism as 'new' in two ways: first, as an ideological break with communism that is explicitly not state-led; and second, as a proactive resistance to capitalist subsumption of commons.

First, scholars use commonism to assert a clear ideological break with communism. Castoriadis (1987, p. 465), an originator of the concept of the social imaginary, explains that 'a signification is indefinitely determinable … although that does not mean that it is determined'. Communism as a signification is determinable, but a number of scholars conclude that communism does appear to be determined at this point in history. Waterman (2003, p. 10) sums up the pragmatic fork in the road that scholars must choose between:

> What are we to call this new Utopia, if not Communism? Commonism? Commonerism? It cannot be called Communism any more, or not at present. That was a utopia of the national-industrial-capitalist era. Many people and peoples are alienated … from 'Communism'. And the effect of its contemporary use — if not the intention of those who still use it — is to isolate them from those many others who are contributing to a reinvention of the commons.

A number of scholars in this systematised review distinguish commonism from communism in terms of the role of 'the people' versus the state. Scholars describe this commonist politics as a 'democracy of the multitude' (Hitchcock, 2019, p. 76), a 'nonstate-centric approach' (Teivainen, 2014, p. 28), 'a place that passionately values social progress, but is deeply sceptical about the idea that statism can deliver it' (S. Parker, 2015, p. 123), and 'non-authoritarian partnerships and networks of cooperation and collaboration' (E. Bell & Scott, 2016, p. 60).

Second, scholars use commonism to combat the seeming hegemony of capitalism, seeking to fight the hegemony of an -ism with the counter-hegemony of another -ism. Dyer-Witheford's (2009) early articulation influences many future scholars:

> 'Commonism' would thus be a social order assembled from a connection or circulation of different commons, preventing the capitalist cooption and subsumption of current and new commons by linking them up, attaining a critical mass that counters the weight of established relations. If capital is an immense heap of commodities, commonism will be a multiplication of commons ….

This critical mass or counterweight is necessary to fight the 'communism of capital' (Bauwens & Kostakis, 2014), or the 'commonism in capitalism' (Caffentzis, 2010, p. 31). Linux is an oft-cited example, open-source software that is the product of commoning, which numerous large companies exploit and enclose for profit, e.g. Apple (iCloud), Google

(Chrome), TiVo, and IBM. Clare and Habermehl (Clare & Habermehl, 2016, p. 109) introduce a 'theory of commonization' that clearly resonates with the counter-hegemonic commons: 'while commons are a necessity for any form of (anarchist) communist society … they are not inherently anti-capitalist … and it is therefore important to differentiate between different types of commons, and ensure that those developed are anti-capitalist.' In summary, scholars use commonism to mark an ideology that opposes both the commodification of capitalism and the state dominance of communism.

1.13. Politics of the commons

These findings regarding commonism accord with recent commons scholarship led by Kioupkiolis (2017, 2019, 2022) that identifies the 'lack of the political in the commons' literature and advocates for the development of a counter-hegemonic politics of the commons. Papadimitropoulos (2017, 2020) performs initial sensemaking about this counter-hegemonic politics by organizing commons research into three broad categories:

- Liberal
- Reformist
- Anti-capitalist

For the most part, these three categories are differentiated by how the commons relates to the state.

The liberal commons 'place[s] the development of the Commons in parallel with the state and market operation' and 'neo-feudalise[s] the Commons under the marketing buzzword of a so-called "sharing" economy' (Papadimitropoulos, 2017, p. 564). The liberal ideology is where work by Ostrom and Benkler tends to be located, where the commons is positioned as a complement to capitalism.

Reformist commons seek to 'replace capitalism from within', gradually replacing 'the accumulation of capital with the circulation of the Commons' (2017, p. 570). Papadimitropoulos places commons scholars such as Bollier, Bauwens, and Kostakis in this category. Outside of the commons discipline, Raworth's (2017) Doughnut Economics, Mazzucato's (2013) entrepreneurial state, and Wright's (2010) social democracy might fall in this category.

Anti-capitalist commons place 'the Commons in a constant class struggle with capitalism, aiming at the creation of a Commons economy against and beyond capitalism' (Papadimitropoulos, 2017, p. 572). Scholars that consistently fall under this category include

De Angelis, Caffentzis, Federici, and Hardt and Negri. Papadimitropoulos (2020, p. 28) summarizes the differences between these three approaches as follows:

> …the liberal argument underestimates the reformist insight that technology has the potential to decentralise production, thereby forcing capitalism to transform into post-capitalism. While the reformists argue for the cooperation of the commons with the state and friendly capital, the anti-capitalists argue for the autonomous development of the commons against and beyond capitalism and the state.

In plain language: liberal commons support a capitalist-oriented state, reformist commons seek to morph the state from a capitalist to commons orientation, and anti-capitalist commons aim to create an alternative commons-oriented society outside of the state.

For the remainder of this thesis, these three terms have been re-named as follows:

- Liberal becomes neoliberal. I made this change because liberal has diverse meanings to people; whereas neoliberal is more readily understood as a capitalist economics.
- Reformist does not change.
- Anti-capitalist becomes counter-hegemonic. I made this change to align further analysis through the lens of diverse economies, the methodology used for this research.

These container terms – neoliberal, reformist, counter-hegemonic – enable us to make the politics of the commons visible to ourselves and the people we work with as we perform commons-making research. I created the term 'commonize' from this literature review, as 'a new enough bottle into which to pour what I hope will be some new wine' (Kunkel, 2013).

1.14. The generative turn

Commons scholarship has thus far been analytical. The concepts from the literature and the knowledge in the field is based on engaging with extant commons. These decades of analytical research have generated numerous, profound insights into how commons function and change. The key concepts that scholars have developed based on these insights, however, cannot be used in their current form to support a community that wants to create or improve a commons, a subject of interest not only to design researchers but also to commons-making researchers in fields such as geography, healthcare, information sciences, and law (Chapter 1.4).

Making the generative turn means moving from inductive reasoning and analytical frameworks to abductive reasoning and generative infrastructure. Making the generative turn also means engaging with the politics of the commons. Designing or making commons, like any design process, requires framing, and framing is inherently political (Prendeville et al., 2022). More specifically, 'This generative turn requires translating and transforming the theories and frameworks from the commons field into tools and infrastructure that communities can use.' (Sacks, 2022a). This thesis marks my attempt to initiate a generative turn in commons research by showing how this marriage between commons theories and frameworks and design research approaches and methods can answer research questions being posed by researchers in both worlds.

Part A has shown that design researchers are already engaged in commons-making but are not drawing on commons literature to inform their commons-making research. I hope that #commonize studio can provide a lightning rod of sorts for other design researchers and activists. By unearthing these concepts for others and showing how they might be used in commons-making research, other researchers may consider how they wish to experiment with the commons literature too.

Part A concludes as a dual invitation: an invitation to commons researchers to consider how their research can be transformed and put to use in service to commoners, and an invitation to design researchers to consider how they can improve the efficacy of their commons-making practices using the commons literature.

Part B: Studio

Part B asks the inverse of Part A: *What does the design research literature offer commons-making researchers?* The contention of Part A is that key concepts from the commons literature that might support commons-making are inaccessible to design researchers. The contention of Part B is that studio pedagogy and studio experimentation, the signature pedagogy and epistemology of design research, might support commons-making but are equally inaccessible to commons-making researchers.

In Chapter 0, 'Studio pedagogy', I ask: What is studio pedagogy? I review two influential scholars and their philosophies of studio pedagogy, Schön's reflective practicum and Shulman's signature pedagogies. I then review a range of sensemaking frameworks developed by design scholars to make studio pedagogy more accessible to others, each of which has influenced the development of #commonize studio.

In Chapter 0, 'Studio experimentalism', I dig deeper to ask: What are studio experiments? This methodological concern emerged during my research process, observing that other institutions performing similar work called themselves labs. I first define laboratory experiments and perform a systematised review looking at the use of the term 'studio experiment'. Based on this review, I propose a tentative set of components for studio experimentalism that clearly demarcate it from lab experimentalism, and I illustrate this contrast with a speculative case study.

How do other studios (even if they call themselves labs) perform experiments in counter-hegemonic 'economy design'? In Chapter 0, 'Economy design studios and labs', I review the practices of three comparable institutions engaged in 'economy design' against McLain's framework for studio pedagogy. I show how these institutions are in actuality conducting studio experiments and consider how these practices might inform #commonize studio.

Chapter 0, 'Commons-making methodologies', builds up the methodological layers of #commonize studio's studio experimentalism. At its core, #commonize studio performs action research, a methodology used by most other design researchers engaged in commons-making. This action research is performed through the lens of the diverse economies methodology, 'the political economy of possibility' (Cameron & Gibson-Graham, 2022). I further modify this action research in two ways. First, I position this research as 'action research through design', a mashup of action research and research through design that

emphasises learning through making that must be with others. Second, I structure this research as action research for diverse economies, a specific type of action research with three strategic aims: activate language, shift subjectivities, and enhance collective action.

Epistemological position statement

Whereas my first position statement articulated my political position, this position statement describes my epistemological position. Just as Part A argued for a counter-hegemonic politics for commons-making research and practice, Part B argues for an artistic epistemology for commons-making research and practice, and for design research more broadly. I named my research practice #commonize studio, which I thought to be an entirely uncontroversial choice based on prior educational experience in architecture. I soon discovered that design research faces epistemological conflict. I am using this opportunity to initiate an epistemological position statement in design research.

Below are two longer quotations from *Studio Studies*, observations by design research authorities that affirm my own observations and experiences with peer design researchers:

> We cannot fail to notice a marked tendency to imagine and shape studios as laboratories in different fields of creative practice. Michael Century (1999) has described the 'studio laboratory' as a post-Manhattan project trope characterizing art – technology innovation engagements. In the field of design, for example, 'living labs' (Björgvinsson et al. 2010) and 'culture labs' (see Born and Wilkie, Chapter 9 in this volume) are imagined as settings for the design and innovation of computational technologies, whilst the label 'design lab' is indicative of an epistemic flinch in which the term 'lab' or 'laboratory' affords legitimacy and authority to institutional milieus for knowledge production and innovation practices involving design. Also in the contemporary visual arts, artists are increasingly conceiving and configuring their studios as experimental systems akin to laboratories (see Farías, Chapter 12 in this volume). (Farías & Wilkie, 2018a, p. 8)

Design professor Alex Wilkie goes on to state more plainly the current epistemological conflict in an interview with anthropologist and musicologist Georgina Born:

> What you've outlined also raises the epistemic status of studios. My studies of design research in universities – and maybe this is also evident in your work on music and art – science studios – shows that designers routinely and explicitly invoke the term 'lab' to designate the epistemic conditions in which work is conducted. It's actually very rare that you find an academic research group that uses the term 'studio'. (Born & Wilkie, 2018, p. 144)

I have found myself on many occasions meeting a design scholar at their 'lab' to discover that their lab was simply a piece of paper taped to their door. Nothing else has changed, just the paper on the door. This paper simply but meaningfully signals to us the world that we are entering, in literally the same way that my childhood restaurant sign signified to my parents that they were entering a restaurant (where I was of course the head chef). My exploration into studio and studio experimentalism revealed one important epistemological question or litmus test for design researchers: Do you believe you are solving a *scientific* (analytical) problem or an *artistic* (creative) problem? This research is emphatically artistic because I believe the question I am answering – What do communities need to create commons? – is an artistic problem, not a scientific one. I consequently name this approach to economic problem-solving 'economy design' to frame economics as an artistic problem. Like many of my peers, I taped #commonize studio to my door to signify that those meeting me were entering an artistic space.

Methodology

Part B presents the entanglement between established and exploratory methodologies that I develop through the course of my research. In this chapter, I disentangle the established aspect of my methodology (action research for diverse economies) from the exploratory aspects of my methodology (studio pedagogy and studio experiment), which I ultimately combine and call 'studio experiments for commons-making' (Chapter 0). While conducting the empirical research in Part C using action research for diverse economies, I pursued an unanticipated second subject of enquiry that became studio experimentalism. Consequently, I undertook a third systematised review and constructed a research methodology that combined my tentative findings from this review with the established methodological approaches used earlier in my research.

1.15. Studio as the laboratory's cultural analogous

'Studio as the laboratory's cultural analogous' is how design educators Ignacio Farías and Alex Wilkie (2018a, p. 2) propose approaching the study of studio pedagogy and what I have called studio experimentalism (they call it studio studies). This phrase embodies the heart of the epistemological and ontological challenges this thesis grapples with and the rationale for methodological selection. As the previous chapter, Epistemological position statement, made clear, this research is decisively artistic and qualitative in intent. Yet, it also strives to eventually become an approach that is consistent and rigorous enough that a doctoral researcher in some near-distant future would select it as their research approach. This tug-of-war between creative and rigorous resulted in a mixture of approaches and methods

seeking to create a transparent, replicable research approach for recording, sharing, and evolving creative experiments.

1.16. Research question

Research methodology adjusts to fit the research question. My research question evolved over the course of research, and the methodology adjusted with it. The two time points worth capturing are the research question at the time of my PhD upgrade and the research question in this thesis:

- What do communities need to imagine and practice postcapitalist, pluriversal commoning? (PhD upgrade)
- What do communities need to make commons? (PhD thesis)

There are two shifts visible in the questions above that relate to my evolving methodology. The first is the removal of 'imagine' from the research question, focusing instead on making. For this reason, I moved from considering approaches like serious game design (Abt, 1975) and speculative design (Dunne & Raby, 2013) to action research (Elliott, 1998). The second is the removal of modifiers in the research question, e.g. postcapitalist, pluriversal. This change was an outcome of my engagement with the diverse economies literature. And, on a pragmatic level, I needed to keep the research question simple to engage action research partners rather than confuse or antagonise them.

1.17. Literature reviews

The literature reviews in this thesis look a bit different than most design research theses I have read as they are intended both to contextualise the research within the existing work and to support other researchers in the field. There are three literature reviews in this thesis, two in Part A and one in Part B, relating to the following questions:

- How do design researchers engage with the commons literature? (Chapter 0)
- How do scholars use the term 'commonism' and why? (Chapter 0)
- What is a studio experiment? (Chapter 0)

I construct each literature review as a systematised review (Grant & Booth, 2009) with a focus on two review components: the search process and the results generated. I took this approach for two reasons. The first reason is that I wanted to make my search process transparent and defensible. Each of these reviews entered novel territory. I had to make informed but subjective decisions about search parameters, such as which phrases and

journals to search. Ultimately, the reader decides if the literature review is robust, and the detail in my systematised review allows the reader to decide this for themselves. Also, future researchers may see opportunities to expand my search parameters to find additional literature. The second reason is that these reviews generated valuable original databases. There had never been, to my knowledge, a database of design research literature on commons-making, and this database may assist future researchers. The level of detail of my systematised reviews also enables others to conduct even more sophisticated reviews in the future, such as systematic reviews.

1.18. Action research for diverse economies

The established core of my research methodology is action research for diverse economies. This method is detailed in the book chapter, 'Action research for diverse economies' (Cameron & Gibson, 2020) in *The Handbook of Diverse Economies* (Gibson-Graham & Dombroski, 2020). I review this method in more detail in Chapter 1.42, Action research for diverse economies. Action research for diverse economies provides not only a clear structure for performing research (action research) but also a clear epistemological and ontological lens through which to perform this action research (diverse economies).

In simpler terms, diverse economies is so named because those of us engaged in this research start with the recognition that diverse economic practices already exist, and that our role is to understand how these practices can be made visible and coherent. In more academic terms, diverse economies is rooted in poststructuralist and anti-foundationalist epistemologies and anti-essentialist ontology, emphasising the role of discourse and performance. Diverse economies is also materialist and privileges doing diverse economies over isolated theorising about them. To this extent, there is a natural fit between diverse economies and practice-oriented design research. I introduce the diverse economies approach in Chapter 1.39, Diverse economies, and I review the epistemological and ontological features of diverse economies in Chapter 1.40, Diverse economies origins and Chapter 1.41, Diverse economies as performative research.

Diverse economies permeated the entire research process and impacted not only the research methodology but also overall research development. As mentioned in Part A, the development of the term commonize is a diverse economies strategy of queering and ontological reframing that is then used throughout the empirical research process. The diverse economies concept that most visibly impacted the empirical research is thick description and weak theory, resulting in detailed accounts of each experiment to enable others to form their own weak theories. The discourse genealogy I perform at the end of the

comparison group experiment is an important research strategy from diverse economies. Finally, the emphasis on the role of the researcher in enacting or performing diverse economies impacted my focus throughout the empirical research on my role in these experiments.

Action research for diverse economies is action research that follows the familiar action research cycle with an emphasis on three strategies: activating new languages, shifting subjectivities, and collective action. The authors do not prescribe how these strategies may be employed in action research, so I incorporated them into the Observe phase of the action research cycle.

1.19. Modifications for studio

I modified this core established methodology to account for my findings from my exploration of studio pedagogy (Chapter 0) and my systematised review of studio experimentalism (Chapter 0). The resultant method, studio experiments for commons-making, is thus a combination of the established methodology of action research for diverse economies and these modifications. I made three visible modifications, which I detail in Chapter 1.38, Action research through design (ARtD).

The first modification is the use of a neologism created by other scholars, ARtD, to describe the action research cycle (Gaete Cruz et al., 2022). ARtD explores the intersection of action research (AR) and research through design (RtD). All #commonize studio experiments follow the familiar action research cycle of plan, act, observe, and reflect. Alongside these familiar words, I added language arising from my exploration of studio to provoke consideration of what delineates ARtD from broader AR. The phase names became:

- Plan/Design
- Act/Make
- Observe
- Reflect/Critique

The second modification is the organisation of the Observe phase of the ARtD cycle. The Observe phase is organised into four categories that draw on language from the aforementioned action research for diverse economies and Villari's (2014) proposal for design action research. Villari also presents three strategies for design action research, which the author describes as 'giving shape to' relationships, new ideas, and artefacts. I found that two of these strategies aligned with two of the diverse economies strategies, so I structured observations around four categories:

- Languages/Ideas
- Subjectivities/Relationships
- Collective action
- Artefacts

The third modification is labelling these experiments as *studio* experiments rather than simply experiments. Naming these experiments as studio experiments seeks to frame these experiments as creative experiments.

Beyond these modifications, my exploration of studio pedagogy and studio experimentalism impacted how I organised and made sense of this research. In Part C, I organise my empirical research into three categories that respond to lab experimentalism (comparison group, pilot experiments, field experiments). In Contributions, I reflect on and detail how this research informs future approaches to creative experimentation. In Conclusion, I find that coaching is one of three overarching design capacities that commons-makers need, an observation rooted in studio pedagogy. In Epilogue, I consider how these experiments might be evaluated as un/successful to inform how future studio experiments might be evaluated. Finally, I changed my thesis title, originally *#commonize studio: Experiments in commons-making*, to reflect this methodological framing.

The combination of action research for diverse economies with these modifications forms 'studio experiments for commons-making'. I have hesitated to assert studio experimentalism or studio experiments as *the* methodology or method in this thesis because a coherent epistemology and ontology remain lacking, as I detail in Chapters 0 and 0. Instead, I offer studio experiments in commons-making as a methodological provocation paired with the clear and defensible method of action research for diverse economies.

1.20. Empirical research structure

The empirical research in Part C is organised into four groups:

- Comparison group
- Pilot experiments
- Field experiments
- Scaffolding commons-makership

The first three terms are deliberately drawn from laboratory experimentalism, discussed in Chapter 0. Throughout my research and writing process, I made decisions about discourse, either to politicise existing language or to use new language. Each route presents opportunities and challenges. In Chapter 0 (Making the generative turn), for example, I

substantiate my decision to propagate a new word, commonize, rather than use the existing word, communize, because multiple authors find the meaning of communize to be irrevocably determined or sedimented. The choice to politicise new language is a key research strategy of diverse economies. By contrast, Wilkie and Farías argue in *Studio Studies: Operations, Topologies and Displacements* that 'the notion of experiment can only describe some highly specific studio processes and is far from offering a more general heuristics' (2018a, p. 9). The authors consequently reject the term 'experiment' for artistic research, a term that is used prolifically in design research, and propose 'studio studies' instead. Another eligible term the authors reference is 'open inquiry'.

In Part C, I opt to politicise existing meaning, a strategy of diverse economies research detailed in Chapter 0. The challenge in doing so is that these words may connote something different for some people. I opt to use this language because all of these terms are already in use in design research, albeit to different degrees. I originally used control group instead of comparison group but changed it based on peer review to reflect the more accurate scientific definition (Kelemen et al., 2023), where control groups are randomised while comparison groups are non-equivalent or not randomised. The last bullet above, scaffolding commons-makership, is used as it is generally employed across education and defined by key theorists in the field (Benson, 1997; Bruner, 1978; Freire, 2014; Vygotsky & Cole, 1978).

1.21. Recruiting action research partners

Recruiting action research partners was by necessity opportunistic. For me, the best action research project is the project that happens. The first systematised review found that other design researchers recruited action research partners through pre-existing memberships to groups, long-standing relationships with communities, or multi-year funded research projects. My time window was considerably smaller, my budget was zero, and the Covid-19 pandemic stymied opportunities to embed myself with any communities. Ultimately, the experiments detailed in Part C were the product of two recruitment pathways: conference workshops and networking within ImaginationLancaster (department). The comparison group arose because I was invited by a peer researcher in my department to join a pre-existing research group. The pilot workshops all took place at conference workshops, either as an invited guest or as a workshop I had submitted to the conference. I met Dr Wernli, the partner for the Soil Trust experiments at one of these conference workshops. I met Dr Nthubu, the partner for the Hack4Blood experiments through Dr Galabo, who I in turn met in my department.

1.22. Methods

#commonize studio draws on a number of design research methods across all experiments. The rationale for method selection and the way these methods are used is discussed in the Plan/Design phase for every experiment in Part C. These methods draw from a range of design areas, such as service design and speculative design. Over time, #commonize studio developed its own design research method vernacular, which is discussed directly in the last experiment, 'Action situation blocks' (Chapter 0).

The methods for about one-third of the experiments were brought to the experiment by peer researchers not me. For the comparison group (Chapter 0), the design fiction method was determined by the group before I joined. I discuss the rationale and use of this method in Chapter 0 and several papers (Craigon et al., 2023; Jacobs et al., 2021). Chapter 0, Commonized design, is a conference workshop organised by other researchers with an unnamed method. I observe that this method combines speculative design with inventorying that is common to diverse economies research, so I name it inventory-based speculative design. Chapter 0, Scaffolding commons-makership, examines the scaffolding process of weaving commons scholarship into methods created by other design researchers. These methods are a co-design tool and service design tools developed by Dr Galabo (Galabo & Cruickshank, 2022; 'Tools & Toolboxes', n.d.) and an ecosystem visualisation method developed by Dr Nthubu (2021).

The methods used in the remaining two pilot experiments (Chapters 0, 0) use what are typically considered service design methods: user persona, user journey map, and service blueprint. All of these pilot experiments engage with more-than-human design, so the rationale for method selection was to use well-established and simpler methods that allowed me to focus on pushing them in new directions. I describe the rationale, adaptation, and use of these methods in more detail in these chapters as well as the paper 'User research to design a more-than-human food commons (Sacks, 2022a).

The methods used in Chapter 0 (Commons model canvas), Chapter 0 (Action situation canvas), and Chapter 0 (#commonize studio design brief) use what might be broadly considered design management methods. The commons model canvas is an adaptation of the Business Model Canvas popular for start-up development, and the action situation canvas is a further iteration of this approach to visualising a business (or commons) model on one page for collective engagement. The #commonize studio design brief is an adaptation of a design brief template that is tested with a commons-maker at a conference workshop, focusing on the types of language prompts that might be useful to a commons-maker as the 'client'.

I attribute the method in Chapter 0 (Body histories) to the peer researcher because he originated the idea, though we worked on it together. This idea emanated from multiple discussions and a participatory design conference workshop considering alternative ways to create a how-to manual for commoners. We explored how children could film their parents engaged in composting practices. I name this method 'social practice design' because it aims to support social practices, a research approach that we engage with and is described further in the chapter.

The final experiment, Action situation blocks (Chapter 0), draws from prior experiments rather than referring to more established methods, particularly the language and design of the action situation canvas and the #commonize studio design brief.

1.23. Other approaches

The approach used in this thesis was selected and developed to meet not only the learning outcomes sought but also the exigencies of the Covid-19 pandemic.

The overwhelming majority of research in this field is rooted in the participatory design (PD) community, so PD and to a lesser extent co-design are the most commonly cited research approaches. I discuss the crossover between PD, co-design, and this research approach throughout Chapter 0. I did not find PD or co-design to be a sufficient home for this research for two reasons. First, all of the examples I could find, at least in the reviews in this paper, were conducted in person. I could not find examples that demonstrated how one could perform PD or co-design (a) remotely (b) with a real community that physically exists elsewhere (c) that has never met the researcher. I did attempt this approach early on in the Covid-19 pandemic, but gaining trust and persuading a group to meet online proved very difficult. Second, in ontological terms, PD and co-design may have described how some commons-makers collaborated with their communities, but it was not how I performed as a design researcher. Most of my interaction was limited to a single individual, the commons-maker, through whom all information about the community was transmitted.

Research through Design (RtD), which is proving to be an increasingly popular choice for design PhD theses, was what I originally planned to discuss in my research methodology before diving down the studio rabbit hole. This made sense at the start of my research when I expected to focus on artefacts. I anticipated that commonized design, which I discuss in Chapter 0, would be comprised of design tools similar to those I began developing in the pilot experiments in Part C, such as a commoner persona. However, relationality became a more important subject of enquiry than the artefacts created or even the process of making. As this evolution took place, the lines between research through design versus for or about

design as explained by foundational scholars like Frayling (1993) and Gaver (2012) became blurrier. Studio seemed to encompass the knowing-through-doing epistemology of RtD while also provoking thought about relationality, e.g. how I relate to the learner or communities.

Beyond broad design approaches, ethnography is one of the more obvious methodological alternatives to action research to answer this research question. A few scholars in the commons-making field use ethnographic approaches, for example as embedded members of makerspaces (Fordyce, 2015; T. S. J. Smith, 2020). Ethnography is a popular method in design research and everyday practice because 'there is no alternative to hanging out with, joining in with, talking to and watching, and getting together the people concerned' (Schatzki, 2013). I had indeed planned to pursue ethnography with several communities, but the Covid-19 pandemic quashed opportunities to do so. There are some virtual ethnography methods (Postill & Pink, 2012), but these methods share similar limitations as PD and co-design. Virtual ethnography is intended for native online communities like social media and gaming groups rather than in-person communities being harassed to interact online with the researcher.

Finally, it is worth summarising two short-lived approaches I pursued because they remain valid and others may wish to pursue them. The first approach is game design. As briefly discussed in Chapter 1.9 (Action situations), much commons literature is grounded in game theory. The intention was to embody this game theory in playable games to support commons-making communities, building on the ideas of procedural rhetoric developed for video games (Bogost, 2010). I felt, however, that this approach was best pursued in-person. The second approach was speculative design. In my first year of research, when the role of imagination was still part of the research question, I developed an approach grounded in speculative design and design fiction. I detail one experiment towards this approach in Chapter 0 and present a draft research approach based on this experiment in Figure 20 (p. 100). Speculative design might have been used in subsequent interactions with some action research partners if they had progressed in a different direction.

Studio pedagogy

What is studio, and why is it so elusive? In *Studio Use in Design Distance Education*, design scholar Derek Jones sums up a common observation: 'A persistent gap that recurred throughout the writing of this covering paper is the lack of definition of studio or even articulacy around its properties or conditions.' (2022, p. 176). Farías and Wilkie posit that 'there is no easy access to the studio since the obstacles come in both empirical and theoretical form' (2018a, p. 2). #commonize studio encountered another challenge beyond empirical and theoretical considerations, which could be called sedimentation of meaning

(Jessop, 2010). While the lab colonizes ever more territory, studio remains fixed in the public imagination as the artist's individual atelier or workshop (Cennamo, 2016; Pasin, 2017). Over 20 years ago, Buchanan (2001) theorized the evolution and expansion of design research as four orders of design. The third order, 'actions', is now a mature design research field that includes interaction design and service design. The fourth order, 'thoughts', exemplified at that time by environmental design, has witnessed a range of emergent design research fields such as transition design and circular design. #commonize studio's focus on counter-hegemonic economics, or economy design, could be said to belong to this fourth order. Yet, as design schools expand into these orders, they invariably call themselves labs not studios. By way of example, the relatively new field of circular design has inspired a Circular Design Lab at both Technische Universiteit Delft and University of the Arts London, but no university-based circular design studios. Commons-making requires not only a transformation of commons literature into accessible infrastructure but also a transformation of studio literature into a useable methodology.

1.24. Schön's reflective practicum

Within the design research literature, Schön is one of the most articulate and vocal advocates for elucidating studio pedagogy for non-designers. While *The Reflective Practitioner* (1983) is probably Schön's most famous book, it is another book, *The Design Studio: An Exploration of Its Traditions and Potential*, where Schön (1985, p. 7) exhorts:

> In order for the lessons of the studio to be made accessible to other professions, however, studio masters must be willing to examine what they already know how to do. They must try to make systematic descriptions of their practice and coaching, and the knowledge and appreciations embedded in them, in spite of the factors that work against systematic self-reflection.

Alongside this treatise on studio pedagogy, Schön also published two relevant papers around the same time, 'The architectural studio as an exemplar of education for reflection-in-action' (1984) and 'Designing as reflective conversation with the materials of a design situation' (1992).

Schön (1985, p. 94) describes studio pedagogy as an 'education in making things', my preferred way to explain design to outsiders, and suggests 'reflective practicum' as a name for this system (1985, p. 89). The reflective practicum draws on several concepts, namely reflection-in-action as a process that depends on knowing-in-action as a capacity. Schön (1985, p. 87) describes reflection-in-action 'as a kind of on-the-spot research process' in which 'design expertise is built over time through engagement in immersive, authentic

activities and regular reflection both on-action, retroactively, and in-action, in the moment.'. Reflection-in-action depends on a type of design knowledge, knowing-in-action, that is 'revealed in and by actual designing' (1992, p. 131). Schön (1985, p. 24) elaborates on knowing-in-action:

> To begin with, the starting condition of reflection-in-action is the repertoire of routinized responses that skilful practitioners bring to their practice. This is what I call the practitioner's knowing-in-action. It can be seen as strategies of action, understanding of phenomena, ways of framing the problematic situations encountered in day-to-day experience. … It is a dynamic know*ing* process, rather than a static body of knowl*edge*, in the sense that it takes the form of continuing detection and correction of error, on-line fine-tuning all within the framework of a relatively unchanging system of understanding.

Schön layers 'conversations with the situation' (1985, p. 26, 1992) onto knowing-in-action, which emphasises that, 'Designing is primarily social' and conducted through 'active sensory appreciation of actual or virtual worlds' (1992, p. 132). Another feature of the reflective practicum is uncertainty, which Shulman also identifies in signature pedagogies. Schön (1985, p. 57) observes that the design student finds themselves in an emotionally challenging situation:

> In the context of the studio there is a double paradox: on the one hand, the student cannot initially understand what he needs to learn; on the other hand, he can only learn it by educating himself, and he can only educate himself by beginning to do it.

Finally, Schön argues that studio pedagogy is as rigorous and important as science's technical rationality. Reflection-in-action relies on 'on-the-spot experimenting' for 'problem-setting' to convert '"messes" into the well-formed problems' to which science may then apply scientific techniques (1985, pp. 16, 57). The role of the design educator is that of coach, inviting students to participate in this process of experimentation, or rather, 'practice as experimentation' (1985, p. 80). These ideas continue to resonate today. The deference to lab over studio in counter-hegemonic economy design institutions reflects the ongoing tug of war between reflection-in-action and scientific technical rationality as modes of experimentation.

1.25. Shulman's signature pedagogies

The second major philosophical lens on studio is studio as the signature pedagogy of design education. As several scholars point out, the concept of signature pedagogy shifts the

emphasis of understanding away from content and curriculum towards ways of knowing, or epistemology, that are essential to that discipline (Osmond & Tovey, 2015, p. 50; Shreeve, 2015). The term signature pedagogy originates with Shulman's 2005 paper, 'Signature pedagogies in the professions'. In this paper, Shulman (2005, p. 52) observes that, particularly in professional schools like architecture, students learn how 'to think, to perform, and to act with integrity' or, in another phrasing, they develop 'habits of the mind, habits of the heart, and habits of the hand' (2005, p. 59). Shulman developed three dimensions, or structures, of signature pedagogies:

- Surface structures, which comprises operational acts of teaching and learning;
- Deep structures, which comprises assumptions about how to impart knowledge and skills; and
- Implicit structures, which comprises beliefs, values, and attitudes, and this is often called the 'hidden curriculum' (Crowther, 2013, p. 55).

Two additional features mentioned my Shulman that design researchers consistently find important are: public student performance and emotional uncertainty (Crowther, 2013, p. 21; Schrand & Eliason, 2012, p. 56; Shulman, 2005, p. 57). Shaffer (2007, p. 103) re-named Shulman's dimensions as:

- Surface structures
- Pedagogical activities
- Epistemology

These alternative names appear to be popular with design researchers and used in several papers on studio pedagogy (Brandt et al., 2013; Cennamo, 2016; Gray, 2016).

Studio pedagogy continues to be recognized as the signature pedagogy of design education (Boling et al., 2016; Farías & Wilkie, 2018b), but making sense of this pedagogy for others outside design remains rare (McLain, 2022, p. 1639; Oh et al., 2013, p. 303; Sawyer, 2018, p. 142). Across the formal and grey literature, four papers have been selected that reflect different approaches to studio pedagogy sensemaking that have informed thinking about #commonize studio.

1.26. Framework for studio pedagogy

McLain's paper, 'Towards a Signature Pedagogy for Design and Technology Education: A Literature Review' (2022), is the most recent and robust synthesis of literature concerning design pedagogy. McLain (2022, p. 1643) describes signature pedagogies not as a way to define or confine pedagogy but rather as a discursive tool 'for recognising, discussing and

critiquing pedagogical approaches, or a lens by which to examine them.'. McLain does not name this signature pedagogy as studio verbatim, but the four themes of this signature pedagogy — design studio, design thinking, design critique, and design project— are familiar features of every studio course in higher education. McLain first develops themes that comprise signature pedagogies across literatures:

- Locations
- Capability
- Uncertainty
- Challenges

McLain then develops four themes for design's signature pedagogy based on these themes:

- Design studio
- Design thinking
- Design critique
- Design project

Finally, McLain (2022, p. 1629) draws on previous literature (Irving-Bell et al., 2019; McLain, 2020) that ties design activities across three activities:

- Ideating or Designing
- Realizing or Making
- Critiquing or Evaluating

I noted the resemblance between these activities and the phases of action research cycles, a methodology used for #commonize studio experiments. In Part C, I present these action research phases using both the typical action research language alongside the terms proposed by McLain to see if they help provoke more designerly considerations in action research.

The phases become:

- Plan/Design
- Act/Make
- Observe
- Reflect/Critique

Below are short reviews of McLain's proposed themes for a signature pedagogy for design education, which I refer to in this paper as studio. For each of these four themes, I present McLain's explanation alongside other notable scholars:

Design studio. McLain describes design studio primarily as a physical location, 'a liminal space between the theoretical and the practical aspects of the discipline.' (2022, p. 1636). Studios are consistently defined by open spaces, no obvious front or back, and large desks assigned to individual students that they can use close to 24 hours of the day (Cennamo et al., 2011, p. 13; Gray, 2016, p. 271; Leiboff, 2010). Studio classes tend to be 2-4 hours long (sometimes longer) several times per week (Cennamo et al., 2011, p. 13; Skaggs, 2013). These surface features of the design studio mean that students are doing their work during the class itself with the instructor/s present to answer questions or engage in critique (Schrand & Eliason, 2012, p. 60), a type of formative feedback. These surface features also generate unique social practices or 'a way of being' (Fallman, 2007, p. 4) that are at once connected to the physical while extending into the other categories of McLain's framework. Fallman observes that studio culture 'promotes a style of learning that is based on continuous dialogue, conversation, asking questions, and giving and receiving critique' (2007, p. 3). The Covid-19 pandemic, when #commonize studio performed all experiments remotely, raised the question: What is studio pedagogy without a physical studio? Gray argues that privileging surface features risks ignoring 'the historic epistemological underpinnings of surface and pedagogical features entirely' (2022, p. 1642).

Design thinking. McLain defines design thinking as 'a disciplinary form of knowledge in action' (2022, p. 1642), recognizing that 'thought and action cannot be separated in design "thinking"' and that 'design thinking is more about acting than about remembering specialist knowledge' (2022, p. 1640). McLain's understanding of design thinking aligns best with how Cross explains 'designerly ways of knowing' (1982) and 'design intelligence' (2011) or Schön explains 'knowledge-in-action' (1985, p. 24). This theme is carried out in the wider literature and pithily synthesized as: 'Within the studio learning environment, students do not learn a body of content knowledge and then apply it but, instead, they learn about design while doing design' (Cennamo, 2016, p. 256; Lawson & Dorst, 2009; Nelson & Stolterman, 2012). Scholars consistently position design thinking as the purpose of studio pedagogy, not the things created by that thinking. For example, in a presentation to non-designers, Skaggs explains that 'Studio instruction generally focuses much more on the students' thought process than on the implementation of a final idea.' (2013). Sawyer offers a definition of studio pedagogy that greatly informs #commonize studio, and it is one that I use to explain studio experimentalism to non-designers: 'the primary intended learning outcome is to enhance the ability of students to consistently generate successful creative works' (2018, p. 170). Sawyer's definition speaks directly to studio experimentalism, pointing to success as the ability to consistently *generate* successful creative works, rather than to *duplicate* them as in a lab.

Design critique. McLain describes design critique 'as a staged presentation for expert and peer feedback' (2022, p. 1640). The conception of critique as performance is echoed by other scholars (Crowther, 2013; Dannels et al., 2008; Schön, 1984; Schrand & Eliason, 2012), and Schön even refers to the role of the instructor in his example of a desk critique as a 'virtuoso performance' (1984, p. 5). Schrand and Eliason, educators in an English department, observe that, 'The public performances and oral feedback we observed in these critiques contrast strongly with the feedback procedures found in the liberal arts courses that we teach.' (2012, p. 52). For this reason, many scholarly works exemplify critique through snippets of instructor-student dialogue (Dannels et al., 2008; Schön, 1985; Shaffer, 2007). Several scholars have tried to make sense of critique using other frameworks. Dannels et al. (2008) set out an initial 'communicative blueprint' for studio, but this blueprint does not capture the skills of the instructor. Oh et al. (2013) attempt to diagram critique from the instructor perspective, but this framework then struggles to exemplify the dynamism of performance articulated by other scholars. Nevertheless, attempts to elucidate critique for others remains important because critique remains 'the primary means through which students' design knowledge is refined' (Cennamo et al., 2011, p. 33).

Design project. McLain describes design projects as 'complex and comprised of common elements' that include resources, teaching methods, contexts, and activities (McLain, 2022, p. 1644). Cennamo et al. argue that studio can be considered a type of problem-based learning, placing the design project at the heart of this 'studio-based learning' (2011, p. 13). Shreeve et al. also consider studio to be a form of problem-based learning that is about 'replicating the experience of being a practitioner' (2010, p. 129). What differentiates a design project, as a type of problem-based learning, from problem-based learning in other fields? Cennamo defines the term 'design brief', a term familiar to most design educators, as 'a design challenge that is intentionally brief and open-ended' (2016, p. 248). This open-ended uncertainty applies to design instructors as much as students. Boling and Schwier describe studio teaching as 'walking into a situation where … they may be called on to help students work through problems they, the instructors, do not know immediately how to solve themselves.' (2016, p. 8). This condition in which designers operate goes by many terms: wicked problems (Rittel & Webber, 1973), design abductive reasoning (Dorst, 2015), and solutioning (Osmond & Tovey, 2015, p. 52), to name a few. What these terms all speak to is that, in contrast to problem-based learning where the problem is clearly defined, studio problems are 'ill-defined' (Cross, 1982).

1.27. Sensemaking frameworks

While sensemaking approaches to studio remain a gap, these three examples reflect a spectrum of approaches that affected #commonize in some way.

- Framework for understanding the design studio (Brandt et al., 2013)
- Theoretical framework of design critiquing in architecture studios (Oh et al., 2013)
- Instructional strategy for studios (Eberly Center, n.d.)

Brandt et al. (2013) propose a 'framework for understanding the design studio' that emphasizes the academic studio as a staging ground (a 'practice community') for participation in the professional community of design (the community of practice). In other words, there are two communities of practice, the academic and the professional, and the studio is the bridge between these two communities (Figure 10) — a community that is practicing entering these communities of practice. The authors credit Barab and Duffy (2000, p. 33) for the concept of a practice community, though it also strongly resembles Logan's work on the creation of 'overlapping "circles of practice"' between education and work in graphic design (2006, p. 331). The concept of communities of practice draws from more familiar literature by Lave and Wenger (1991). The authors then propose a table with these three communities (professional community of practice, studio bridge as practice community, and academic community) along one axis and Schaffer's signature pedagogy categories (surface structures, pedagogical activities, epistemological beliefs) along the other axis. The idea of the studio as a bridging practice community resonates with #commonize studio, as a place where the commons-maker and their community practice commoning.

Oh et al.'s 'theoretical framework of design critiquing in architecture studios' seeks to make critiquing more explicit, in order to support 'studio instructors to systematically plan and examine their critiquing practice.' (2013, p. 302). The authors develop this framework because 'no systematic attempt has been made to develop a descriptive theory that can account for the complexity of critiquing'. Based on their literature review, the authors develop a framework for critiquing practice consisting of 11 factors that focuses on critiquing conditions and methods (Figure 11). This framework is too complex for #commonize studio right now, but the schematic relationship between critiquing conditions and methods is useful. How do we design researchers explain critique to commons-makers who have not experienced design critique in a studio setting? If we think of commoning as a form of constant co-design (Galabo & Sacks, 2021), and the sites of commoning as the design studio, how do we support commoners to develop these critiquing capacities?

Finally, the Eberly Center for Teaching Excellence and Educational Innovation at Carnegie Mellon University (CMU) presents a high-level 'instructional strategy' (Table 10). The introductory text to this instructional strategy offers what I found to be the simplest way to delineate studio from lab, namely the delineation between scientific and artistic problem-solving: 'Labs and studios provide opportunities for students to learn procedural skills in a setting where they can observe, practice, explore, solve problems *(whether scientific or artistic)*, and gain mastery through hands-on use of disciplinary tools and techniques.' (Eberly Center, n.d.) [emphasis mine]. The instructional strategy for studios is described as a 'general model for teaching procedural skills that can be adapted for different studio contexts.' (Eberly Center, n.d.). The CMU instructional strategy for studios outlines a clear picture of studio as a more holistic process in language that is understandable to most people, including non-designers. The seven stages offer a reasonable entry point for making implicit studio pedagogy explicit; however, the strategy omits methods that instructors could use at each stage. This digestible approach informed #commonize studio's development of scaffolding, infrastructuring, and institutioning.

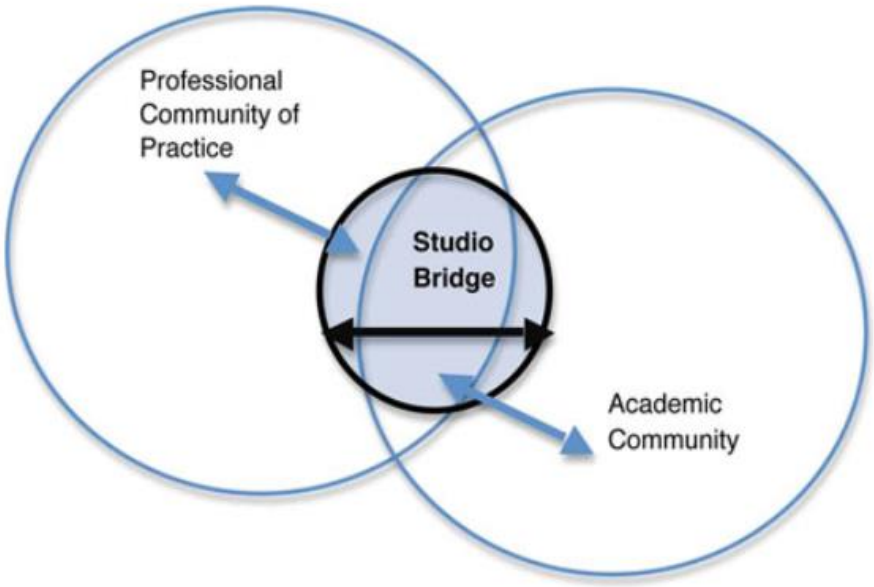


Figure 10. The studio as a bridge, or a 'practice community', between professional and academic communities of practice (Brandt et al., 2013, p. 338).

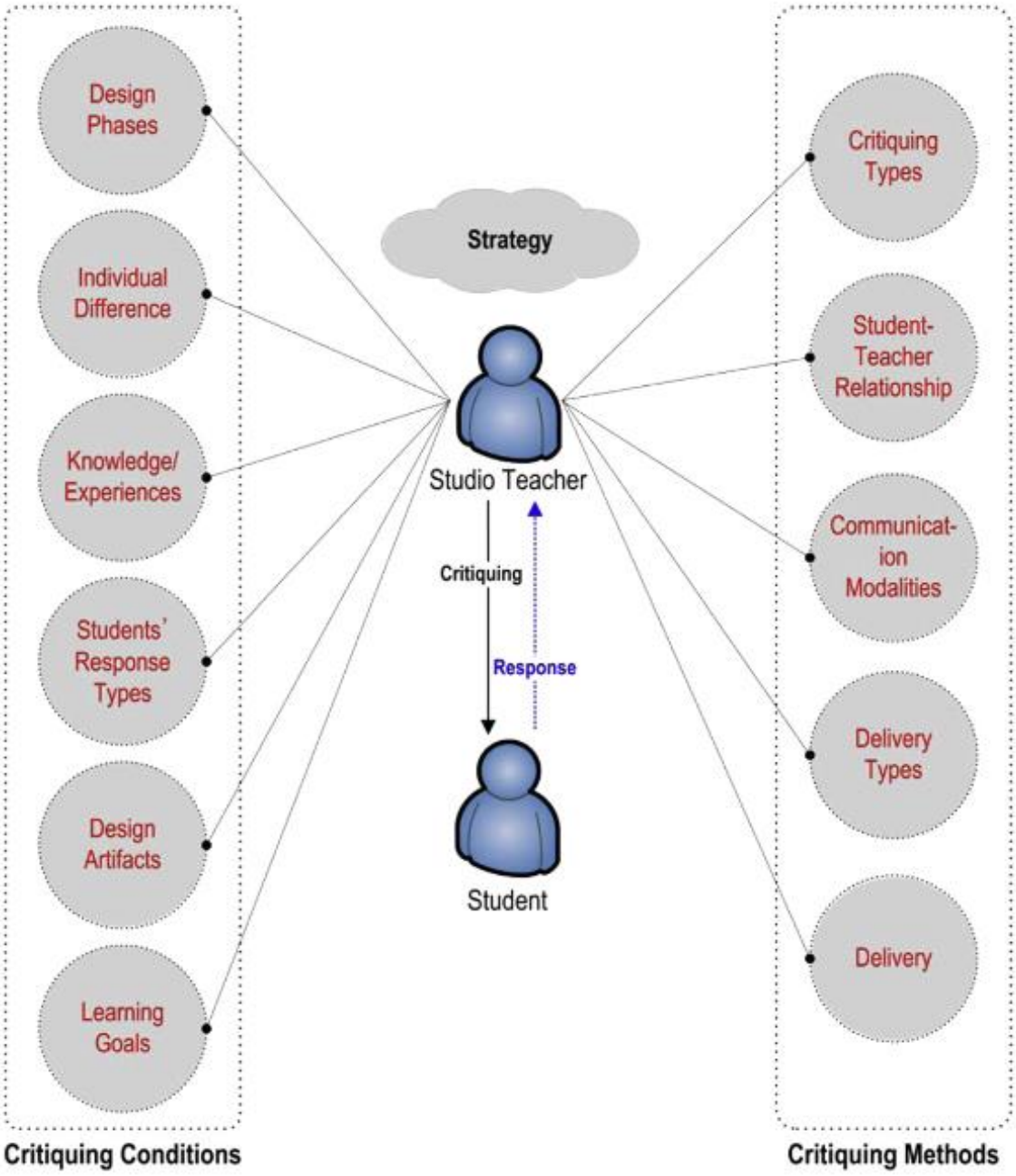


Figure 11. A framework for critiquing practice, where 'A studio teacher considers critiquing conditions and then selects a set of critiquing methods to offer feedback.' (Oh et al., 2013, p. 318).

Table 10. Instructional strategy for studios (Eberly Center, n.d.).

Stage	Instructor actions	Student actions
Situating	Situates the particular exercise or task within the context of the course and discipline, so that students can see its relationship to other core concepts, practices, etc.	Listens, thinks, answers questions
Modelling	Models expert practice while describing and explaining each step of the process from planning (selecting materials/tools, organizing work space, conceptualizing the task) through execution	Observes, listens, asks questions
Scaffolding	Provides guidelines, steps, and parameters to structure student exploration	Conceptualizes the task and begins planning
Coaching	Provides coaching and feedback while students engage in the exercise themselves	Engages in the practice, asks questions, reflects on own practice in relation to expert practice
Fading	Gradually decreases coaching and scaffolding, allowing students greater independence	Operates with increasing independence in more and more complex situations (less structure, more choices/complications, etc.)
Self-direct learning	Assists only when requested	Practices the real thing alone or in groups
Generalizing	Guides students from their own process to larger insights and useful generalizations	Generalizes from own practice to larger principles, concepts, or interpretations

Studio experimentalism

What is a studio experiment? This question that emerged from this research process could be the subject of an entire other PhD. Just as I hope Part A cracks opens a field of research for others to explore, Part B cracks open, in the smallest way, the field of studio experimentalism. Farías and Wilkie (2018a, p. 2) propose 'studio studies' to position 'studio as the laboratory's cultural analogous'. But, to truly position studio as an analogous experimentation method to lab, as Schön also advocated, studio experimentation must be viewed as equally rigorous and valuable. I first briefly review what defines a lab experiment

as a counterpoint to whatever may come to define a studio experiment. I then perform a systematised review of the literature on 'studio experiment' to understand what scholars mean by studio experiment and to develop tentative observations about what defines a studio experiment.

1.28. Defining laboratory (lab) experiment

What makes an experiment a *laboratory* (lab) experiment? For the sake of concision, I focus on the entry for 'Laboratory experiments' (Pederson, 2017) in *The SAGE Encyclopedia of Communication Research Methods* to understand key features shared across laboratory experiments, particularly social science experiments that deal with people. Below are the key points outlined in the definition.

- Purpose: 'to test theoretical assumptions by focusing on one or several predictive elements of the theory and isolating the influence of the hypothesized elements on outcomes'
- Techniques: 'random assignment of participants and control groups to assess causal inferences about the relationships between independent and dependent variables'
- Interactions: 'participants working individually or interacting with other participants or confederates (i.e., trained participants or researchers) to complete a directed task'
- Features: 'controllability'; achieved by creating 'nearly equal environmental conditions', 'randomly assigning participants', and 'blinding' (i.e. deception)

These points are familiar to most of us, and, if you attended a university, you probably participated in such lab experiments as a test subject. Some design research experimentation does meet these criteria, particularly experiments conducted online with anonymous participants; however, the vast majority of design research, particularly commons-making research, does not meet these criteria.

Above all, lab experiments answer scientific questions, not creative questions. Pederson explains that 'Laboratory experiments play an important role in the scientific method of building, testing, and revising theories.'. The Eberly Center (n.d.) summarises its instructional strategies for labs and studios as, 'Labs and studios provide opportunities for students to learn procedural skills in a setting where they can observe, practice, explore, solve problems (*whether scientific or artistic*).' (emphasis mine). The lab is used to explore scientific questions, and the studio is used to explore artistic (or creative) questions. The lab is the signature pedagogy of science and possesses its own surface structures, pedagogical activities, and epistemological beliefs. Perhaps, rather than hopelessly trying to fit ourselves

into the mould of scientific research, we design researchers can turn to studio as a container for a different type of experiment, experiments in creation.

1.29. Systematised review design

The original question driving this systematised review was: What is a studio experiment? There were few records in Scopus or Google Scholar, so my findings are tentative. The primary learning outcome is that more work is needed to build out studio experimentalism, both for design researchers and for commons researchers interested in commons-making.

This systematised review was simpler than others due to the paucity of records. There were four steps:

- Scopus. I searched Scopus for the phrase 'studio experiment' in the title, abstract, or keyword fields. I included the alternatives 'studio experiments', 'studio experimentation', and 'studio experimentalism'. This search produced 27 records.
- Google Scholar. I searched Google Scholar using these same phrases in the title. This search produced 22 records.
- Combining records. The combined records contained several overlaps, for a total of 43 records.

Record elimination. Twelve of the 43 records were eliminated from the review for one or more of the following reasons: irrelevant, not in English, unavailable. The systematised review ultimately included 31 records.

A clear limitation of this systematised review was delimiting results to papers that included the verbatim phrase 'studio experiment' or permutations of that phrase. Future reviews might search the design research literature for the term 'experiment' alone to generate more results. The purpose of this review, however, was to understand how scholars consciously invoke this specific term. Lab experiments do not grapple with this challenge. A similar Google Scholar search for 'laboratory experiment' generated nearly 5,000 records. If studio is to become the cultural analogue to laboratory, do scholars need to be willing to consciously recognise, label, and assert their experimentation as studio experiments?

1.30. Systematised review results

Making sense of the small pool of results was more challenging than other systematised reviews. The lab experiment is built on the scientific method, but there is not an equally clear 'studio method'. I present here a tentative attempt to organise studio experimentalism (Table

11) but further research will no doubt generate more instructive approaches. My initial attempt at sensemaking drew on Frayling's (1993) language and focused on the system of inquiry (Glanville, 1999; Jonas, 2012). I organized the results into three categories:

- Experiments into studio: Experiments into executing studio pedagogy, e.g. conducting studio online during the Covid-19 pandemic.
- Experiments through studio: Experiments in studio that address a system of inquiry outside the studio, e.g. students explore designs for commercial tile-making.
- Experiments about studio: Forensic experiments and investigations into individual artist studios.

The first two categories are both relevant to #commonize studio. As a studio operating during the Covid-19 pandemic, I faced pedagogical challenges about conducting design research with partners. The second category, experiments through studio, most closely aligns with #commonize studio, as a studio whose system of inquiry is outside the studio rather than the studio itself. The third category is the least clear and consistent, and also currently seems the least relevant to #commonize studio.

The majority of papers fell into the first category, experiments into studio. Within this category, I organized papers into Shaffer's three signature pedagogy categories.

Experiments into studio – surface structures. A number of papers experiment with surface structures' impact on pedagogical outcomes, or the operational acts of teaching and learning. Examples include physical modelling (Abdelhameed, 2011), visual abstraction (Kulözü, 2016), media techniques (Khalili, 2023), and online approaches necessitated by the Covid-19 pandemic (Doyle et al., 2023; Kamalipour & Peimani, 2022). Consistent with studio pedagogy, the authors are generally investigating and observing learning outcomes rather than physical outputs. For example, Khalili (2023) notes that the experiment with film in studio will 'leave an ever-lasting imprint on the architectural visualization skills of students as well as their thinking about the notion of space and architectural design', and Doyle et al. (2023) 'assessed [students] on a rubric of criticality, ideation/experimentation/observation and thoroughness of documentation'.

Table 11. Aggregate results of the systematised review.

Category	Record
Experiments into studio – surface structures	Architectural form creation in the design studio (Abdelhameed, 2011)
	Experiments, practices and positions in architectural design studio (Aydemir, 2017)
	Pandemic experimentalism (Doyle et al., 2023)
	Learning and teaching urban design through design studio pedagogy (Kamalipour & Peimani, 2022)
	A design studio experiment (Khalili, 2023)
	Teaching design to city planning students (Kulözü, 2016)
Experiments into studio – pedagogical activities	Indifferent or devoted (Galil & Kandil, 2015)
	Collaborative architectural design studio environment (Qureshi, 2019)
	Neither individual, nor group (Türkkan et al., 2012)
	Themes of place and space in design teaching (Ulusu Uraz & Balamir, 2006)
Experiments into studio – epistemology	Education and space for mobile lives (Çakıcı & Örmecioğlu, 2017)
	A design studio experiment on site and building integrations towards placemaking (Deviren, 2006)
	Integration of revealed knowledge into design thinking (Maharika, 2018)
	Making urban design teaching more permeable to regional green infrastructure (Medeiros de Freitas, 2023)
Experiments through studio	Fabricating ceramic covers (Caldas & Duarte, 2005)
	Going green in architectural education (Dabaieh et al., 2017)
	Free-form ceramics (Duarte et al., 2004)
	Designing shelters for 3D-printing (Duarte et al., 2018)
	Rethinking Shanghai's urban housing (Hee, 2007)
	Computer generated architectural design (Rügemer, 2001)
	Learning mathematics through design (Shaffer, 1997)
Experiments about studio	Inaudible visitors (de Lautour, 2017)
	From perception to paint (Jelley, 2013)
	Rediscovering Daphne Oram’s home-studio (Waller, 2018)

Experiments into studio – surface structures. A number of papers experiment with surface structures' impact on pedagogical outcomes, or the operational acts of teaching and learning. Examples include physical modelling (Abdelhameed, 2011), visual abstraction (Kulözü, 2016), media techniques (Khalili, 2023), and online approaches necessitated by the Covid-19 pandemic (Doyle et al., 2023; Kamalipour & Peimani, 2022). Consistent with studio pedagogy, the authors are generally investigating and observing learning outcomes rather than physical outputs. For example, Khalili (2023) notes that the experiment with film in studio will 'leave an ever-lasting imprint on the architectural visualization skills of students as well as their thinking about the notion of space and architectural design', and Doyle et al. (2023) 'assessed [students] on a rubric of criticality, ideation/experimentation/observation and thoroughness of documentation'.

Experiments into studio – pedagogical activities. Four papers engage in pedagogical activities, or assumptions about how to impart knowledge and skills. Qureshi (2019, p. 311) challenges the desk critique model that typically pairs a 'a single tutor and student', instead giving the student 'the freedom to select any one of the teachers of the design studio for discussion and desk critiques'. Türkkan et al. (2012, p. 8) alter studio dynamics and focus observation on 'negotiation', which they mean as 'tension between individuality and collectivity'. Ulusu Uraz and Balamir (2006, p. 14) similarly describe their experiment as 'twofold, one relating to the formation of self in students and the other referring to the building up of a collective studio culture'. Galil and Kandil (2015, p. 96) explore the 'capacity of the design studio to reinforce issues of identity, sense of ownership and belonging'.

Experiments into studio – epistemology. Another four papers experiment with epistemologies. Deviren (2006) explores placemaking. Çakıcı and Örmecioğlu (2017, p. 2842) ask students 'to listen to the whisper of the site and material as described by Rafael Moneo'. While many papers discuss the introduction of interdisciplinary knowledge in the studio, several experiments are explicitly about this intervention. Medeiros de Freitas (2023) introduces 'green infrastructure' to an urban design studio to generate different outcomes. Maharika (2018, p. 37), focusing on Islam in architecture, asks 'whether studio design is also open to the integration of spirituality and revealed knowledge'.

Experiments through studio. Studio experiments through studio include studio classes using the studio to produce designs for use outside of the studio. Most of these studios engage external stakeholders, who serve in a range of capacities from end user to implementation partner. Rügemer conducts experiments through a university studio 'to trace possibilities to plan and build individual shaped architecture, using today's state-of-the-art computer driven process chains' (2001, p. 289). Hee engages students to 'reinterpret the *lilong* [traditional housing type]' (2007, p. 140), which will be reviewed by real estate developers. Dabaieh et al.

bring students to a 'three week urban living lab workshop on the project site' (2017, p. 357) to develop viable structures for Bedouin communities there. A group of scholars in Portugal capture a series of experiments involving ceramic tile design that are evaluated by external stakeholder (Caldas & Duarte, 2005; Duarte et al., 2004, 2018), e.g. industrial partners will evaluate tiles for both aesthetic value and thermal and structural performance (Caldas & Duarte, 2005, p. 269). Shaffer's (1997) 'mathematics studio' is the one studio experiment outside art, architecture, or design. Shaffer finds that students enjoyed three features that are less typical in mathematics classrooms, which he terms: control ('freedom of physical as well as intellectual movement'), expression ('the process of taking some part of one's internal being … and representing it externally'), and interaction ('students' relations to other people as it connects to their learning experiences') (1997, pp. 103–104).

Experiments about studio. The final category, tentatively labelled experiments about studio, is less consistent. Jelley (2013) uses a camera obscura and painting techniques to test a theory about Vermeer's style, a type of studio experiment that might be called a forensic studio experiment. Two other scholars also examine the artist's studio as a site of studio experimentation (de Lautour, 2017; Waller, 2018), though they do not perform experiments themselves. These three papers represent studio experiments in the context of the artist's studio, rather than the studio class in the other papers.

These delineations between studio experiment types are admittedly imperfect. This initial sensemaking using studio pedagogy dimensions and designerly systems of inquiry aims to ground studio experimentalism in ways of thinking about design research that are familiar to and accepted by design researchers.

1.31. Studio experiment components

So, what makes an experiment a *studio experiment*, especially in contrast with a lab experiment? I return to the summary I produced earlier for lab experiments and contrast these component descriptions with my tentative observations from the systematised review (Table 12).

Alongside these components, a more holistic consideration emerges: What makes a studio experiment (versus a lab experiment) successful? Both experiment types do seek to be replicable. If we follow Binder and Brandt's (2008) suggestion for a 'design:lab', studio experiments might equally aim to be recorded and reproduced like lab experiments. However, the lab experiment is deemed valid scientific knowledge if other scientists can precisely duplicate the results using the prescribed process. In contrast, a studio experiment might be deemed successful if studio experiments can generate successful results in their

context. In sum, success in lab experimentalism is defined by *duplicability*, while success in studio experimentalism is defined by *generativity*.

Purpose. Building on Sawyer's definition, the purpose of studio experiments is to 'enhance the ability of students to consistently generate successful creative works' (2018, p. 170). This definition focuses our attention on the people involved rather than the inert elements of the experiment. In the commons literature, Helfrich (2015) articulates the entanglement between people and resources as, 'There is no *commoner* without commoning'. Equally, we might say there is no studio experiment without studio experimen*ters*. Lab experiment results can be reproduced by a machine. A studio experiment must be reproduced by people, making people the product of studio experiments as much or even more so than the artefacts they create.

Techniques. The technique that features most consistently across the literature is the role of critique. Critique can take many forms, from private desk critique between student and instructor to semi-private peer critiques to public reviews. Critique and critiquing are an indispensable feature of studio pedagogy, as pointed out by numerous authors earlier. Several papers discuss critique in their studio experiments. Doyle et al. (2023) experiment with 'Crit Clubs', Qureshi (2019) 'breaks' the traditional pairing between tutor and student for desk crits, Galil and Kandil (2015) invoke 'critical pedagogy' based on Freire's *Pedagogy of the Oppressed*, Dabaieh et al. (2017) incorporate critiques and groups sessions in their experiment, Deviren (2006) articulates the focus of the experiment being to create 'critical and creative designers', and Shaffer (1997) incorporates 'peer review' in a mathematics studio experiment. These examples highlight different dimensions of critique and criticality. For some authors, the purpose of the experiment is about developing student criticality; for other authors, critique is a component of the experiment, something that the authors are experimenting with alongside other variables.

Interactions. The interaction type that features most consistently across the literature is how students navigate between individual and collective identities. Scientists do collaborate, but results are scientifically correct or not. The negotiation between the self and the collective is one of the skills that studios as practice communities seek to develop. These skills are more often reflected in implicit structures or epistemological beliefs. In several papers, though, this negotiation is made more explicit and clearly communicated as surface structures to students. Alongside the experiments by Türkkan et al. (2012) and Ulusu Uraz and Balamir (2006) reviewed earlier, Qureshi's (2019) experiment in 'collaborative studio pedagogy' makes this negotiation visible by giving students freedom over the critique process, while Galil and Kandil (2015) experiment with studio's ability to create new collective identities

tied to place. Fallman finds that '[s]uccessful studio culture' (2007, p. 5) achieves a balance between individual work and small groups.

Features. At least eight papers discussed the introduction of new knowledge from other disciplines as part of the studio experiment. The studio experiment is, in part, an experiment in what happens when students combine different knowledges into something new. For example, Khalili (2023) introduces film to understand how it affects student 'thinking about the notion of space and architectural design', Medeiros de Freitas introduces green infrastructure as a 'new language' (2023, p. 2), Dabaieh et al. 'introduce the concepts of sustainable design and environmental solutions' (2017, p. 357), and Shaffer (1997) weaves together mathematics and art in a 'mathematics studio'. Studio's incessant curiosity for combining knowledges or disciplines to see how that affects the generative process has no parallel in lab experimentalism.

Table 12. A discursive review of components of lab experiments versus studio experiments.

Component	**Lab experiment** (Pederson, 2017)	**Studio experiment**
Purpose	'to test theoretical assumptions by focusing on one or several predictive elements of the theory and isolating the influence of the hypothesized elements on outcomes'	To develop approaches that 'enhance the ability of students to consistently generate successful creative works' (Sawyer, 2018)
Techniques	'random assignment of participants and control groups to assess causal inferences about the relationships between independent and dependent variables'	Critique at every level, from individual desk critique to peer critique to public reviews
Interactions	'participants working individually or interacting with other participants or confederates (i.e., trained participants or researchers) to complete a directed task'	Participants navigate between individual and collective identities to generate a solution in response to an ill-defined problem or design brief
Features	'controllability'; achieved by creating 'nearly equal environmental conditions', 'randomly assigning participants', and 'blinding' (i.e. deception)	Introducing and scaffolding of diverse knowledges or disciplines
Success	Duplicability	Generativity

1.32. Revisiting lab and studio experiments

Why does developing an understanding of studio experimentalism matter? Before I move to the next chapter that reviews institutions engaged in counter-hegemonic economy design, I want to review a specific case study in experimental economics that elucidates this relationship between lab and studio experimentalism.

Experimental economics has evolved over the years and recently earned three economists at the Jameel Poverty Action Lab (J-PAL) the 2019 Nobel Prize in Economic Sciences 'for their experimental approach to alleviating global poverty' ('The Prize in Economic Sciences 2019', 2019). In a representative experiment, 'researchers conducted a randomized evaluation of a household water cistern construction program to test the impact of economic vulnerability on clientelism' (Bobonis et al., n.d.). Researchers selected a randomized group of households to receive free water cisterns and observed through surveys what impact this had on household voting patterns. The experimenters conclude that there is a relationship between these two variables and that 'reducing citizens' vulnerability … reduces votes for clientelist politicians' (Bobonis et al., 2022). This experiment embodies all of the components of lab experiments. The experiment tests the relationship between two variables, provision of water cisterns and voting behaviour. The experimenters exercise control by randomising which residents receive cisterns and blinding everyone beyond the research team to the intentions of the experiment and to each other.

This lab experiment has taken us as far as it can go. We observe the relationship, but what can we do about it? Succeeding research, how to solve this 'expressive problem' (Shaffer, 1997, p. 110), requires studio experimentation instead. Returning to the components of studio experiments (Table 12), how might a studio experiment build on this lab experiment?

Techniques (critique). Critique can address this problem at many levels, from experts (from the community or externally) performing desk critiques (desk crits), to resident groups developing collective designs (peer crits), and even extending critique to the political system that creates such vulnerability in the first place.

Interactions (identities). Water as a collective action problem is a long-standing commons subject. Residents may need to develop collective action solutions that navigate between individual or neighbourhood needs and wider collective needs, e.g. cisterns in one zone might affect water security in another zone.

Features (interdisciplinarity). In the J-PAL experiment, cisterns are built but residents gain no new knowledge or capacities. Why don't residents build cisterns? Is this due to lack of

materials, knowledge, power, money? Each of these needs leads to different knowledge that can be introduced to residents, by each other or by external people.

The primary output of the J-PAL lab experiment is a set of files that describe how to perform this experiment along with a dataset for the experiment conducted. In contrast, the studio experiment would likely generate cultural artefacts and designs. The studio experiment would also generate intangible outputs that are more difficult to record and share: institutions, capacities, and subjectivities. The J-PAL lab experiment, a pinnacle of lab experimentalism, successfully performs the act of dissection, unpicking relationships between variables and people by blinding members to emotional influences. In contrast, the studio experiment performs the act of weaving, combining peoples and knowledges in new combinations bound together by solidarity and affection.

Economy design studios and labs

There are several other institutions besides #commonize studio that engage in counter-hegemonic economy design, including commons-making. How do these other economy design studios perform studio experiments? I review three of the most high-profile institutions (in the English language, at least).

- Institute for Innovation and Public Purpose (IIPP) Policy Studio
- Doughnut Economics Action Lab (DEAL)
- P2P Lab

Only one of these institutions calls themselves a studio, but, as I hope to show, they are all performing studio experiments and not lab experiments. The purpose of including this type of landscape analysis is three-fold:

- To present methodological considerations from similar institutions that informed #commonize studio
- To surface through discourse and artefact analysis the potential value of studio experimentalism to such institutions; and
- To confront the deep-seated bias that we hold for scientific knowledge over creative knowledge.

For this analysis, I apply McLain's framework for studio pedagogy to each studio's published materials to evaluate the pedagogical approach each studio uses. IIPP Policy Studio best exemplifies design thinking, DEAL best exemplifies design projects, and P2P Lab best exemplifies design studio. None of these institutions visibly exemplify design critique, though DEAL and P2P Lab take notable approaches through their accessible websites.

1.33. IIPP Policy Studio

The IIPP Policy Studio is part of a larger institution, the Institute for Innovation and Public Purpose (IIPP) at University College London (UCL). IIPP's focus is 'Changing how public value is imagined, practised and evaluated to tackle societal challenges' (IIPP, n.d.-b), built on the renowned work of Prof. Mariana Mazzucato. There are only two data sources for the IIPP Policy Studio: the web page for the IIPP Policy Studio (IIPP, n.d.-b) and a more informative post on *Medium* (Mazzucato et al., 2022).

Design thinking. Both web pages emphasize a four-step 'practice-based theorizing in action' methodology (Figure 12). The methods referenced include participatory co-design workshops and rapid prototyping. The authors also cite a master's module called 'Transformation by Design'. The publicly available module description uses the terms 'design thinking' and 'practice-based' (IIPP, n.d.-a). IIPP notably identifies the need to integrate an 'orientation' for 'new economic thinking' with design thinking: 'While the participatory co-design method is important, without the new economic thinking it would be hollow.' (Mazzucato et al., 2022). IIPP calls this approach a 'new epistemology of policy-making'.

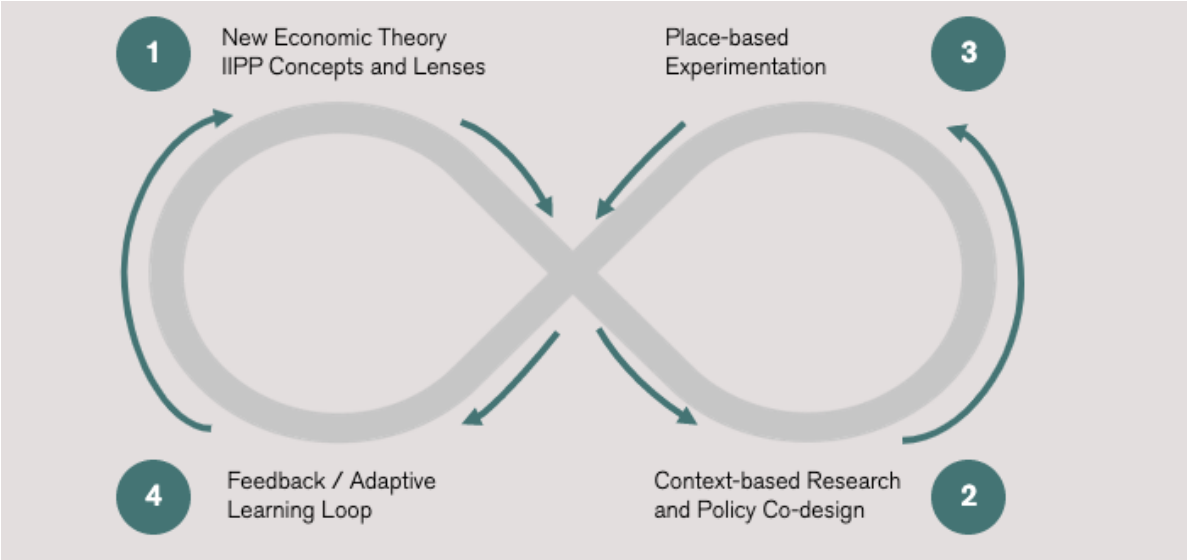


Figure 12. IIPP Policy Studio's 'practice-based theorizing' model (IIPP, n.d.-b; Mazzucato et al., 2022).

Design studio. IIPP describes the Policy Studio as 'a virtual policy studio space which enables us to systematically coordinate our policy deep dives and draw together a dedicated team that enables this work at scale.' (Mazzucato et al., 2022). This may mean that work is carried out online, or more likely, in-person workshops are conducted using physical spaces at UCL or the client site.

Design critique. Critique is not mentioned in any data sources.

Design project. The website offers four project links under 'Read more on our policy work' with no other information. None of these reports mention the IIPP Policy Studio, so it is not possible to know what the IIPP Policy Studio project was, if anything.

While the details of how IIPP Policy Studio operates are unknown, the website language indicates a desire to be like a studio. The website prominently features 'practice-based theorizing in action' that mirrors Schön's reflective practicum. IIPP identifies the need to weave education about 'new economic thinking' within the studio, explaining that, 'Shifting policymakers towards a "market-shaping" approach where there is more uncertainty about the future involves challenging many deeply established paradigms, strongly held mindsets and common ways of working and thinking about policy.' (Mazzucato et al., 2022).

This approach, particularly coming from a well-respected economics research centre, reinforces observations from previous systematised reviews, particularly the need for scaffolding, or what the IIPP Policy Studio calls 'new economic thinking'.

Since IIPP Policy Studio calls itself a studio, the question here is how articulating studio pedagogy and experimentalism might improve this studio's practices (whereas, for the next two cases, I question their self-labelling as labs). The most glaring issue is how this studio declares its approach to be a new epistemology, a phrase worth showing in context: 'The key is to develop and test both new frameworks and on-the-ground solutions together. This work ultimately generates a new epistemology of policy-making — a new way of gathering, framing and analysing knowledge about policy.' (Mazzucato et al., 2022). The design researcher will immediately recognise this description, developing policy knowledge by designing policy, as the epistemology of design research. This language is positive on one hand, affirming studio as a valid methodology for economy design, and frustrating on the other hand, leaving us to wonder how design research might support more economy design studios like this one.

1.34. DEAL

The Doughnut Economics Action lab (DEAL) was created by Kate Raworth after her book, *Doughnut Economics: Seven Ways to Think Like a 21st Century Economist* (2017), took off and garnered her recognition as one of the world's most influential economists (Wittenberg-Cox, 2020). The book visualizes how humans relate to and sustain Earth using a stylised doughnut, living in a narrow band that neither overshoots Earth's regenerative capacity nor undershoots so far that human life becomes miserable. The DEAL website presents dozens of data sources, which are organised into tools, stories, and themes.

Design thinking. The last line of Raworth's book implores, 'When it comes to new economic thinking, *draw* the change you want to see in the world too.' (2017, p. 293). Just a few pages earlier, Raworth offers a vision for the future where she invites economists to 'leave behind the foolhardy search for economic laws of motion' and 'step up to the design table' (2017, p. 242). Raworth set up DEAL to turn 'Doughnut Economics from a radical idea into transformative action', yet the DEAL website explains that 'Our name is very intentional: we are focused on action and always learning through experiment.' ('About DEAL', n.d.). It seems the design table of 'those innovative architects, industrial ecologists, and product designers who are spearheading the regenerative design revolution' (Raworth, 2017, p. 242) has been moved to a lab. The DEAL community website enacts studio processes and goes some way to addressing Binder and Brandt's (2008) concerns around process documentation. For example, one DEAL team member shares a tool called 'Stepping into the Doughnut' (Figure 13) with the stated plan of 'writing it up as a workshop guide here on the DEAL Community Platform for anyone to pick up and use, adapt and evolve' (DEAL team, 2021).

Figure 13. An experiment conducted at the Playground for the New Economy festival, documented by the 'Communities and Art Lead' at DEAL (DEAL team, 2021).

Design studio. Many of the tools and stories on the DEAL website show physical locations for experimentation. The physical sites of experimentation range from conference rooms to city streets. For example, 'A Doughnut lab for hands-on sustainable action: A mobile and modular doughnut lab to make the Doughnut Economy tangible on the streets of Berlin' (Donut Berlin, 2023), shows members of Donut Berlin leading open-air interactive stations for people to experience Doughnut Economics principles, e.g. participants make seed balls at a station to demonstrate the principle of 'be regenerative' (Figure 14). All of these sites are valid sites for studio experimentation but fail to meet the controllability expectations of a lab.

Figure 14. People making seed balls at a station to demonstrate 'be generative' (Donut Berlin, 2023).

Design critique. DEAL does deploy a form of design critique at the website level that offers typical features for online creation communities (Fuster Morell, 2014), including: create profiles, add content, and like and comment on other posts. It is not clear how such interactions shape knowledge beyond allowing members to sort content by 'most popular' or 'most comments', but it is possible that DEAL members are using this data to inform future commons-making. Such technology is widely available now and presents advantages and disadvantages to wikis.

Design project. DEAL excels at documenting and sharing projects on its website. Some projects are inevitably better documented than others as the project website content is determined by its author. These projects illustrate design briefs for studio experiments, clearly intended for generative replication but not duplication, as is the case for lab tasks.

Overall, DEAL robustly enacts all of McLain's studio pedagogy features and addresses Binder and Brandt's requirements for a design:lab. DEAL's website comes closest to what I could hope for #commonize studio in the future. DEAL provokes a question for the future: If 'studio method' and/or 'studio experimentation' were clearer, would that provide a better guide to the DEAL community in conducting, recording, and evolving their studio experiments?

1.35. P2P Lab

P2P Lab is dedicated to commons research through commons-making. P2P stands for peer-to-peer, originated by Benkler (2006). P2P Lab was founded in 2012 by Prof. Vasilis Kostakis (Dafermos, 2020; 'P2P Lab', n.d.-a). According to the P2P Lab website, 'The P2P Lab is an

interdisciplinary research collective focused on the commons.' (P2P Lab, n.d.-b). There are two principal data sources for analysing P2P Lab: the P2P Lab website (P2P Lab, n.d.-b) and the P2P Lab entry in the P2P Foundation wiki ('P2P Lab', n.d.-a).

Design thinking. P2P Lab describes implementing projects 'using participatory and community-based methods and practices. We forward research and knowledge through the creation of spaces for creative resistance and commons-based alternatives.' (P2P Lab, n.d.-b). These methods and practices signal designerly over scientific goals.

Design studio. P2P Lab maintains multiple locations, including makerspaces. The older makerspace is Tzoumakers in Kalentzi, Greece, which describes itself as both a 'community workshop' and an 'open lab' (Tzoumakers, n.d.). Tzoumakers was a site of research-through-design for the EU-funded project Phygital, a portmanteau of physical and digital. Phygital aimed 'to pilot, evaluate and promote an emerging production and business model' that involved 'developing and connecting open collaborative production spaces (makerspaces)' and 'supporting the emerging entrepreneurial practices' ('About', n.d.). P2P members published a number of research papers drawing on this research, including a book chapter in *The Handbook of Peer Production*. This chapter, titled 'P2P learning', concludes, rather spectacularly, that reflection-in-action is 'one of the most important tools' for P2P learning (Antoniadis & Pantazis, 2020), citing Schön's *The Reflective Practitioner*. While Tzoumakers describes itself as an open lab, the project discourse supports Tzoumakers as an open studio performing studio experiments.

Figure 15. Tzoumakers, 'an open lab for communities to cooperatively design and manufacture tools for small-scale agricultural production ', was a physical site for the Phygital project by P2P lab (Tzoumakers, n.d.).

Design critique. P2P Lab, as part of the P2P Foundation, created the P2P Foundation wiki with editable pages. The wiki could operate as a form of design critique at two levels: a form of commons akin to Wikipedia for knowledge construction, and as a medium for project-level critique, e.g. to share project outcomes for online-moderated critique.

Design project. P2P Lab features a number of academic research projects on its website. Phygital, for example, features multiple research objectives that design researchers would label research through design. Another major EU-funded project, Cosmolocalism, seeks to 'improve our understanding of how to create sustainable economies through the commons' ('Extended Summary', n.d.). P2P Lab describes Cosmolocalism as a 'pilot-driven investigation' using participatory action research. In addition to these large projects, P2P Lab features a number of creative projects. For the project 'Wikiart: Commoning artistic expression', P2P Lab aimed to 'explore what lessons can be drawn from commons-based peer production with regards to art (in particular, theatre and music)' (Kostakis & Drechsler, 2015). A current project, TheOtherSchool (n.d.), 'briefly communicates new and old economic, political and philosophical ideas that can have a transformative effect on society' through videos, games, and children's books.

P2P Lab is a leading institution for counter-hegemonic commons-making that occupies a territory between the other two studios. P2P Lab primarily conducts academic research like IIPP Policy Studio, but it also has a community-building focus like DEAL. As the closest relative to #commonize studio, P2P Lab's use of action research has affirmed the use of action research for this thesis. The recognition of reflection-in-action as an important 'tool' for learning encouraged me to more boldly assert Schön's reflective practicum as a basis for #commonize studio experimentalism, and to make this reflective practicum more accessible to researchers outside design.

1.36. Making the studio turn?

The continued reluctance to invoke the term 'studio', even amongst design researchers, left me asking, 'What's so bad about studios?' P2P Lab is conducting research through design in makerspaces and lauds reflection-in-action, Schön's proposed epistemology for studio, as one of the most important tools for learning. DEAL's experiments include people making seed balls on the street (Figure 14) and 'play[ing] in and around the safe and just space' (DEAL team, 2021) created by ropes in a barn (Figure 13).

These experiments are beautiful, instructive, and impactful. These experiments are being published by well-respected economists at influential institutions that I would label economy design studios. Why do these institutions, that are so clearly engaged in experiments in

creativity rather than analysis, in solving artistic rather than scientific problems, insist on calling themselves labs? I cannot offer an empirical answer to this question. What this review does show, though, is that we design researchers need to make studio pedagogy and studio experimentalism more visible and accessible if we want counter-hegemonic economy designers to use it. And, in so doing, we must also confront why we, too, typically privilege lab over studio.

The primary implication of this exploration into studio experimentalism for the research approach in this thesis is framing my research as artistic experiments rather than scientific ones. In Table 12, I also posit that generativity might be a measure of success for such studio experiments, which I consider throughout the #commonize studio experiments in Part C and Epilogue. Attempts to pinpoint the epistemology, ontology, or methods of studio or studio experimentalism within design research would be premature at this point.

First, the overwhelming majority of literature reviewed in Part B concerns *architecture* studios, which are related to but not equivalent to art or design studios. Almost all papers reviewed in Chapter 0 concern architecture studios. Schön, Shulman, and Schaffer create observations based on architecture studios. McLain's review of signature pedagogy for design only finds two papers categorized as design. In short, there is much still to explore within the specific context of *design* (and/or design research) studios.

Second, studio, even within the narrow category of design studio, represents no singular epistemological or ontological foundation. In the book chapter, 'What is studio?', Cennamo (2016) observes that influential works by Shaffer (2007) and Brandt et al (2013), discussed in this thesis, find that different communities of practice have different epistemologies. Cennamo summarizes this conflict within design research using an example from Brandt et al's 'A theoretical framework for the studio as a learning environment' (2013):

> For example, Brandt et al. (2013) reported very different conceptions of what constituted 'good design' when comparing an industrial design and a human-computer interaction (HCI) studio classroom. Whereas the industrial design studio demonstrated a *reflective practice paradigm*, in which the uniqueness of the design problem was examined through multiple design solutions subjectively analyzed in the design critique, the HCI studio course applied a problem-solving paradigm that valued a *logical, step-wise analysis* of the design problem and the empirical data of usability. (Cennamo, 2016, p. 253) [emphasis mine]

Third, alongside these epistemological variations is the role of the studio instructor. Constructivist understandings of the studio instructor as 'co-constructor of knowledge' (Cennamo, 2016, p. 253) informed my research approach and is explored in Chapter 0, but

the historical role of the 'studio master' inherited from the École des Beaux Arts tradition remains commonplace in studios around the world (Gray & Smith, 2016). In *Studio Teaching in Higher Education: Selected Design Cases*, Boling and Schwier caution against defining studio teaching: 'The reader looking here for a template or guide book on studio teaching will be disappointed – by intent. There is no single, generalizable set of guidelines that we can, or want to, offer.' (2016, p. 20).

Fourth, from this multitude of epistemologies arise multiple ontologies as well. Farías and Wilkie (2018a) point to three: 'expressing' by Dewey (2005), 'making' by Ingold (2013), and 'prototyping' by Wilkie (2014) as exemplar ontologies within what they call 'studio studies'.

Based on this review, I approach studio experimentalism as a methodology or approach. Naming this research as studio experiments, rather than simply experiments, serves to frame the experiments as expressly artistic research that seeks to solve an artistic or creative problem, in this case the problem of how people create counter-hegemonic commons. Within this framing, studio experiments can be performed by adding additional methodologies and conducted using various methods. As outlined in Table 14, I add diverse economies as a research methodology constraint and use a variety of commonplace design research methods to conduct these studio experiments.

Commons-making methodologies

How might #commonize studio perform studio experiments? Lab experiments follow the scientific method, but there is not a singular 'creative method' for studio experimentalism. The earlier reviews particularly found that the plurality of this research employed action research in some form, e.g. P2P Lab uses 'participatory and community-based methods'. Action research is a logical choice for #commonize studio given the focus on commons-making with others. Action research is, however, ideologically agnostic, so I introduce a second methodological layer to action research called diverse economies that specifically addresses the counter-hegemonic concerns of #commonize studio.

1.37. Action research

Action research refers to a range of approaches. What kind of action research is #commonize studio? First, I delineate between action research and participatory action research and locate #commonize studio distinctly within action research and not participatory action research. Second, I consider a recent, novel mashup between action research and research through design called action research through design (ARtD), which I find useful to test with #commonize studio.

The first consideration is action research versus participatory action research, both of which are cited in the commons-making literature. Elliott (1998, p. 50) likens action research to Schön's reflective practice. In this light, framing #commonize studio as action research (reflective practice) is quite natural. The way Elliott explains the difference between action research and other research forms is that 'The fundamental aim of action research is to improve practice rather than to produce knowledge. The production and utilization of knowledge is subordinate to, and conditioned by, this fundamental aim.' (1998, p. 49). For participatory action research, Elden (1981, pp. 257–258) cites four decision questions that must be answered:

- What is to be evaluated?
- How will it be evaluated?
- How will the data be analysed?
- What will be done with the findings?

Elden explains that 'Research is participatory when those directly affected by it influence each of these four decisions and help carry them out'. A finer differentiation is the role of the researcher, characterized in participatory action research as that of '"colearner" rather than of "expert in charge of change" in which the researcher's expertise includes the ability to "fade out" as participants take charge of their own learning' (Elden & Levin, 1991). This role of 'co-producer of knowledge' is contrasted with the researcher as facilitator or instigator (J. Bell et al., 2004). #commonize studio aspired to (and still aspires to) perform participatory action research, but the nature of studio projects and known outcomes thus far tempers this aspiration. Framing #commonize studio as action research is more honest, and it also focuses analysis on #commonize studio's practice, something that I was able to observe and record, rather than the knowledge and change created for studio partners, which was far more difficult to know or record.

1.38. Action research through design (ARtD)

The second consideration was how other researchers pair action research with research through design, a more designerly mode of inquiry that seemed like such a natural pairing to me that I assumed others might have done it. One exhaustive literature review by Taylor (2018) found this explicit pairing to be rare. I did find one recent paper that explicitly combines action research with research through design in a portmanteau they named 'action research through design' or 'ARtD' (Gaete Cruz et al., 2022). The authors explain that the purpose of this combined approach is 'to generate knowledge from practice by acting in an actual ongoing design process' (2022, p. 367) and outline how these two approaches worked

in tandem in the project (Table 13). Overall, action research specifies *how* the researcher interacts with other actors, and research through design specifies the research *focus*. Action research can address any research area, but action research through design must address design matters. Research through design can be conducted in any manner, including by oneself, but ARtD must be conducted in collaboration with the other research actors.

Table 13. Delineation between action research (AR) versus research through design (RtD) approaches in Gaete Cruz et al. (2022, p. 367).

Operational levels	**Approach**
Planning	AR approach to the collaboration of actors RtD approach to the design of objectives
Conduct design	AR approach to collaboration with actors RtD approach to the outcomes and objectives
Reflecting	AR approach to collaboration and the process RtD approach to evaluate design and outcomes

Alongside Gaete Cruz et al.'s (2022) proposal for ARtD, another proposal that has been included in #commonize studio's action research is Villari's (2014) proposal for 'design action research' in the *Routledge Companion to Design Research*. Villari identifies three 'immaterial' dimensions that designers might 'give shape' to when conducting such design action research (2014, p. 315):

- Relationships: Giving shape to the relationships between those involved in the research process and proposing new ways to connect individuals, companies, institutions, communities, places, etc.
- New ideas: Giving shape to new ideas and to design strategies so as to make immaterial elements like knowledge, values, know-how and identity tangible.
- Artefacts: Giving shape to the artefacts that concretise the research output; i.e., description and visualisation of design scenarios, design concepts or final project solutions that are products, new services, distribution systems, communication systems, etc.

These three dimensions align with and complement the three strategies proposed for diverse economies action research reviewed in Chapter 0.

1.39. Diverse economies

The most useful methodology for guiding #commonize studio so far has been diverse economies, which progenitors more often refer to as a 'research program' (Gibson-Graham & Dombroski, 2020, p. 7). The pithiest description of diverse economies is 'the political economy of possibility' (Cameron & Gibson-Graham, 2022). This political economy of possibility takes as its starting point that 'ethical economic practices *already exist in abundance*' (emphasis mine) (Gibson-Graham et al., 2020) and that the task of this methodology or research programme is 'Determining just how these practices connect and cohere to build a different world' (Cameron & Gibson-Graham, 2022). In turn, this world-building is performed through scaling *out* via relational networks and associations rather than scaling *up*, or a 'politics of horizontal extent, reach, and association' (Gibson-Graham & Dombroski, 2020, p. 20; St. Martin et al., 2015, p. 16).

Two images exemplify the enactment of diverse economies research: the Diverse Economies Iceberg (Figure 16) and Time-Property Geographies (Figure 17). First published in *A Postcapitalist Politics* and continuously updated by the Community Economies Collective, the Iceberg surfaces how much of what we call the economy 'comprises but a small subset of the activities by which we produce, exchange and distribute values' (2006, p. 69). The Iceberg seeks to deconstruct the meaning of economy and make visible other words and meanings that could expand what economy means to us. The Iceberg is often used with communities to perform this deconstruction in their own context and language, e.g. Redrawing the Economy (n.d.).

Time-Property Geographies is one of several tools published in *Take Back the Economy: An Ethical Guide for Transforming Our Communities* (Gibson-Graham et al., 2013), which attempts to make diverse economies research accessible for community use. Figure 17 is a completed example for an Australian household, charting hours on the x-axis and property type on the y-axis. The purpose of this tool is to surface the many property types besides individual private property that factor into a quotidian day. For example, one household member works at a state-owned hospital, the children use open-access internet for schoolwork, and the household enjoys leisure time at a community-owned community centre and football club.

Figure 16. Diverse Economies Iceberg (Community Economies Collective, n.d.).

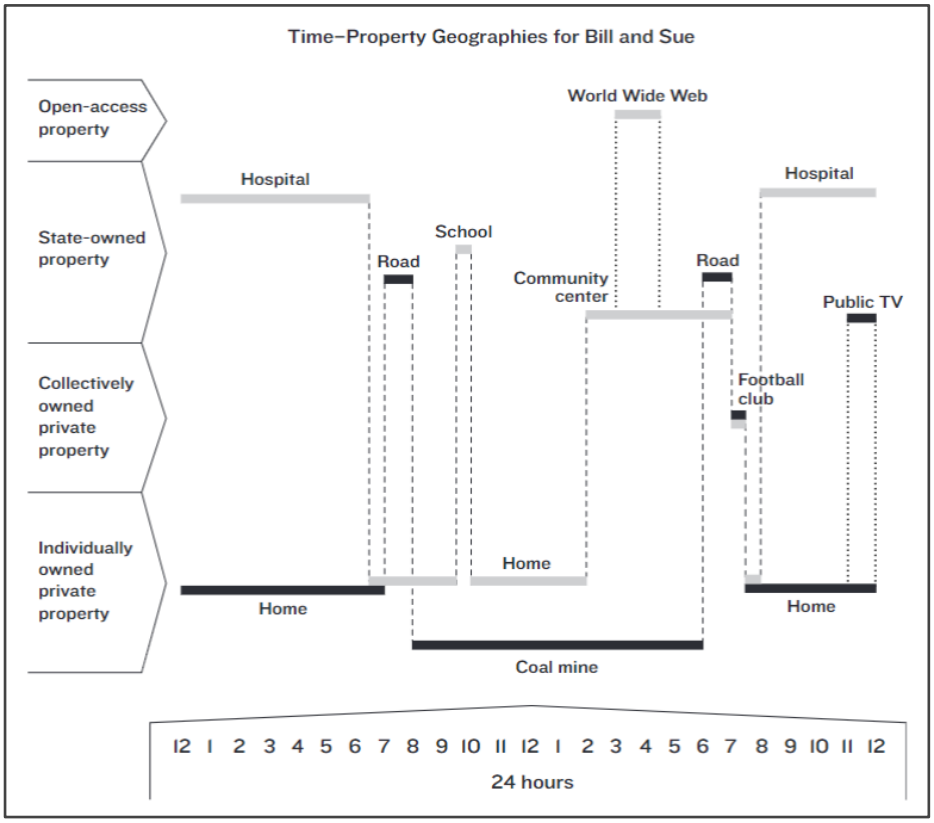


Figure 17. Time-Property Geographies (Gibson-Graham et al., 2013, p. 134).

1.40. Diverse economies origins

Founding mothers Gibson-Graham (2008, p. 613) announced, 'the birth of a "diverse economies" research community in economic geography' in 2008. This announcement came after a decade of scholarship building on Gibson-Graham's *The End of Capitalism (As We Knew It): A Feminist Critique of Political Economy* (1996) and the growth of a global research network called the Community Economies Research Network. The diverse economies research program has since matured into a more academically rigorous methodology with the publication of *The Handbook of Diverse Economies* (Gibson-Graham & Dombroski, 2020).

Diverse economies is rooted in poststructuralism, which signifies for Gibson-Graham 'a theoretical approach to knowledge and society that embraces the ultimate undecidability of meaning, the constitutive power of discourse, and the political effectivity of theory and research.' (2003, p. 95). The power of discourse became an early focus for Gibson-Graham and other early diverse economies scholars, viewing the relationship between words and meaning as 'continually being created and revised as words are recontextualized in the endless production of texts' (2003, p. 96). Gibson-Graham characterise this poststructuralist approach as anti-foundationalist in epistemology and anti-essentialist in ontology.

Epistemologically, diverse economies poststructuralism views knowledge as a social process and 'refuses a vision of knowledge as "grounded in reality" or as charged with the task of mirroring or "reflecting' the world"' (2003, p. 97; Rorty, 2009). Ontologically, diverse economies approaches discourse as having an 'infinity of contextualizations that provide multiple and contradictory readings' (2003, p. 97).

Finally, diverse economies poststructuralism draws on feminist poststructuralism, anti-essentialist theory about overdetermination, and queering. Writing a decade ahead of Fisher's *Capitalist Realism* (2009) and Žižek's *First as Tragedy, Then as Farce* (2009), diverse economies scholars articulated capitalocentrism (Gibson-Graham, 1996) as defining all alternatives in their relationship to capitalism, and capitalonormativity (Gibson-Graham et al., 2000, p. 13) as reducing difference to a binary frame. These terms arose from feminist poststructuralists who previously re-named Derrida's logocentrism as 'phallagocentrism' to highlight how male association imbues words with positive value, e.g. factory (male) versus household (not male) (Gibson-Graham, 2003, p. 98). An observation from my research on studio experimentalism is that phallogocentrism is one way we might diagnose the problematic meanings and values assigned to lab (male) versus studio (not male).

1.41. Diverse economies as performative research

While positions like poststructuralism and anti-essentialism inform diverse economies epistemology and ontology, materialism informs diverse economies performance. In other words, 'a different economy cannot be thought into existence; rather, it must be *enacted* and made durable by multiple means, including infrastructures, subjects, ecologies and theories' (emphasis mine) (Cameron & Gibson-Graham, 2022). There are several broad concepts that have persisted over the years that inform diverse economies as performative research:

- Capitalocentrism
- Thick description and weak theory
- Overdetermination and entry points

Capitalocentrism. Capitalocentrism means not only the way that capitalism is privileged in economic discourse but also defines how we discuss alternatives (Gibson-Graham, 2006), e.g. post-capitalism and anti-capitalism. The term 'diverse economies' aims to contest capitalism's stranglehold on our imagination, what Fisher (2009) termed 'capitalist realism'. Diverse economies researchers, from my experience, engage in this battle in every research project.

Thick description and weak theory. Diverse economies researchers try to resist temptations to create 'strong theory' for how diverse economies work in favour of 'interrogating specific examples and instances' (Cameron & Gibson-Graham, 2022) and generating 'thick descriptive inventory that breaks down the powerful presence of any dominant term' (Gibson-Graham & Dombroski, 2020, p. 9). These inventories and thick descriptions may eventually generate weak theories (Sedgwick, 1997) that are localised and malleable. The preference for thick description and weak theory is shared with much commons literature. The design principles for managing commons, the most popular commons literature concept outside the discipline, is weak theory based on extensive inventorying and thick descriptions of commons.

Overdetermination and entry points. The concept of overdetermination in diverse economies, inspired by the work of Althusser (1969) and Resnick and Wolff (1989), recognises that we each have multiple identities but some identities overdetermine or dominate others (Gibson-Graham et al., 2000). The way we as diverse economies researchers choose to make sense of the world, particularly with the communities involved in the research, is what Resnick and Wolff term entry points (1989, pp. 25–30). Cameron and Gibson (2022) describe entry points as 'the culmination of our pasts as well as our projections for the type of world we want to live in and that we think might be feasible'. Similar to capitalocentrism, my experience indicates that studio experiments in diverse economies must engage with entry points in every project.

The diverse economies literature offers strategies for enacting diverse economies research, with subtle changes over the years. One of the earliest works is 'Poststructuralist interventions' (Gibson-Graham, 2003), which organises the enactment of diverse economies research into three 'interventions':

- Deconstruction, informed by Derrida (1976), seeks to highlight 'moments of contradiction and undecidability in what appears to be a neatly conceived structure or text' (Ruccio, 1998) to remind us that 'meaning is always in process and incomplete' (Gibson-Graham, 2003, p. 99).
- Genealogy, informed by Foucault (1991), seeks to 'denaturalize' notions of the economy and make visible how power intersects with knowledge production, ideally to support a 'proliferation of and multiplicity of discourses that can create subjects able to resist and reconstitute power in different ways' (Gibson-Graham, 2003, p. 100).
- Performativity, informed by Butler (1993), views theory as a political intervention for which the 'production of new knowledges is a world-changing activity, repositioning other knowledges and validating new subjects, practices, policies, and institutions'

(Gibson-Graham, 2003, p. 100). Gibson-Graham would later draw on Law and Urry to apply performativity to the researcher as well: 'to change our understanding *is* to change the world' (Gibson-Graham, 2008, p. 615; Law & Urry, 2004, p. 391).

In 'Diverse Economies: Performative Practices for "Other Worlds"', Gibson-Graham focuses on the researcher and discusses three 'techniques of doing thinking that geographers (and others) are using to cultivate themselves as ethical subjects of economic possibility' (2008, p. 620):

- Ontological reframing
- Reading for difference
- Creativity

Ontological reframing proposes that diverse economies researchers 'can choose to create new discourses and counter-technologies of economy and construct strategic forms of interplace solidarity, bringing to the fore ways to make other worlds possible' (2008, p. 623). This approach aligns with modern trends in both pluriversal design and commons literature, intersecting with Bollier and Helfrich's call for 'Making an OntoShift to the Commons' (2019, Chapter 2). Reading for difference applies de Sousa Santos's 'sociology of absences' to destabilize the discourse of capitalocentrism, widening 'the possibilities for social experimentation' by enlarging the field of what are considered credible economic activities (2009, p. 239). Creativity is defined as 'thinking creatively in order to generate actual possibilities where none formerly existed' (Gibson-Graham, 2008, p. 620). Echoing the role of interdisciplinarity in studio experiments, this creative thinking 'often involves bringing things together from different domains to spawn something new' (2008, p. 625). Gibson-Graham offer terms created by other scholars that might find purchase by design researchers: cross-structuring (C. K. Smith, 1974), cross-appropriation (Spinosa et al., 1995), and extension (Varela, 1999).

1.42. Action research for diverse economies

The most recent articulation of diverse economies as performative research is 'Action research for diverse economies', in which Cameron and Gibson (2020) identify three 'strategies' for performing diverse economies research as action research. These three strategies are:

- Activating new languages
- Shifting subjectivities
- Collective action

The authors characterize diverse economies research as a form of action research because 'Diverse economies researchers are interested in the ways that people are already engaged in these types of practices (albeit sometimes in nascent ways) and how research can play a practical role in helping to strengthen such economic practices.' (2020, p. 511).

Activating new languages, which builds on the earlier postcapitalist intervention of deconstruction, recognises that words shape the actions and possibilities that are considered feasible. This relationship between words and possibilities resembles how Jessop (2013) explains economic imaginaries as created by a combination of structuration (compossibilities) and *sinnmachung* (meaning-making). Cameron and Gibson also recognize that, 'Invariably, diverse economies researchers come up against portrayals of economies that limit what is considered feasible, and therefore have to weave new languages of economy that expand options for action.' (2020, p. 512). This new language may emerge from the community through the research process (McKay et al., 2007) or may be strategically introduced by the researchers (Gibson-Graham et al., 2019).

Shifting subjectivities refers to shifting the ways that people 'imagine themselves in relation to economic practices' (Cameron & Gibson, 2020, p. 512). Examples of such shifts include people recognising capacities in themselves that were previously unvalued or undervalued and developing new collective identities of 'being in common' (Nancy, 1991).

The focus of collective action in diverse economies research is about creating new economic possibilities. Collective action might be considered synonymous with the action phase of action research, but the word 'collective' focuses on how diverse economies research builds counter-hegemonic power. These collective actions emerge from the research process so cannot be known in advance (Cameron & Gibson, 2020, p. 512).

These three strategies from this most recent paper ultimately inform #commonize studio's experimentalism the most directly. What the papers collectively show over time is the role of discourse and performance in diverse economies research.

1.43. Weaknesses of the diverse economies methodology

Gómez (2023) identified two issues that remain unresolved by diverse economies in a recent review of *The Handbook of Diverse Economies*, issues that I also confronted in my research:

- A normative challenge, i.e. What makes some economies better, worse, desirable, or problematic?
- The absence of any theory or practice of counter-hegemony.

A compelling example of the first challenge is the makerspace community observed by Fordyce (2015), where online neo-Nazi groups plot how to use 3D printing technology to build weapons, take over state infrastructure, and use that infrastructure to erect a white supremacist state. Is this vision part of diverse economies? If not, how do we know when we have crossed the line between agonism and antagonism (Mouffe, 2000)? Diverse economies scholars have remedied this problem more recently by developing 'community economies' as a subset of diverse economies, with six 'coordinates' (Community Economies Collective, 2019; Gibson-Graham et al., 2020):

- Survival
- Surplus
- Transactions
- Consumption
- Commons
- Investment

These coordinates are more normative. For example, a question related to the survival coordinate is: 'How do we balance our own survival needs and well-being with the well-being of others and the planet?'. The commons coordinate asks people to consider: 'What do we share with human and non-human others? How do we maintain, replenish, and grow this natural and cultural commons?'.

The development of community economies within the diverse economies research program goes some way to addressing Gómez's critique that the 'diverse economies framework does not acknowledge the contrasting diversity of other-than-capitalist enterprises' (2023, p. 448). An outstanding challenge for community economies is to address normative questions about community. As Gómez points out, 'the "community" beyond the community economy is often rife with power asymmetries and inequalities' (Bayat, 1997; 2023, p. 448). Diverse economies researchers, including #commonize studio, currently must turn to other literature and methodologies to address this issue.

The second issue is the absence of a theory or practice of counter-hegemony. Diverse economies does seek to build counter-hegemonic power. The current approach of diverse economies focuses on scaling out through thick description, but other scholars question how effective this approach can be (R. Lee et al., 2010).

From the experience of #commonize studio, there may be a middle ground: perhaps diverse economies researchers can develop weak theories and thick descriptions of building counter-hegemonic power. I value the emphasis on weak theory over strong theory because it reminds me that there are always unknown economies and cosmologies that I need to make

space for. My research with commons-makers in other cultures during #commonize studio made visible to me that, just as the word 'commons' does not directly translate for others, there will be counter-hegemonic practices in other cultures for which I have no words. These counter-hegemonic forms may simply not be part of my economic imaginary. Creating relationships between networks and associations is also a type of diverse economies research, research in scaling out. So perhaps diverse economies researchers can apply the same strategies to these experiments too, recording thick descriptions of attempts to scale out, and developing weak theories over time from these compiled thick descriptions.

Studio experiments for commons-making

The methodologies reviewed in Part B layer together to form #commonize studio's empirical research methodology, what might be called 'studio experiments for commons-making'.

Table 14. #commonize studio's 'studio experiments for commons-making' methodology layers.

Studio experiment Frames the research as creative rather than analytical. My initial research also posits that generativity defines success in studio experimentation, rather than duplicability for lab experimentation.
Diverse economies Research approach that provides the epistemology and ontology for these studio experiments. Diverse economies is rooted in poststructuralist and anti-foundationalist epistemologies and anti-essentialist ontology, emphasizing the role of discourse and performance.
Action Research through Design (ARtD) A research approach popular with other commons-making researchers. ARtD is a neologism created by other scholars that explores the intersection of action research and research through design, detailed in Table 15.
Design research methods #commonize studio draws on a number of design research methods. These methods are identified in the Plan/Design phase for every experiment in Part C.

Naming these experiments as *studio* experiments, as discussed in Chapter 1.36, creates a first methodological layer that seeks to frame these experiments as artistic or creative experiments. A studio experiment may become more prescriptive in the future, in a future where the 'creative method' is as fleshed out as the 'scientific method', but the studio experiment currently remains an experiment that requires additional research methodology

specification. Studio experiments for commons-making is thus a cascading layering of research approaches (Table 14).

The core of this methodology is action research, and all #commonize studio experiments follow the familiar action research cycle of plan, act, observe, and reflect. As action research through design (ARtD), I have revised these cycles to include dual terms:

- Plan/Design
- Act/Make
- Observe
- Reflect/Critique

The second set of terms is taken from McLain's (2022) discursive framework for studio pedagogy.

These ARtD cycles are then conducted through the lens of the diverse economies methodology. The three strategies for diverse economies action research are used to organize the observations for all studio experiments: activating new languages, shifting subjectivities, and collective action.

Similar to ARtD phases, I have revised these three strategies to include dual terms that reflect Villari's (2014) proposal for design action research. I have also added a fourth strategy, artefacts, raised by Villari. The intention is to provoke a designerly emphasis throughout the action research process. These four strategies become:

- Languages/Ideas
- Subjectivities/Relationships
- Collective action
- Artefacts

Table 15. Summary of the #commonize studio ARtD methodology.

ARtD phase	Phase categories	Explanation
Plan/Design	Commons literature Design methods Experiment design	Each experiment is an experiment in combining commons literature concepts with design methods.
Act/Make		The second terms (Design, Make, Critique) are derived from 'Towards a signature pedagogy for design and technology education' (McLain, 2022).
Observe	Languages/Ideas Subjectivities/Relationships Collective action Artefacts	These four categories for organising observations are derived from 'Action research for diverse economies' (Cameron & Gibson, 2020) and 'Action research approach in design research' (Villari, 2014).
Reflect/Critique	Personal reflections Forms of critique	In line with studio pedagogy, I highlight forms of critique: desk critique, peer critique, interim review, and public review.

Part B sheds light on the etymology of 'studio' in #commonize studio. #commonize studio is itself a diverse economies intervention or strategy. As a discourse intervention, specifically an act of queering, 'commonize' seeks to destabilize the perceived nationalise/privatise binary that limits our economic imagination. 'Studio' embraces diverse economies as performative research, situating commons-making as a designerly, making process, one that we can only research through the act of designing. Studio was an emergent methodological concern. It would have been easier for me to limit this thesis to action research and diverse economies without raising the messy landscape of studio pedagogy and studio experimentalism. The first half of Part B is, in a sense, a product of action research, a response to a barrier I observed in making the generative turn in commons scholarship. Like my invocation of commonize, I hope this more-questions-than-answers foray into studio experimentalism births wider activity, paving the way for other researchers across disciplines to access studio pedagogy and studio experimentation to answer their research questions.

Part C: #commonize studio experiments

Part C is the empirical research underpinning this thesis. The research question that is effectively driving these ARtD cycles is: *How can these two literatures support commons-makers?* This question moves our focus from research to practice. While I do present reflections and emergent learning through these experiments, the focus of Part C is thick description of studio experimentalism as conducted by #commonize studio. In 'Contributions and conclusion', which follows Part C, I review observations across the arc of these experiments.

Chapter 0, '#commonize studio', reviews the evolution of how I described, communicated, and visualised #commonize studio over the course of this research process.

Chapter 0, 'Comparison group', considers what control might be in studio experimentalism, using an early studio experiment to ground this exploration.

The subsequent chapters detail studio experiments, with most chapters corresponding to an ARtD cycle using the 'studio experiments for commons-making' format described in Table 14 and Table 15.

Chapters 0-0 detail pilot experiments, which are studio experiments conducted with anonymous academic participants but not used in the field with commoners.

Chapters 0-0 follow a different format. Chapter 0, 'Field experiments', introduces the two sets of field experiments that inform the rest of Part C, Soil Trust in Hong Kong and Hack4Blood in Botswana. Chapter 0, 'Scaffolding commons-makership', details the process of scaffolding commons-making knowledge with commons-makers, combining experiences with three commons-makers in an overall ARtD description.

Chapters 0-0 detail field experiments, which are studio experiments conducted with commoners from the two commons reviewed in Chapter 0, Soil Trust and Hack4Blood.

#commonize studio

#commonize studio became the way that I framed my research for almost all experiments, including research ethics documentation. This framing was an experiment unto itself. How do I frame economics as a design subject for others, and how do I explain commons quickly and accessibly? I review how I communicated #commonize studio over the course of research for two purposes: first, in line with action research, to inform my practice by reflecting on what has taken place; second, in line with studio experimentalism, to record how I described and visualised commons-making so that others may build on this knowledge base for their own commons-making experiments.

1.44. Describing #commonize studio

#commonize studio is composed of three discourse elements:

- # (hashtag)
- commonize
- studio

The element 'commonize' was developed first, dating to late 2020. As described in Part A, I created the term commonize to name a process that might contest the perceived binary of nationalise-privatise. The term commonize was first used in a conference paper (Sacks & Coulton, 2020) and a conference presentation (Sacks, 2021a).

In the paper, 'Addressing the elephant in the cloudless sky: Designing a commonised mobile network infrastructure' (Sacks & Coulton, 2020), commonize is first defined within the context of mobile network infrastructure:

> This mobile network infrastructure is in turn shaped by the economic ideologies where it exists. Most, if not all states, have chosen to nationalise or privatise mobile network infrastructure. In neoliberal capitalist parlance, privatisation is also associated with liberalisation. A third option would be to 'commonise' this infrastructure. To commonise means to treat the infrastructure as a common good that is controlled by its users.

I named my presentation for the 2021 *Design and Economics* conference '#commonize: Using commonized design to create a post-capitalist economy' (Sacks, 2021a). This is the first time I used the hashtag with commonize. In this presentation, I present this definition as:

> #commonize = To place a shared resource under the governance of a community of people. Commonize contrasts with the choice to privatize or nationalize.

I also describe the broader approach of commonized design as, 'An approach to managing the resources that we depend on by increasing community control over those resources.'. A slide from the presentation (Figure 18) contextualises the understanding of commonized design in comparison with other design approaches. Several people have found these definitions useful, including a supervisor who incorporated some of these ideas into a paper about design values (Cooper, 2022, p. 52) and a peer scholar who incorporated some of these ideas into a book chapter (Galabo, 2023, p. 43).

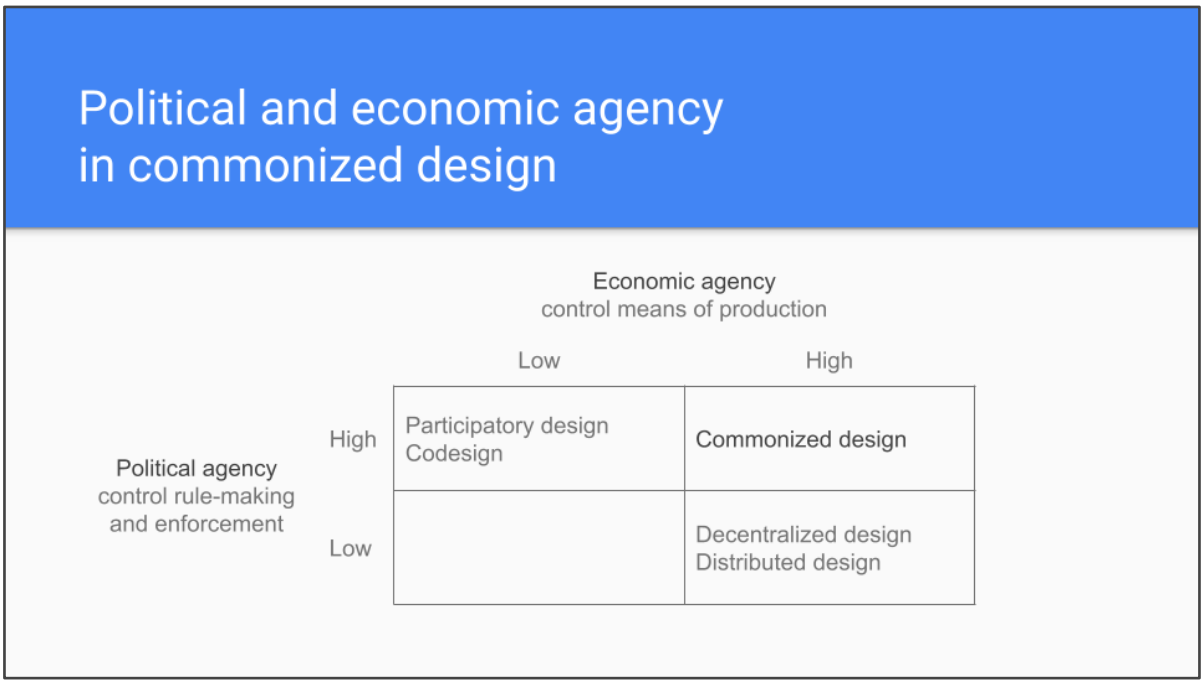


Figure 18. Slide from conference presentation, '#commonize: Using commonized design to create a post-capitalist economy' (Sacks, 2021a).

The more robust concept of #commonize studio was developed over 2022. #commonize studio was first clearly articulated in research ethics documentation, e.g. participant information sheet, approved by Lancaster University in summer 2022 (Appendix 3. Participant information sheet). The description of #commonize studio in this documentation is:

> #commonize studio is an experimental design studio that designs alternative economies, specifically commons-based economies. What does such a studio look like? We collaborate with people leading the development of commons to create products and processes to support their progress. This research is producing new knowledge about how communities and researchers can use design processes to support the creation of commons-based economies.

This description remains valid but is longer than typically allowed for biographies and abstracts. The next two definitions are approaches to describing #commonize studio in fewer words.

The first public description of #commonize studio dates to a conference workshop in October 2022 titled '#commonize Studio: Creating Design Briefs for Disruptive Economics' (Sacks, 2022b). The one-sentence description of #commonize studio for that workshop is, '#commonize studio explores what a design studio that supports communities to build commons looks like.'.

A more recent description, included in my author biography for a book chapter, is, 'a design studio that supports partners to make commons through studio experimentation' (Mullagh et al., 2024). This more recent description seeks to more visibly assert the two propositions of this thesis: commons-making can be understood as a design process and studio experimentalism is an appropriate methodology for the study of commons-making.

I never publicly explain the use of the hashtag, which has remained an ironic choice since I barely use social media. The hashtag references economic ideologies and imaginaries, two terms that describe shared mental models that only survive if they are shared by groups of people. The hashtag is a modern symbol indicating the desire to create a shared discourse, or a shared ideology or imaginary, around a term.

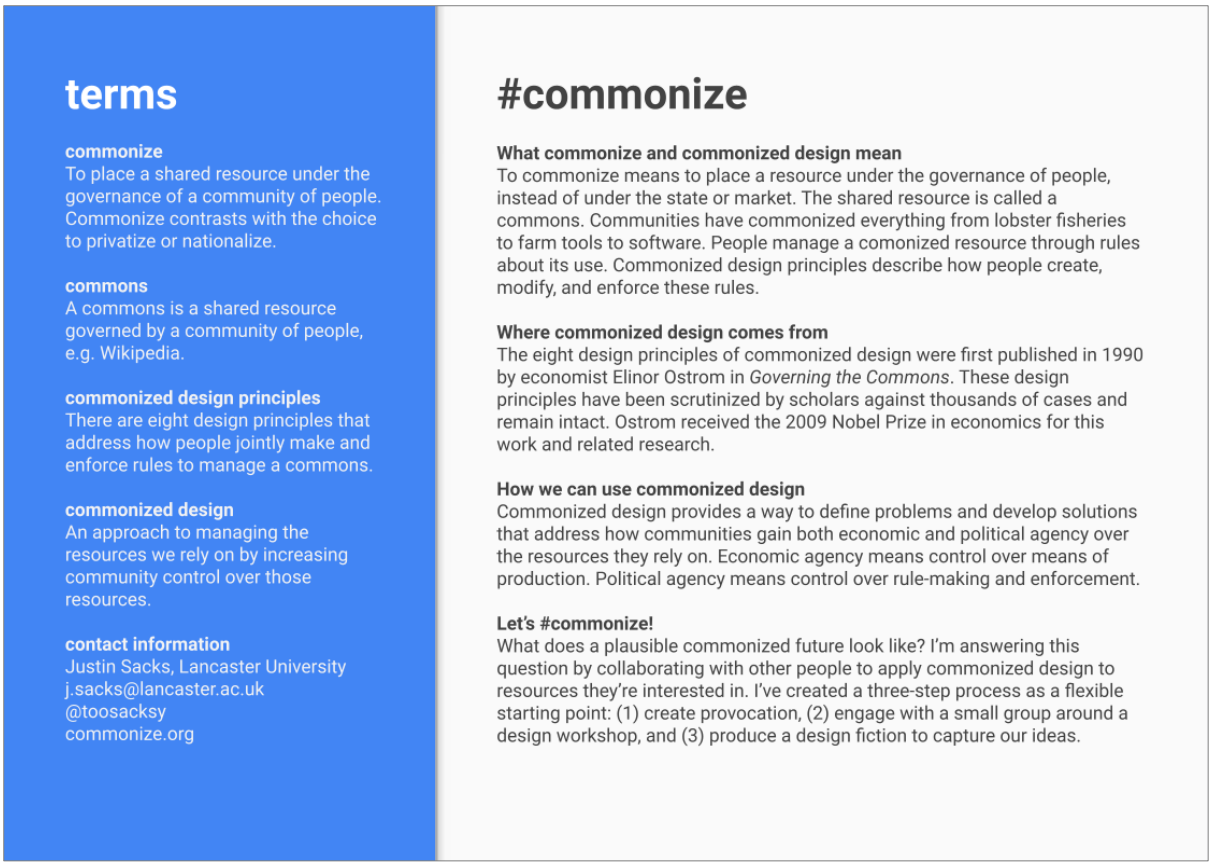
1.45. Visualising #commonize studio

Much of the ideation and iteration for #commonize studio remains unpublished, yet I spent much time imagining how to communicate commonize and #commonize studio to other people. One visualisation (Figure 19) that I originally created with a website in mind found new life more recently as the holding slide for presentations, i.e. the slide I have up on screen while we wait for people to arrive. The image tries to communicate the wide applicability of commonize.

Figure 19. A #commonize visualization for a website or slide deck.

Figure 20 is part of an executive summary I created for an earlier research approach. This figure is text-heavy, but it represents how I attempted to convey my research approach within the limits of a page. I attempt short definitions of: commonize, commons, commonized design principles, and commonize design. At the time, I proposed a three-step research process: '(1) create provocation, (2) engage with a small group around a design workshop, and (3) produce a design fiction to capture our ideas.' A research process I still think is useful!

I created the current logo (Figure 21) for the research ethics process and continue to use it. I selected pink, a red hue, to destabilise communist meaning. The use of pink, a bright and modern red hue, might possibly evoke for the observer a sense that #commonize studio means something different than however they currently understand communism.



terms

commonize
To place a shared resource under the governance of a community of people. Commonize contrasts with the choice to privatize or nationalize.

commons
A commons is a shared resource governed by a community of people, e.g. Wikipedia.

commonized design principles
There are eight design principles that address how people jointly make and enforce rules to manage a commons.

commonized design
An approach to managing the resources we rely on by increasing community control over those resources.

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#commonize

What commonize and commonized design mean
To commonize means to place a resource under the governance of people, instead of under the state or market. The shared resource is called a commons. Communities have commonized everything from lobster fisheries to farm tools to software. People manage a comonized resource through rules about its use. Commonized design principles describe how people create, modify, and enforce these rules.

Where commonized design comes from
The eight design principles of commonized design were first published in 1990 by economist Elinor Ostrom in *Governing the Commons*. These design principles have been scrutinized by scholars against thousands of cases and remain intact. Ostrom received the 2009 Nobel Prize in economics for this work and related research.

How we can use commonized design
Commonized design provides a way to define problems and develop solutions that address how communities gain both economic and political agency over the resources they rely on. Economic agency means control over means of production. Political agency means control over rule-making and enforcement.

Let's #commonize!
What does a plausible commonized future look like? I'm answering this question by collaborating with other people to apply commonized design to resources they're interested in. I've created a three-step process as a flexible starting point: (1) create provocation, (2) engage with a small group around a design workshop, and (3) produce a design fiction to capture our ideas.

Figure 20. The first of two pages of an executive summary for an earlier research approach.

#commonize
studio

Figure 21. Working logo for #commonize studio.

1.46. Experiment methods

I developed a specific, consistent method for conducting #commonize studio experiments, which is layered on top of the ARtD format summarised earlier (Table 15). The two key features of this method were:

- Collaboration with a single 'commons-maker', and
- Remote-only engagement.

Collaboration with a single 'commons-maker'. I use this term to describe the individuals I collaborated with in studio experiments. In principle, all commoners are commons-makers, but commons-maker here identifies the specific person who became the liaison for

#commonize studio. In the earliest experiments, not documented in this thesis, I tried to collaborate with the whole community, but this proved too time-consuming to generate empirical data within my research timeframe. Rather than acting as a visible convenor or facilitator, the role I observed most often in design research, I found my role could be best described as behind-the-scenes coach. In most of the field experiments, I coach a single commons-maker, responding to their perceived needs, which they take forward with their community on their own. For Soil Trust, one of the two applied experiments, my existence remained unknown to the rest of the community.

Remote-only engagement. Necessity is the mother of invention, and the Covid-19 pandemic birthed a remote-only approach with commons-makers. This approach allowed me to support multiple commons-makers anywhere in the world with no budget. The one downside to this approach was the commons-maker as 'unreliable narrator'. All of my knowledge about these experiments comes from the commons-maker. In many experiments, it became clear that the commons-maker was more enthusiastic about commons-making than their peers. The principal repercussion of this unreliable narrator dynamic was that we spent time preparing materials and experiments that either went unused or were received poorly by the rest of the community.

While I developed remote-only engagement through commons-makers as a method in response to the demands of the Covid-19 pandemic, both method features proved advantageous to the in-person facilitator/convenor method I observed in previous design research. In addition to widening the scope of research sites, this approach responded to 'institutioning the common' (Teli et al., 2018, 2022) by supporting the commons-maker to carry out commons-making in their own way and become the commons expert for their community.

1.47. Experiment types

The studio experiments in this thesis can be organised into three categories:

- Comparison group
- Pilot experiments
- Field experiments

Chapter 0, 'Comparison group', considers what control might be in studio experimentalism. In this comparison group, a multidisciplinary group of scholars built a data commons without any scaffolding, infrastructuring, or institutioning interventions by #commonize studio.

The next three chapters describe pilot experiments, which are prototypes or 'dry runs' (Croson, 2002, p. 924). These pilot experiments were conducted with academic conference participants to test early versions of design methods. These chapters detail only those experiments that were tested but never used in the field with #commonize studio partners.

- Chapter 0: Commonized design
- Chapter 0: Commoner persona and journey map
- Chapter 0: Commoning blueprint

The remaining chapters are field experiments. Field experiments, similar to the experimental economics championed by Smith (G. Foster, 2015; V. L. Smith, 1976), are experiments carried out in the real world that adhere as closely as possible to the requirements of studio pedagogy.

The first set of chapters describe field experiments with Soil Trust, a university-led project to commonize excess domestic food into compost for a local farm in Hong Kong.

- Chapter 0: Commons model canvas
- Chapter 0: Action situation canvas
- Chapter 0: Body histories

The final set of chapters describe field experiments with Hack4Blood, an idea-stage start-up to commonize blood donation and transfusion services in Botswana.

- Chapter 0: #commonize studio design brief
- Chapter 0: Action situation blocks

These three studio experiment groupings also roughly correspond to time. The comparison group took place in late 2020, the pilot experiments took place during 2021, and the field experiments in Hong Kong and Botswana took place from mid-2022 through early-2023.

The one deviation from this format is the experiment titled 'Scaffolding commons-makership' (Chapter 0). Scaffolding commons-making knowledge with commons-makers became one of the most critical aspects of #commonize studio's experimentalism. Much of this work is documented in conference papers. Rather than treat each scaffolding process as a separate ARtD cycle, I have combined them into one overall ARtD cycle to highlight the shared features of this scaffolding process.

Table 16 summarizes all of the experiments included in Part C.

Table 16. Summary of #commonize studio experiments.

Chapter	Experiment name	Studio partner	Year	Type
0	Comparison group	IoFT Network +	2020	Comparison group
0	Commonized design	MobileCHI	2020	Pilot
0	Commoner persona and journey map	IASC	2021	Pilot
0	Commoning blueprint	IASDR University module	2021 2022	Pilot
0	Scaffolding commons-makership	Dr Galabo Dr Wernli Dr Nthubu	2021 2022 2022	Scaffolding
0	Commons model canvas	Soil Trust	2022	Field
0	Action situation canvas	Soil Trust	2022	Field
0	Body histories	Soil Trust	2022	Field
0	#commonize studio design brief	Hack4Blood	2022	Field
0	Action situation blocks	Hack4Blood	2023	Field

Comparison group

We are familiar with a control group for lab experimentalism, but what is control in studio experimentalism? Is the concept of control even useful? In 2020, nearly a year before I conducted all other experiments, I unwittingly participated in a studio experiment that both informed my research process and, on reflection, was a type of control group. More specifically, it resembled a type of control group called a quasi-experimental post-test only non-equivalent comparison group (Kelemen et al., 2023, p. 235), meaning the group was

neither randomised nor exactly matched with the experimental group. I use comparison group in this chapter because it offers more flexibility and utility to design researchers than the strictly defined control group. In this ARtD cycle, I performed no scaffolding, infrastructuring, or institutioning for the experiment participants, which might have altered the course of this research project.

1.48. What is a comparison group?

In laboratory experimentalism, 'true experimental design' involves either random assignment of participants or a control group (Pederson, 2017), and researchers are recommended to design experiments that change only one factor or one variable at a time (Croson, 2002, p. 939). Studio experiments could meet these criteria, but doing so would be prohibitively costly, impractical, and often deemed unethical. Instead, studio experimentalism employs a different form of control: the existing situation or *status quo*. In this respect, Simon's (1969) oft-cited definition of design offers a more instructive approach to thinking about control in studio experimentalism: 'To design is to devise courses of action aimed at changing existing situations into preferred ones.'. In J-PAL's lab experiment, the control group is the group of people who experience no interventions at all, i.e. the existing situation (but they are randomly selected, which is why J-PAL can call them a control group versus a comparison group). Similarly, in the 'pandemic experimentalism' of Doyle et al. (2023), the instructors describe challenges with the existing situation, perform a number of changes, observe and reflect on the results, and then experiment again with the next cohort.

A problem that both economics lab experimentalism and studio experimentalism must confront is how the existing situation is described. In design research, how we describe the existing situation is called framing (Benford & Snow, 2000). Harvey poses this framing challenge in a commons-specific context: 'Why, for instance, do we not focus in Hardin's metaphor on the individual ownership of the cattle rather than on the pasture as a common?' (2011, p. 104). Hardin's (1968) 'tragedy of the commons' metaphor frames the existing situation as a problem of pasture governance, but what if the course of action to arrive at a preferred situation is more dependent on cattle governance? J-PAL frames the existing situation in terms of the relationship between water provision and clientelism. Yet, what if the relationship of consequence is between water privatisation and clientelism, or between industrial pollution or universal basic income or mutual aid groups and clientelism?

A comparison group in studio experimentalism might, therefore, seek to fulfil at least these two criteria:

- The experimenters must allow the frame to be described and developed by the 'experimentees', and
- The experimenters must perform no counter-framing (Prendeville et al., 2022), i.e. they must not introduce anything into the frame created by the experimentees.

The experiment considered here as a comparison group is a project by a multidisciplinary academic working group tasked with designing a commons but never made aware that they were doing so. The working group members thus framed the commons they created using the language and ideas from their individual domain expertise.

I also argue this experiment is a valid comparison group because the project was deemed successful in all other respects. That is, the working group members commented positively about the project, the funders indicated satisfaction with the project, and the eight-month experiment generated four journal papers. Moreover, the high calibre of the artefacts created by the working group members demonstrate achievement of studio pedagogical aims. In short, this experiment was a successful studio experiment in commons-making, yet, despite this success, the working group members produced a decidedly neoliberal commons in the absence of any counter-framing.

1.49. Background

The Internet of Food Things Network Plus (IoFT) was a four-year research project funded by UK Research and Innovation (UKRI), the national funding body for UK research. A Network Plus project is a specific research approach that 'aims to bring together relevant researchers and stakeholders that cross multiple disciplines' (*Network Grants*, n.d.). The purpose of IoFT was to bring 'together data and computer scientists, chemists, and economists to investigate how artificial intelligence, data analytics and emerging technologies can enhance the digitalisation of the UK food supply chain.' ('Home', n.d.).

Within this Network Plus, I was part of a specific working group described by members as an 'Ethics of AI in Food Data Trusts Working Group' (Jacobs et al., 2021) or a working group 'to create a data trust framework related to food safety' (Manning et al., 2023, p. 40). This ARtD cycle took place from April through December 2020, nearly a year before the next empirical research for #commonize studio began.

The following exploration of this cycle draws on data published in four papers. The majority of data can be found in 'Ethics by design: Responsible research & innovation for AI in the food sector', the paper for which I had the greatest contribution and was a second author.

- ‘Considering the Ethical Implications of Digital Collaboration in the Food Sector’ (Jacobs et al., 2021)
- ‘Artificial Intelligence and Ethics within the Food Sector: Developing a Common Language for Technology Adoption Across the Supply Chain’ (Manning et al., 2022)
- ‘Ethics by Design: Responsible Research & innovation for AI in the Food Sector’ (Craigon et al., 2023)
- ‘Reflexive Governance Architectures: Considering the Ethical Implications of Autonomous Technology Adoption in Food Supply Chains’ (Manning et al., 2023)

1.50. Purpose

According to the working group’s first paper:

> The Ethics of AI in Food Data Trusts Working Group was established to investigate and frame the ethical issues that arise from the creation and use of a data trust, and how the potential negative or unintended consequences of using Industry 4.0 technologies to facilitate a data trust model between many collaborative parties can be mitigated. (Jacobs et al., 2021)

In a prior workshop, before this ARtD cycle began, the group ‘identified sharing data about allergens as a conceptual scenario on which we could base our research.’. The aim of research described in this ARtD cycle was to use speculative design to support the working group to investigate and frame ethical issues for a fictional data trust, using allergens to focus the world-building process.

The definition of data trust for the working group became, ‘a mechanism to collate data from multiple sources, either physically, or virtually, to be managed or orchestrated in some way on behalf of all of the parties through independent, fiduciary stewardship of data.’ (Jacobs et al., 2021). Based on this definition, IoFT was creating a data commons, using the trust as ‘a legal relationship that allows for the protection of a data commons’ (Ruhaak, 2020). The working group referenced and paraphrased The Open Data Institute’s definition of data ethics as their definition: ‘data ethics reflects appropriate actions related to how data is collected, maintained, used and shared and the ethical impact on individuals, communities and society.’ (Manning et al., 2023; Tarrant et al., 2021).

There were no political boundaries or frames about what the group needed to do beyond the background provided above. The observable boundaries were these definitions of data trust and data trust ethics and a subject focus on allergens. These boundaries were sufficiently

agnostic that the group could have, in principle, generated a commons with any political form, from neoliberal to counterhegemonic.

1.51. Plan/Design

As the comparison group, this experiment explored commons-making based entirely on how group members defined and understood commons without any intervention from me.

Commons literature

No references to the commons literature were offered to the working group for the duration of the project, no members of the group used these terms, and no members asked for me to explain anything about data commons.

In addition to making no interventions regarding the commons literature, I also made no interventions prescribed by diverse economies action research. The group could have chosen to explore food systems through numerous existing economic worlds. Examples of alternatives that already co-exist with neoliberal capitalism include cooperativism (e.g. food cooperatives), solidarity economies (e.g. community-supported agriculture), and mutual aid (e.g. community kitchens). Instead, the group filtered all speculation through the lens of neoliberal capitalism. The speculative world was composed of a hegemonic (i.e. 'the') food sector that consisted of consumers who purchased processed food from supermarkets and used privately held platform technology to track allergen data.

In the language of diverse economies, I had 'come up against portrayals of economies that limit what is considered feasible'; however, for this comparison group, I did not 'weave new languages of economy that expand options for action' (Cameron & Gibson, 2020).

Design methods

This experiment was grounded in speculative design methodology and design fiction as a design research method. The first of the four papers, which became a reference for speculative design in future papers, defined speculative design as follows:

> Speculative design is a design methodology that aims to provoke discussion by using speculation to consider potential, plausible, or possible future outcomes of current directions in societal or technological development. These speculative outcomes are not intended to be predictive or suggest how things should be, but instead provide opportunities for discussion. (Jacobs et al., 2021)

The principal reference is Dunne and Raby's (2013) seminal book on the subject, *Speculative Everything: Design, Fiction, and Social Dreaming*.

In ‘Ethics by Design’ (Craigon et al., 2023), the paper where I had the greatest involvement, design fiction as method is described and referenced as follows:

> Design Fiction is a research methodology that aims to create space for discussion around possible futures, through worldbuilding and the creation of artefacts to represent and produce an imagined storyworld with ‘focus on generating understanding and insights rather than finished products’ (Dunne & Raby, 2013, p. 251). To this end a design fiction is ‘(1) something that creates a storyworld; (2) has something being prototyped within that story world; and (3) does so in order to create a discursive space’ (Lindley & Coulton, 2015, p. 210).

Experiment design

This experiment was organized into three activities:

1. World-building. The goal of this step was to arrive at a sufficient shared understanding of the world inhabited by the fictional data trust.
2. Design fiction-making. The goal of this step was to produce artefacts from this speculative world that provoked diverse ethical considerations related to AI in this data trust.
3. Ethical evaluation. The goal of this step was to identify ethical strengths, weaknesses, opportunities, and threats embodied by the design fictions.

The design research working group members led world-building and design fiction-making, which will be reviewed below. Ethical evaluation was led by a different working group member and is omitted from this review as it did not contribute to the commons-making process.

1.52. Act/Make

The first activity, world-building, comprised three steps:

- Identifying stakeholders (Figure 22),
- Sharing narratives about this speculative data trust, and
- Diagramming the speculative world (Figure 23).

Identifying stakeholders. Group members were presented with a grid of blank sticky notes and instructed to name a stakeholder in each sticky note. Next, group members were instructed to group the sticky notes into categories.

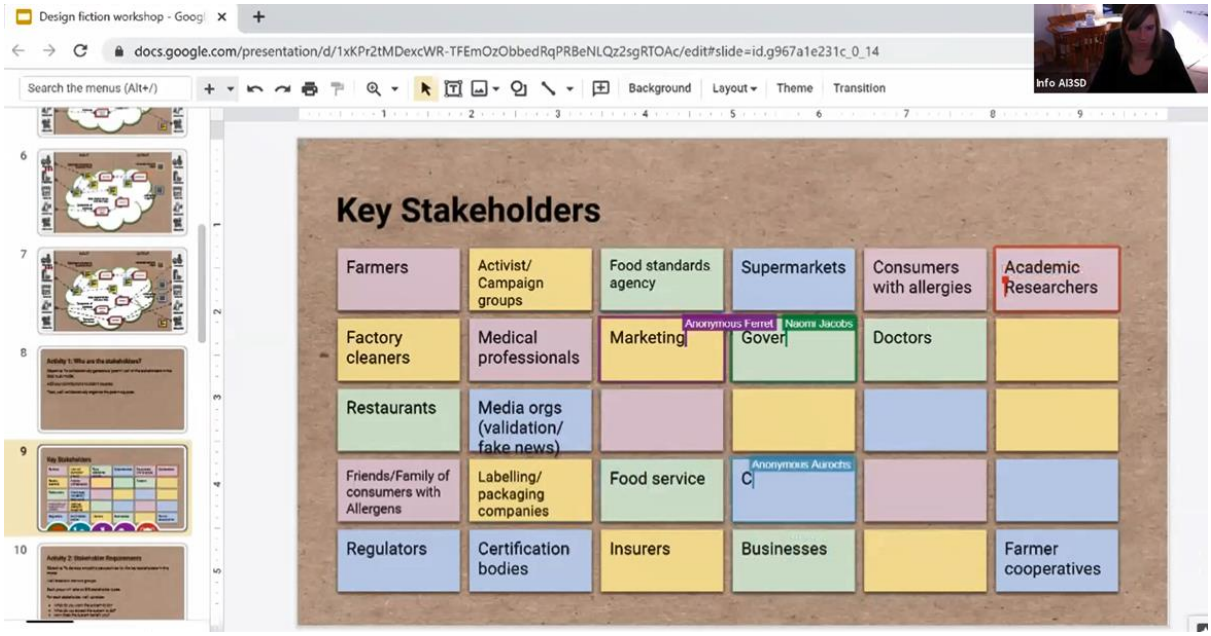


Figure 22. Identifying stakeholders. Working group members entered text onto sticky notes and then grouped notes into categories that informed diagramming of the speculative world (Figure 23).

Sharing narratives about this speculative data trust. All members were asked to submit a short narrative about the speculative data trust, under 500 words, to the two design researchers. These short narratives were intended to assess where group members converged and diverged in their imagining of the speculative data trust. The narratives did not conflict so much as highlighted different sensemaking lenses. The ideas and language from these narratives were used to inform the world-building diagram in the next step.

Diagramming the speculative world. The world-building diagram was primarily undertaken by the two design researchers in the group. The diagram incorporated the key stakeholder groups developed in the stakeholder identification step and incorporated ideas and language raised in the narratives step. This diagram was presented to the group to identify any major narrative issues before moving to design fiction-making. No major challenges arose during this diagram review.

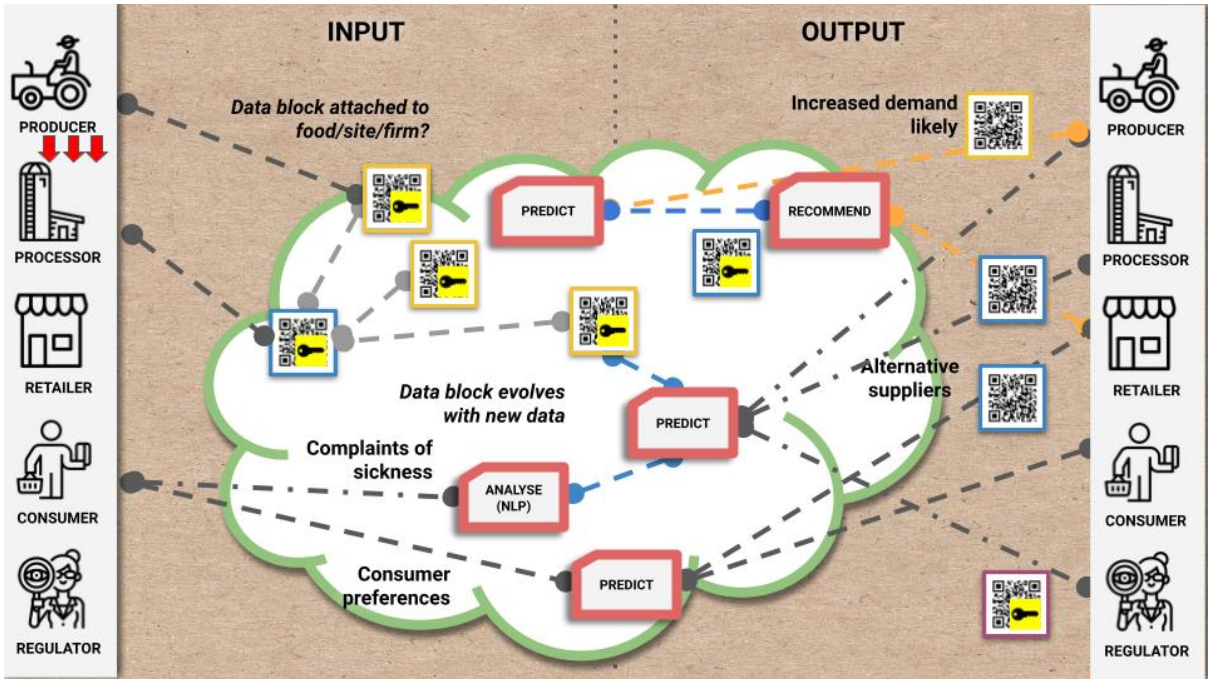


Figure 23. World-building diagram. The speculative diagram follows data from a variety of food system stakeholders and how these might interact with AI.

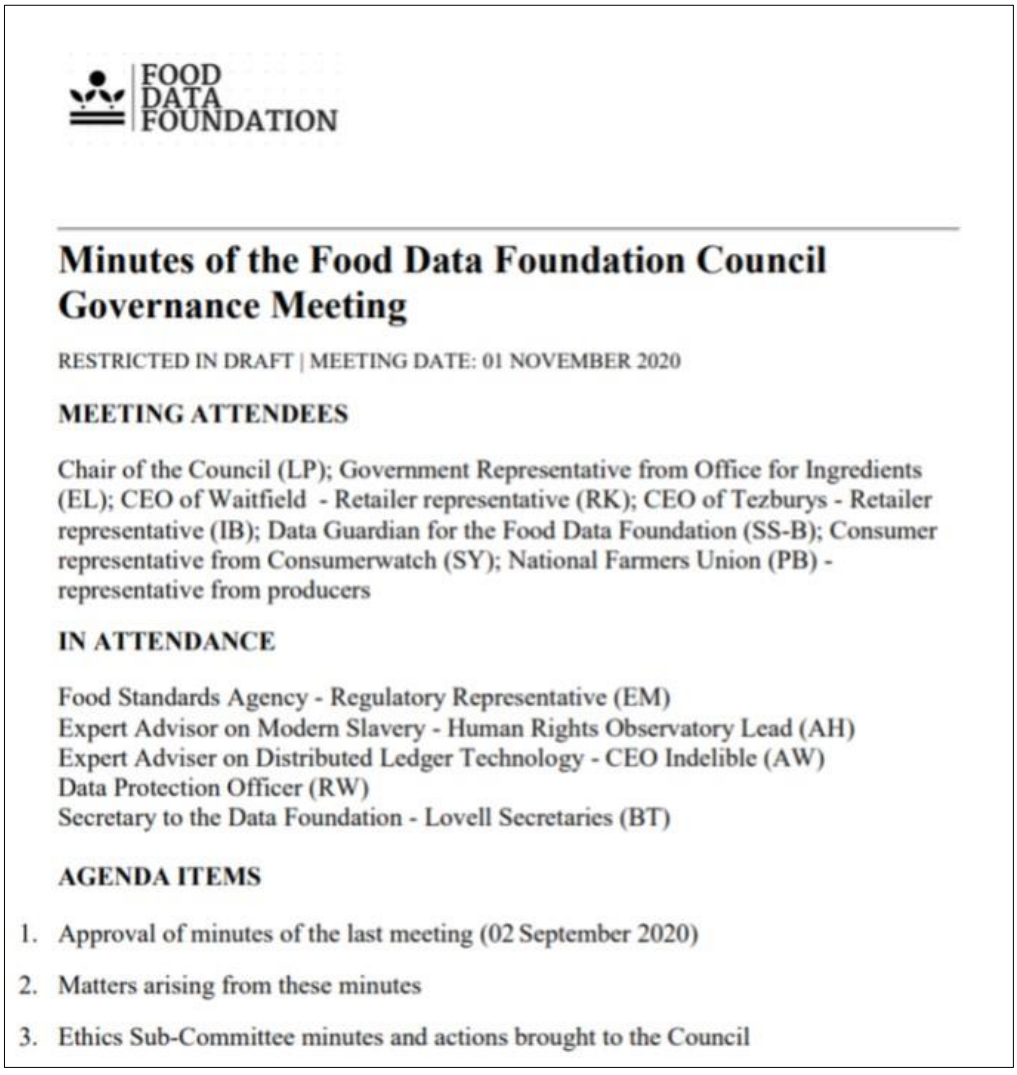
The second activity, design fiction-making, adapted university design studio pedagogy. The two design researchers developed seven design fiction options, which were presented to the group for review and a vote. We calibrated these seven options to cover a variety of ethical issues identified in earlier steps and to align with domain expertise of the group members. These options were simple descriptions such as: ready meal packaging, mobile app wireframes, and supplier audio tour. These descriptions, coupled with the world-building diagram, acted as the design brief for the design fictions. We conducted a voting process to identify the top 3-5 design fictions. Four options became clear winners of this voting process. Group members self-sorted themselves into pairs, so a pair of members took on each of the four design fictions.

The pairs worked on their design fiction artefacts over two months and contacted the design researchers, the “studio instructors”, as needed. We conducted one peer critique along the way, where each pair presented their work for constructive critique from the group. A month later, we conducted the equivalent of a final review, where external experts were invited to interact with and critique the artefacts and then evaluate the artefacts using the Moral-IT cards.

The final artefacts created by the group are presented below and are discussed in greater detail in the aforementioned papers. These artefacts include:

- Meeting minutes of the Food Data Foundation council (Figure 24)
- Wireframes of the Allert allergen-tracking mobile app (Figure 25)
- Smart packaging for a supermarket ready meal (Figure 26)
- Logos (Figure 27)

The purpose of sharing these images here is to illustrate the impressive calibre of the artefacts created by studio 'students' who described themselves as non-designers with little or no formal design experience.



FOOD DATA FOUNDATION

Minutes of the Food Data Foundation Council Governance Meeting

RESTRICTED IN DRAFT | MEETING DATE: 01 NOVEMBER 2020

MEETING ATTENDEES

Chair of the Council (LP); Government Representative from Office for Ingredients (EL); CEO of Waitfield - Retailer representative (RK); CEO of Tezburys - Retailer representative (IB); Data Guardian for the Food Data Foundation (SS-B); Consumer representative from Consumerwatch (SY); National Farmers Union (PB) - representative from producers

IN ATTENDANCE

Food Standards Agency - Regulatory Representative (EM)
Expert Advisor on Modern Slavery - Human Rights Observatory Lead (AH)
Expert Adviser on Distributed Ledger Technology - CEO Indelible (AW)
Data Protection Officer (RW)
Secretary to the Data Foundation - Lovell Secretaries (BT)

AGENDA ITEMS

1. Approval of minutes of the last meeting (02 September 2020)
2. Matters arising from these minutes
3. Ethics Sub-Committee minutes and actions brought to the Council

Figure 24. Fictional minutes provoked discussion on how such a board's ethical review processes would function and what governance structures were in place for certification of new technological applications.

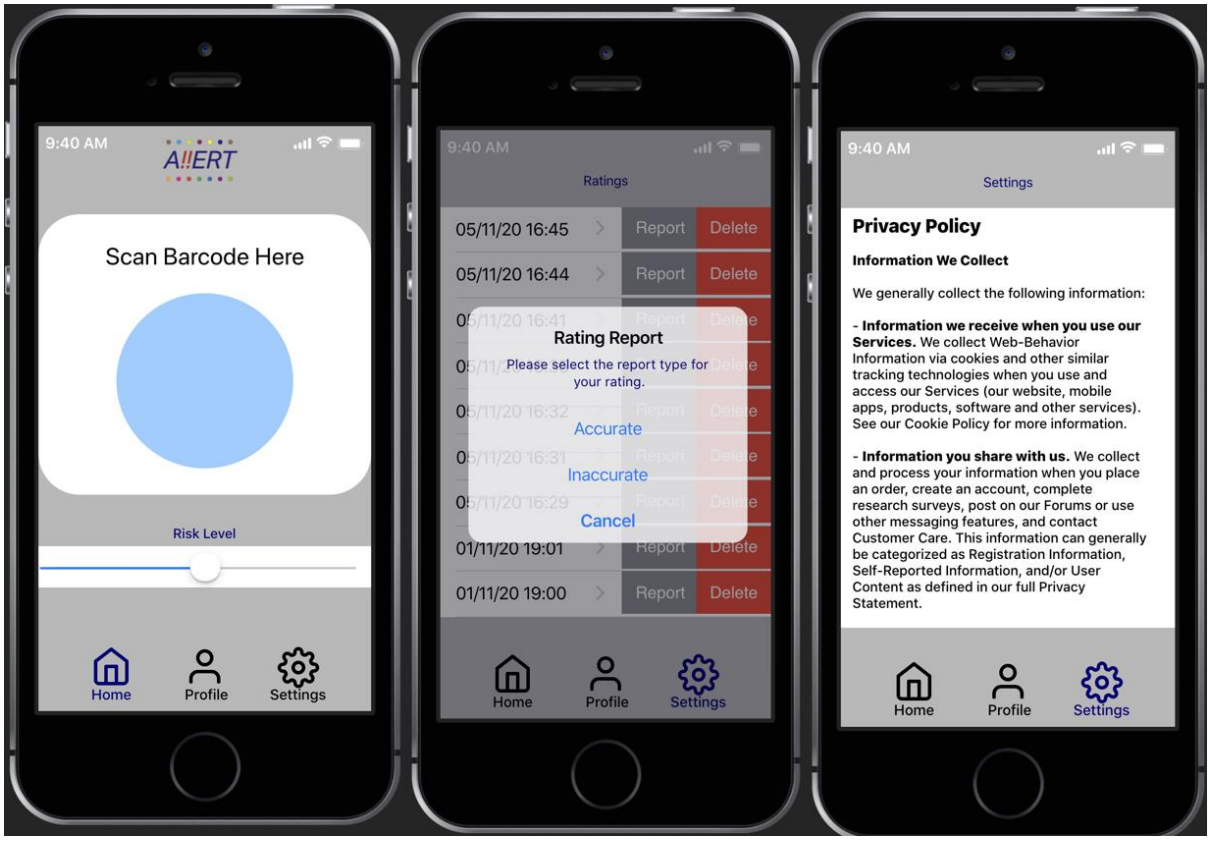


Figure 25. Wireframes of the fictional Allert allergen-tracking mobile app. Allert allows a user to scan for allergen information, set their personal preferences, report inaccuracies, and review the privacy policy.

Figure 26. Smart packaging for a supermarket ready meal. The display cycles through information updated via the Internet, similar to modern digital price tag displays.

Figure 27. Logos created by working group members. Allert is the fictional mobile app company and Office for Ingredients is a British national governance body. Food Data Foundation log appears in Figure 24.

1.53. Observe

Observations are limited here as much as possible to what is observable in the published papers.

Language/Ideas. The language and ideas of this comparison group demonstrate the extraordinary pull of capitalocentrism. None of the design fiction artefacts present co-existing economic worlds. We see only the tip of the Iceberg: capitalist digital platforms, capitalist processed food, and a foundation chaired by familiar capitalist roles. Three of four paper titles contain the phrase '*the* food sector' (emphasis mine), reinforcing the imagining of the economy as a singular, knowable system. These paper titles were, moreover, accepted by peer reviewers in three journals spanning data science (*Patterns*), food science (*Trends in Food Science & Technology*), and technology (*Journal of Responsible Technology*).

The absence of co-existing economic worlds underpinning this speculative world again underscores the power of capitalist realism within speculative design. None of the papers, particularly the two papers that discuss the design process in detail, ever mention the politics or worldviews underpinning their speculative worlds. Speculative design is always political and always circumscribed by worldviews. In this case, as for much speculative design work, the design reinforces capitalist hegemony, complicit in capitalist realism by treating capitalism as a neutral background that requires no explanation.

Relationships/Subjectivities. While the language of the experiment outputs reinforces capitalist relationships and subjectivities, this comparison group presents heartening results for shifting relationships in design research. The 'students' in this comparison group, the working group members who were not self-described design researchers, authored three of the four papers for journals in their respective fields. This authorial confidence demonstrates

that these peers felt sufficient mastery of the design research methodology to write about it for their respective audiences.

Collective action. One way that collective action for this academic research might be observed is how working group members propagate what has been learned in the studio experiment. That might take the form of the group bidding for future work together or originating separate projects that build on this project.

Artefacts. IoFT clearly produced many artefacts, but, in hindsight, the richness of the data contained within these artefacts is inaccessible to future researchers. For example, the additional wireframes for the Allert app and the full text of the Data Foundation Council are unavailable for observation. This problem speaks to the challenge of studio experiment documentation. Where do researchers put these artefacts so that their full data can be utilised by future researchers?

1.54. Reflect/Critique

Critique

This experiment contained all levels of critique, relying on peer critique to support the design fiction-making process and a public review to critique the design fiction artefacts.

Desk crit. For Activity 2, the other design researcher and I were available to field questions from the group on an *ad hoc* basis, i.e. they might email us with a question. We had allocated time for one-to-one meetings with participants, but most questions were handled via email.

Peer crit. We tended to meet as a group at least twice per month for 2-3 hours per session. The group averaged 6-8 people per meeting, and always fewer than 10 people, an accepted threshold for performing group-based creative and critical work (Morss & Murray, 2005, p. 55). There were several sessions, usually 3-4 hours in length, where we convened, broke off to perform work individually or in pairs, and reconvened. A delightful dynamic I observed from this experiment was the emergence of what I termed 'social making' at the time. To preserve the authenticity of my observation, I quote myself from a rejected, unpublished paper submitted to IASDR 2021:

> The speculative design and evaluation processes are 'social forms of making'. Through this collaborative process, new forms of knowledge were generated by and for the group members. The social, iterative process through which the design fictions were developed led to unexpected evolutions and interactions that enhanced the robustness of world-building and uncovered new avenues for investigation. In one example, one member of the team worked on a privacy policy that another incorporated into the

> mobile app fiction. In another example, team members working on the packaging fiction included a screen displaying a breakdown of product costs and sustainability, and this was subsequently incorporated by others into the board meeting minutes fiction, which highlighted privacy implications for farmers.

In short, the peer critique led to greater coherence in world-building, a finding I would seek to replicate in future experiments.

Public review. This ARtD cycle finished with an online event where peer researchers and domain experts were invited to critique the design fiction artefacts. This critique was mediated through the use of Moral-IT cards that had been designed by one of the working group members (Urquhart & Craigon, 2021). The artefacts provoked a robust spectrum of critique that covered many of my own concerns:

> When considering things going wrong, they questioned if the impact on stakeholders would be distributed fairly, moreover if some would be unfairly impacted if they were associated with an error or harm, which was not their fault, but would become associated with their product, as illustrated in the documentary.
>
> Considerations of participation, user empowerment and power asymmetry … were more contested, being identified as both sources of potential benefit and harm of data sharing through the system. Greater openness of data was identified as something that would potentially allow stakeholders to challenge existing power asymmetries in the food system, yet concerns were raised that the existing imbalances may be reinforced or exacerbated depending on the specific implementation of the system. (Craigon et al., 2023)

Reflection

The primary reflection from this comparison group was the profound impact that scaffolding might have on experiment outcomes. IIPP Policy Studio asserts that, 'While the participatory co-design method is important, without the new economic thinking it would be hollow.' (Mazzucato et al., 2022). Design researchers had thus far identified infrastructuring and institutioning as part of commons-making, but none of them had explicitly mentioned scaffolding. Several papers do detail such activities. For example, the initial stage of the Grassroots Wavelengths project 'included community meetings and workshops where the authors emphasized the goals of a voluntary and participatory community radio platform, operated and owned by the community.' (Cibin et al., 2020, p. 49). I earlier quoted the AvoinGLAM project by Marttila that identified 'infrastructuring "commons culture"', which the author goes on to define as, 'Building commoning principles, vocabularies and ideals that

actors (organizations and individuals) can use to define their identities' (2016, p. 4076). All future #commonize studio experiments considered the role of scaffolding after this comparison group.

1.55. Discourse genealogy

This studio experiment prompted a foray into discourse genealogy (Gibson-Graham, 2003). The working group created a commons but never engaged in these concepts, nor did the Open Data Institute (ODI), the group's primary reference for data trusts. Why?

To start, all four papers refer to a framing paper for the research, 'A Trust Framework for Digital Food Systems' (Brewer et al., 2021), co-authored by several working group members. This paper repeatedly describes the data trust securing or serving a 'common benefit' or 'common good' but does not elaborate these meanings or provide references for them. The paper is short and labelled as a comment paper, so it is not intended to be robust, yet the relationship between this framing paper and the subsequent working group papers illustrates how framing reproduces framing.

The primary source for understanding data trusts across all four papers is the ODI, so what does the ODI have to say about commons and data trusts? A search of the ODI website finds no definitions of commons or data commons. Why is this? A possible reason for the omission of commons from the discourse may be their close collaboration with another respected UK organisation, the Ada Lovelace Institute (ALI), whose mission is 'to ensure data and AI work for people and society' ('Ada Lovelace Institute', n.d.).

At the time of IoFT, the only published content on ALI's website about commons was a blog post by a well-regarded Cambridge University professor that dismissed commons as 'a metaphor rather than an analytical construct' (Coyle, 2020). Coyle's post dismisses data commons because, 'One challenge is that the data economy exists at huge scale, whereas Ostrom's studies investigated small groups, which made it possible to overcome the challenge of monitoring behaviour and to apply social sanctions when needed.'.

Since the 2020 blog post, ALI has produced two reports that cite and dismiss commons and ODI has produced one podcast where commons are mentioned and problematically defined. These references would not have been available to IoFT but reflect the likely trajectory of thinking about commons at the time of IoFT's work. In the ALI report, *Participatory Data Stewardship*, endorsed by the ODI, stewardship is defined as 'the responsible planning and management of common resources' (2021b, p. 11), yet common resources is neither defined nor cited again. In another report by ALI endorsed by ODI, *Exploring Legal Mechanisms for*

Data Stewardship, the authors conclude that 'the prospects of their [commons] emergence from the complex legal position surrounding data at the time of writing are not strong, so will not be discussed further in this report.' (2021a, p. 54).

The sole explanation of commons by ODI is a 2022 podcast with a European non-profit organisation called Open Future (Dinnage et al., 2022). In this podcast, The ODI defines commons as 'resources that can be shared by all members of society', an erroneous definition that instead describes open-access resources. In contrast with The ODI and ALI, Open Future does believe that Ostrom 'has shown how these ideas can be applied in modern times, and in particular how we can take ideas about managing resources like pastures or water sources and apply them in the digital realm.'. Open Future frames data commons and data trusts inversely to The ODI and ALI. In their report, *Data Commons Primer: Democratizing the Information Society*, Open Future authors define data commons as 'digital data that are collectively stewarded and governed by a community' (Tarkowski & Zygmuntowski, 2022, p. 9). The authors proceed to list forms of data commons, which they call 'primitives', 'with which different forms of data commons can be designed and built', including data cooperatives and data trusts. These definitions align far better with current commons scholarship on data commons, which regards data commons as a resource and data trusts as a legal form to manage a data commons (Ruhaak, 2020). How would IoFT have unfolded if the genealogy of data trusts started with Open Future instead of ODI?

How did ALI and ODI come to conclude that commons scholarship was irrelevant to data trusts? One potential answer is that their research neglects modern commons research. The two reports above by ALI cite a single reference, Ostrom's 1990 *Governing the Commons*. Coyle's blog post cites Ostrom's 2009 Nobel Prize lecture. These are inappropriate reference points for data commons research, given the Internet as we know it did not exist in 1990, and the first iPhone came out in 2007. Since this time, there has been substantial research related to data commons, most often under the banner of digital commons or knowledge commons. There have been popular books such as Lessig's *The Future of Ideas: The Fate of the Commons in a Connected World* (2002) and Benkler's *The Wealth of Networks* (2006). There have been multiple scholarly anthologies about knowledge commons, such as *Governing Knowledge Commons* (Frischmann et al., 2014) and *Governing Medical Knowledge Commons* (Strandburg et al., 2017), both of which include chapters about the Genomic Data Commons. There are research groups dedicated to digital commons, such as P2P Lab (n.d.-b) at Tallinn University of Technology and Dimmons (n.d.), a portmanteau for digital commons, at Open University Catalonia. A simple Google search using the term 'data commons' generates compelling and diverse examples on just the first page, such as the

GivingTuesday Data Commons (n.d.) and Georgetown Law's Civil Justice Data Commons (n.d.).

To summarize this genealogy: We start with Ada Lovelace Institute (ALI), a forerunner of data trust discourse in the UK. ALI removes commons scholarship from the data trust discourse based on their limited review of old commons literature. The Open Data Institute (The ODI) defines data trusts using ALI's cleansed discourse, which has not only erased commons literature but deemed commons literature irrelevant to data trust research. This data trust definition is picked up by IoFT, first by the IoFT convenors as a framing paper and then by the IofT working group. This genealogy helps explain why the IoFT working group produced a neoliberal commons; it also highlights the considerable scaffolding activities required of a commons-maker, not only to expand possibilities to include counter-hegemonic commons but also to consider commons discourse at all.

Commonized design

This experiment took place as a workshop at the *MobileHCI* conference in October 2020, my first conference and conference paper. In response to the workshop call, titled 'Cloudless Skies: Decentralizing Mobile Interaction', I co-authored a short paper, 'Addressing the Elephant in the Cloudless Sky: Designing a Commonised Mobile Network Infrastructure' (Sacks & Coulton, 2020). It turned out that our paper was the only paper submitted in response to the workshop call. Consequently, the entire three-hour workshop was dedicated to engaging with the provocations posed in the paper.

1.56. Purpose

The objective of the workshop was to 'develop and discuss current and future scenarios for decentralized mobile interaction, both utopian and dystopian.' (Schulte et al., 2020). In response to this workshop call, I proposed the concept of commonized mobile network infrastructure and presented the following provocation:

> A design solution to this problem might be modeled on affordable housing policy. In many states, private companies must set aside a proportion of units as affordable housing. This policy is part of a social contract in most capitalist states. In short, all of society has created the opportunity for the private company to make money by creating housing, and in return the private company must create housing for all of society. (Sacks & Coulton, 2020)

1.57. Plan/Design

This experiment differs from all other studio experiments in this thesis because I had no role in planning/designing the experiment. The experiment, the workshop conference in this case, was wholly planned/designed by the workshop organizers, and I entered the workshop with no information. That being said, I was able to record and make sense of this experience to reflect on how such a workshop could be conducted in the future as a more deliberate commons-making studio experiment.

Commons literature

This short paper limited engagement with commons literature to the design principles for managing commons. The provocation described earlier centred on design principle four, explained in the paper as follows:

> This paper focuses specifically on design principle #4: 'Make sure the rule-making rights of community members are respected by outside authorities'. The logic of this design principle underpins privatisation as much as commonisation. To privatise mobile networks, the rule-making rights (governance) of the community members (the private sector) are respected by the outside authorities (the state). This security of tenure provides the incentive to the private sector to invest in the infrastructure. There is no known example of a state awarding such rule-making rights to citizens or a group of citizens regarding mobile network infrastructure. (Sacks & Coulton, 2020)

The paper then posed the following question with respect to this design principle, which provided the basis for the workshop: 'How might the state ensure the rule-making rights of citizens for a commonised mobile network infrastructure?' (Sacks & Coulton, 2020).

Design methods

The workshop organizers did not articulate design methods. On reflection, what we did together was a type of speculative design rooted in inventorying, a method from community economies research described as the 'primary "weapon of destruction"' of capitalocentrism (Gibson-Graham & Dombroski, 2020, p. 9). In diverse economies research, inventorying means to take stock of the diversity of economic activities at play, exemplified by the Diverse Economies Iceberg presented earlier. In the comparison group, without any interventions, the working group performed stakeholder mapping, a type of inventorying, wholly within a capitalocentric world. This conference paper, in contrast, contested the capitalocentrism of current mobile network infrastructure to open the inventorying process to a greater diversity of economic activities. Whereas the comparison group imagined how a fictional data trust

might operate within an existing capitalocentric world, this group imagined what a commonized world might look like if it acknowledged and expanded on very real, actually happening counter-hegemonic activities. This approach to speculative design generated scenarios that were pragmatic and possible rather than utopian. We might call this method 'inventory-based speculative design'.

Experiment design

The Miro board created by the workshop organisers visualises the experiment design (Figure 28). The top centre zone presents the experiment design as 'Workshop Structure'. Each of these steps is contained in four zones of the Miro board:

1. Introductions = Goals of the workshop (top left)
2. Paper Presentation & Open Discussion = Cloudless Skies (middle left)
3. Speculation Exercise = Addressing the Elephant in the Cloudless Sky Discussion (top right)
4. Next Steps = Next Steps (bottom centre)

There were four participants: two workshop organisers, my supervisor, and me. The experiment took three hours.

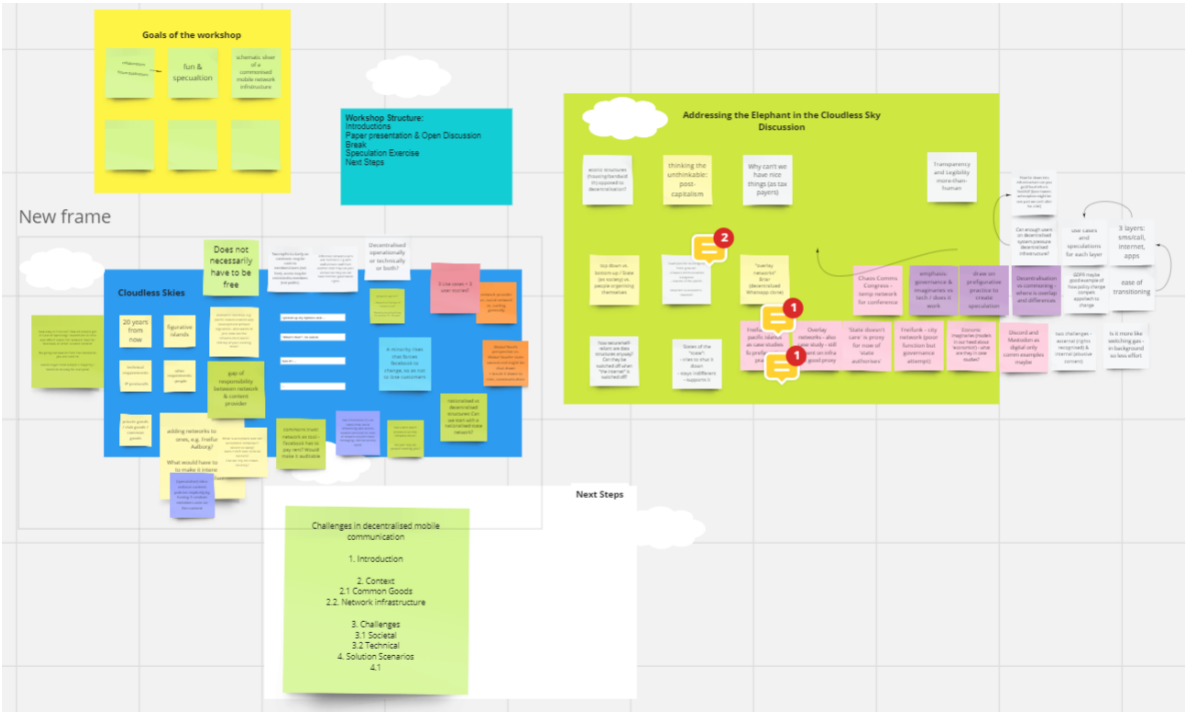


Figure 28. The whole Miro board for the workshop, created by the workshop organizers.

1.58. Act/Make

The act/make phase loosely followed the 'Workshop Structure' from the experiment design.

The first real step after introductions was 'Paper Presentation & Open Discussion' (Figure 29). In the context of speculative design, the workshop paper became the primary means of world-building. The paper also served to introduce 'new economic thinking' (Mazzucato et al., 2022) that was earlier identified by the IIPP Policy Studio. Visible sticky notes included both clarifying understandings of commons as well as ideas that arose during the discussion.

The second step, 'Speculation Exercise' (Figure 30), is when workshop members performed inventorying. After some inventorying, the group attempted to make sense of this inventory within this speculative world. For the most part, white and yellow sticky notes contained broad ideas, pink and purple sticky notes contained examples, and white notes contained sense-making ideas.

For the last step, 'Next steps' (Figure 31), the organizers felt that we might co-author a paper on this topic, which they provisionally titled, 'Challenges in Decentralised Mobile Communication'. The notes in this zone relate to ideation around paper structure, which was another attempt to make sense of the sticky notes across the Miro board.

On reflection, one way to summarise this method might be:

- Frame speculative world using paper
- Inventory real examples that might populate this speculative world
- Organise examples into a sensemaking structure
- Develop a paper to communicate this speculation to others

Figure 29. The first step, 'Paper Presentation & Open Discussion'.

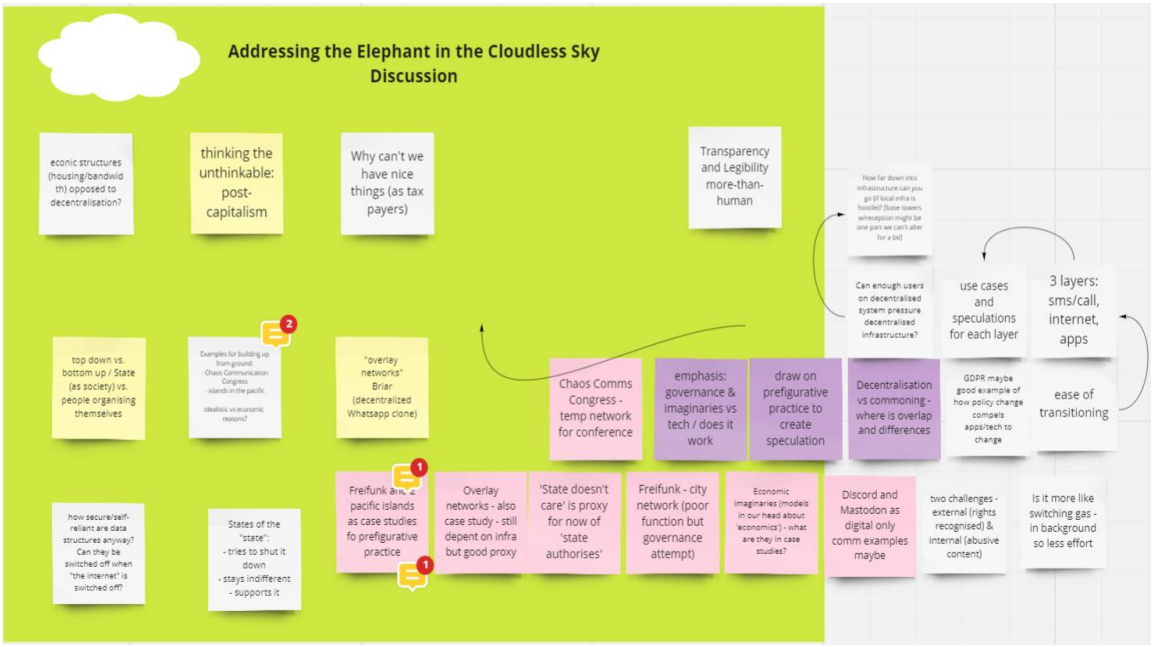


Figure 30. The second step, 'Speculation Exercise'.

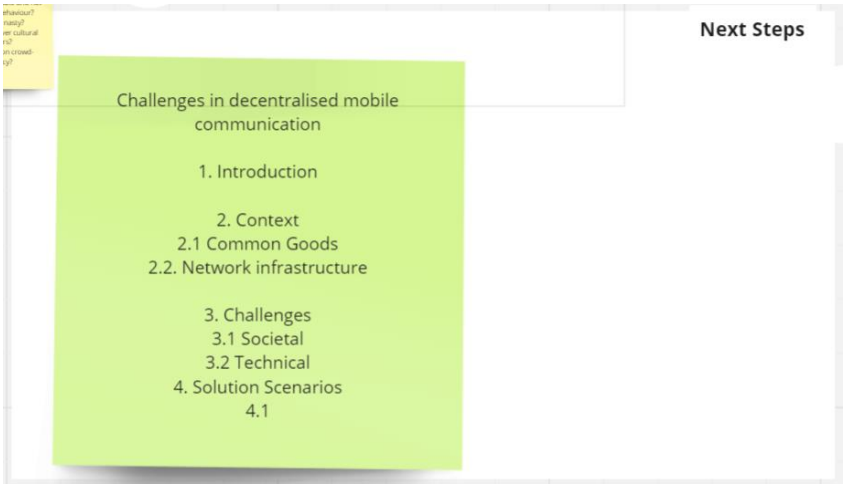


Figure 31. The last step, 'Next Steps'.

1.59. Observe

Observations are limited to the Miro board.

Language/Ideas

This experiment became a type of peer critique for my ideas about #commonize and commonized design. Writing and sharing the paper forced me to externalise and articulate what commonized design might be, particularly in comparison to decentralised design. The two workshop organisers engaged in this peer critique in multiple ways.

First, they posed clarifying questions about commons. One sticky note that exemplifies this discussion reads: 'Two myths to clarify on commons: may be costs to members/users (not free), access may be restricted to members (not public)'.

Second, they related the topic to their knowledge and suggested real examples of commonized mobile network infrastructure. One sticky note that exemplifies this thought process reads: 'Freifunk - city network (poor function but governance attempt)'. Third, they began structuring ideas around mobile network infrastructure typologies. One sticky note that exemplifies this structuring reads: '3 layers: sms/call, internet, apps'.

Through a constructivist lens, the workshop organisers related the new ideas from the paper and our discussions to their domain expertise. In turn, I was able to see how my ideas and language were understood and constructed by sympathetic peers.

Relationships/Subjectivities

The dynamics of this workshop were highly egalitarian. This dynamic probably is most attributable to the workshop size, and this observation has bearing on future experiments.

Morss and Murray (2005) suggest groups of 4-10 for generating ideas. And, in my anecdotal experience during the Covid-19 pandemic, the ability to fluidly turn-take online maxes out around 4-5 people. The ability to truly connect with others, particularly people we have never met before, might mean that future such experiments limit participation to five people.

Collective action

At the end of the workshop, the workshop organizers suggested we turn our discussion into a paper. While the paper did not materialise, the interest in investing time to write and publish a paper exemplified a form of collective action. The workshop organisers do not represent a commoning community, but they do represent an important role in shifting economic thinking. Collective action among academics could certainly be measured in part by co-authoring papers. These papers translate commonized design for diverse disciplines and audiences in the same way that the comparison group communicated speculative design to non-designer audiences.

Artefacts

The primary artefact generated by this experiment is the Miro board. The Miro board in this case is difficult to read and make sense of; however, this workshop took place six months into the Covid-19 pandemic, when we all were learning how to navigate online collaboration and tools like Miro. Nowadays, many researchers generate shareable artefacts using Miro or similar web applications. While this specific Miro board has shortcomings as a design artefact, further iteration on this board design might yield more successful artefacts.

1.60. Reflect/Critique

The workshop was effectively a form of peer critique. My reflection on this process resulted in the proposed research method outlined earlier (1.45).

Critique

This experiment took place nine months into my PhD, at a time when I was still performing literature review and formulating my research plan. The decision by the workshop organisers to conduct the workshop even though my paper was the only submission felt, to me at least, a positive critique of the value of my approach. As discussed above, the workshop then became a type of peer critique of my ideation thus far. The decision by the workshop organizers to develop a paper, albeit abandoned, was, according to my supervisor, quite unusual. Again, their interest in writing a paper based on the workshop felt to me to be a positive critique of commonized design and its role in mobile communication.

Reflection

This experiment showcased the value of paper-writing as a device for speculative design. In contrast with the comparison group, this workshop paper expanded the economic field of vision and the 'options for action' (Cameron & Gibson, 2020, p. 512), creating space for diverse economies strategies such as inventorying. This reflection resulted in my development of the initial research programme (1.45). This experiment design blended the success of the 'social making' process from the comparison group (1.54) with the success of this pilot experiment in commonized design. While I ultimately proceeded with a different research plan, this proposal remains viable, valuable, and of interest for future #commonize studio experimentation.

Commoner persona and journey map

This experiment is the most thoroughly documented experiment of #commonize studio. Much of this experiment is recorded in the paper 'User Research to Design a More-than-Human Food Commons' (Sacks, 2022a), which will be cited throughout this chapter.

In contrast with all other experiments in this thesis, this experiment was conducted with commons scholars. Thus, while all other experiments explored how to translate commons literature for design researchers acting as commons-makers, this experiment sought to introduce design research methods to commons scholars.

This studio experiment was conducted as an online workshop at an academic conference for commons scholars. Participants chose to participate based on the workshop abstract published to the conference website, which I have included in full below as an artefact that reflects ideas and language at the time:

> How might a commons be governed if non-human species are treated as equal actors? The most salient decolonization critiques in the commons field identify the need to account for other ontologies and epistemologies. A recurring theme, particularly in indigenous ontologies, is the location of humans as part of nature rather than separate from nature. What does it mean to govern a commons as a more-than-human community? This design workshop will explore the IAD framework and design principles for managing a commons through the lens of more-than-human design, a design methodology that asks us to design for non-human species alongside humans. We will use a scenario involving the management of urban green space to explore how non-human species might be represented in commoning. How do frameworks and design principles need to change to account for more-than-human commoning? The

> workshop will use hands-on activities to design a more-than-human commons (participants are also welcome to observe only). (Sacks, 2021b)

The commoner persona, based on the user persona, and the journey map, based on the customer or service journey map, are different design tools, but they are presented together here because they were used together in the single workshop.

1.61. Purpose

This experiment was originally conducted in anticipation of further collaboration with a studio partner. The partner had been discussing 'food lawns', an idea popularised in the book *Food Not Lawns: How to Turn Your Yard into a Garden and Your Neighborhood into a Community* (Flores, 2006). For the community members espousing the idea, food lawns meant permaculture-inspired lawn management that would yield edible human food through chemical-free practices. The community organized a kick-off meeting in October 2021, where I listened to their discussion without recording data. Shortly after the kick-off meeting, the community found itself diverted by other initiatives, and further discussion of food lawns was pushed back beyond the timeframe of this research.

The overall purpose of this experiment was described as follows in the paper:

> The experiment described and analyzed in this paper is a workshop conducted for the General Conference for the International Association for the Study of the Commons (IASC) in October 2021 (Sacks, 2021b). This workshop was conducted both to prototype tools before engaging the real community and to obtain feedback from commons scholars about these tools. (Sacks, 2022a)

1.62. Plan/Design

The experiment entailed adapting the user persona and journey map methods from service design, testing their use with commons scholars, and evaluating the results using the SES framework from the commons literature and pluriversal design considerations from the design literature.

Commons literature

This experiment specifically explored how design research methods might support commons-makers to engage with SES framework variables.

In the paper, I presented a definition by food commons scholar Vivero-Pol to explain commons:

> It's a collective way of managing a resource. So you have a resource, you have a community that is managing that resource and you have the governance. The governing mechanism is doing things together and doing things together is commoning. The resource is essential for the entire community. Everybody should have a stake in the management of that resource. (Schweizer, 2021)

I explained the SES framework to design researchers building on Vivero-Pol's description:

> The resource is represented as Resource Systems (e.g. lawns) and Resource Units (e.g. bees). The community is represented as Actors (e.g. neighborhood residents), and the governance is represented as Governance Systems (e.g. group policies). The center, Focal Action Situations, represents the many scenarios in which these four variables interact. For example, how will the community make policies on what food to grow? How will the community know if these policies conflict with the needs of nonhuman actors like bees, and what will the community do about it? (Sacks, 2022a)

Design methods

The user persona and journey map were selected because they appeared to address many of the SES variables without much modification. For the workshop participants, I shared an example of each tool before moving onto the modified versions (Figure 32, Figure 33).

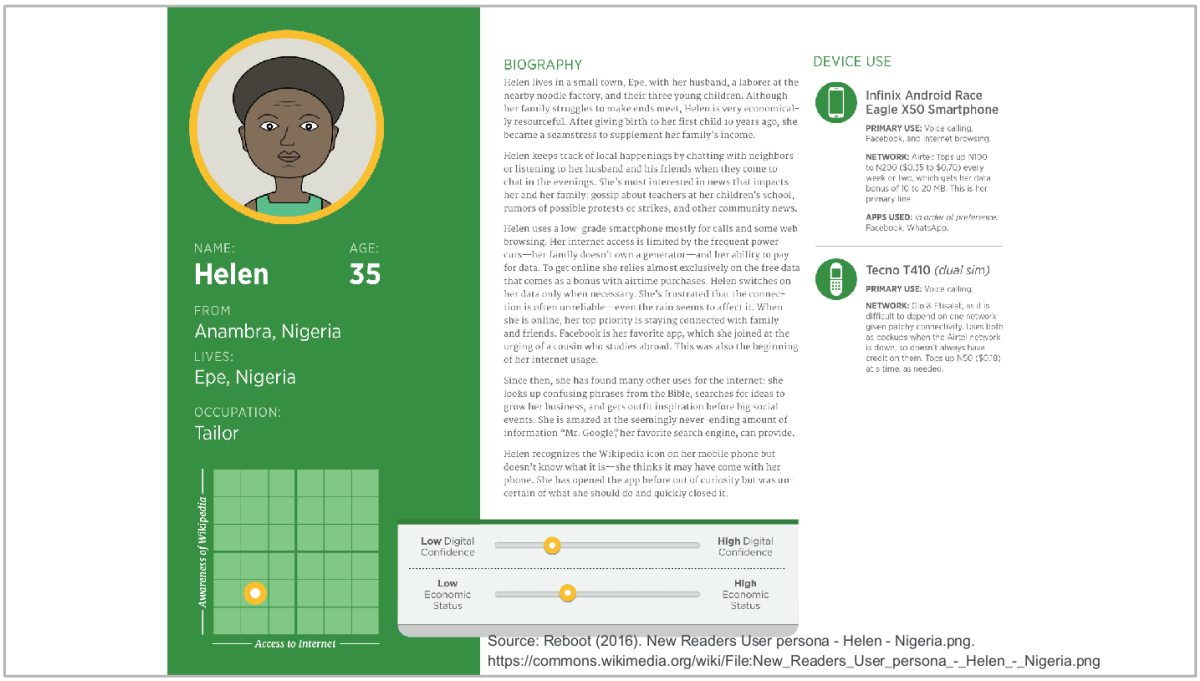


Figure 32. Exemplar user persona shared with workshop participants (Reboot, 2016).

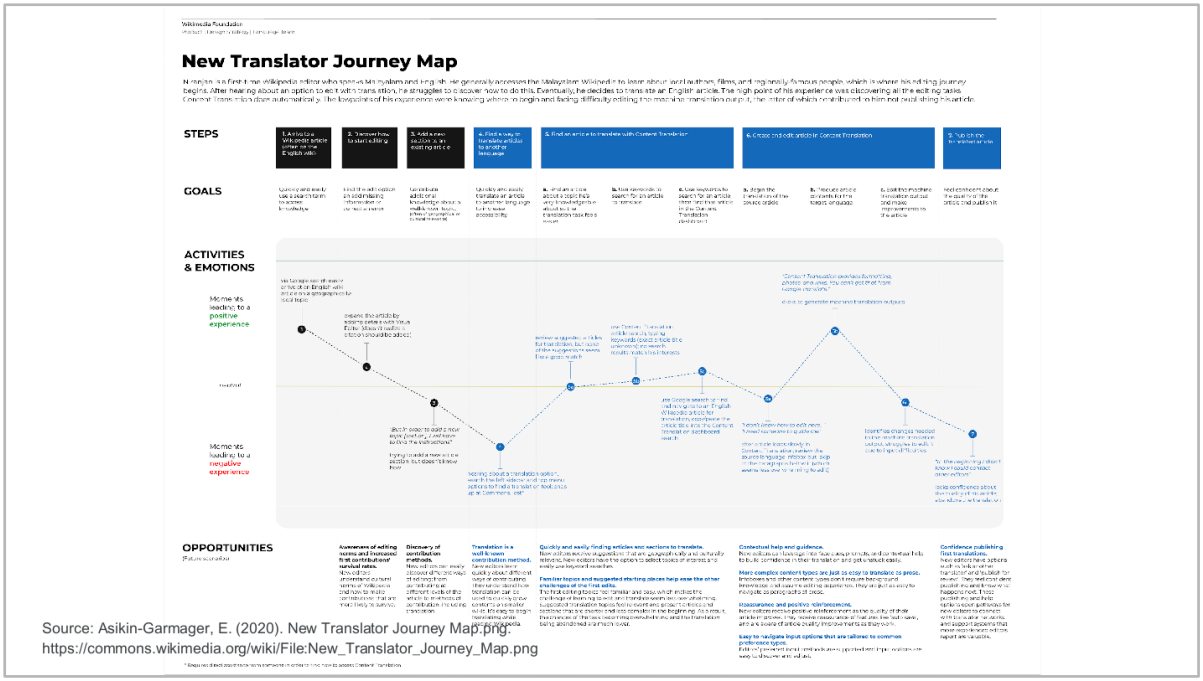


Figure 33. Exemplar journey map shared with workshop participants (Asikin-Garmager, 2020).

I explain the rationale for using and adapting these design methods in the paper alongside blank templates for the two design methods (Figure 34, Figure 35):

> The two tools selected for the workshop experiment are the user persona and the user journey map, both of which are frequently cited in both industry-oriented and scholarly works on design research, particularly service design and interaction design (Koskinen et al., 2011; Martin & Hanington, 2018; Stickdorn et al., 2018). The user persona was selected to support exploration of more-than-human actors in the community. The purpose of the user persona in the workshop was not to imagine the answers for the user persona but rather to prompt questions from participants about user research questions, sources, and methods. The user persona was accordingly presented as four quadrants: Bio, Goals, Who, and How. Bio and Goals acted as the two containers for psychographic information about the user. Who represented data sources for answering these questions, and How represented research methods to obtain this data. The user journey map was selected to support exploration of focal action situations, where users interact and produce outcomes. The purpose of the user journey map in the workshop was to begin identifying both the journey to be mapped and the potential interactions/conflicts that should be explored in greater detail as focal action situations. The user journey map for the workshop was accordingly pared down to the journey itself, which is often labelled as phases, steps, or stages on a user journey map. The word 'user' was replaced with 'member' for both tools to reflect the relationship between commons members. (Sacks, 2022a)

Figure 34. Commoner persona template presented in experiment (Sacks, 2022a).

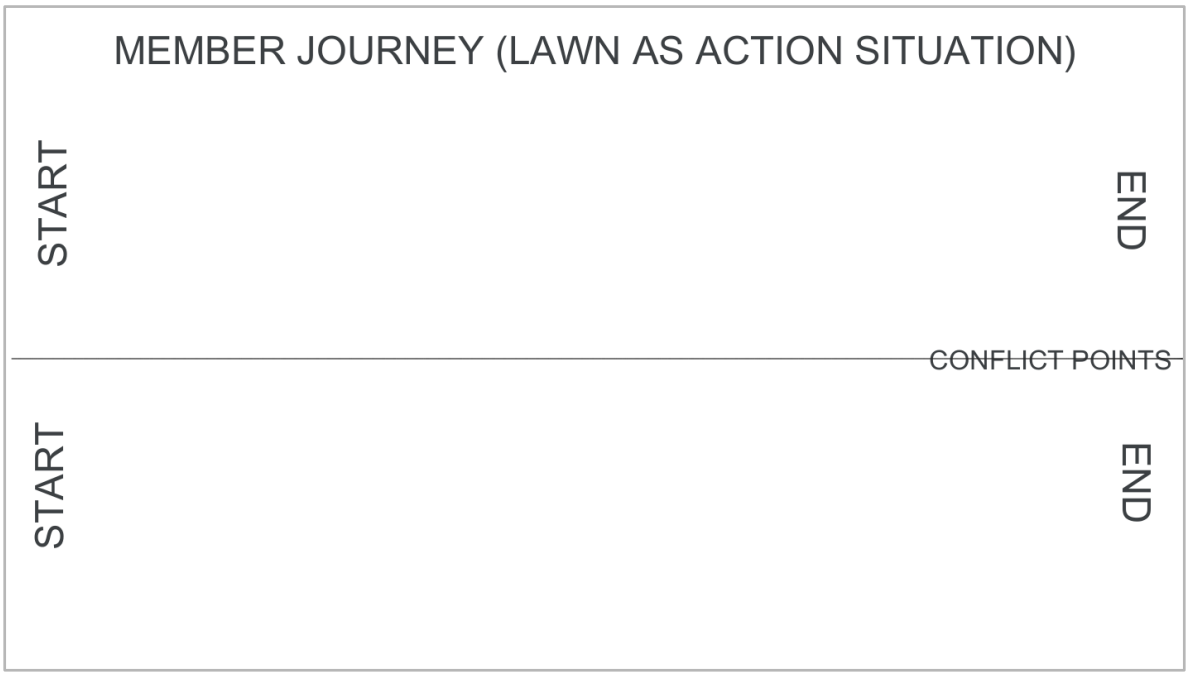


Figure 35. Commoner journey map presented in experiment (Sacks, 2022a).

More-than-human design is the other design methodology (rather than specific method) introduced in this experiment. In the paper, I explain that 'more-than-human means theory and practice focuses on the ways nonhuman nature is regarded as ontological equals to humans.' (Sacks, 2022a). The paper references a range of scholars and concepts that seek to describe more-than-human theory:

- 'think *with* the world and not *for* the world' (Galloway, 2017, p. 475)
- Naturecultures (Haraway, 2003; Puig de la Bellacasa, 2010, p. 157), and
- Uncommons (Blaser & de la Cadena, 2017, p. 190).

The paper acknowledges that more-than-human theory includes inorganic non-humans, such as Internet of Things (Coulton & Lindley, 2019) and animal-computer interaction (Hook, 2019; Mancini et al., 2017). This experiment, however, evaluates the design methods for their ability to answer questions about (organic) non-human species, inspired by Maller's paper about 'more-than-human thinking' (2021, p. 5):

- Who speaks for or represents nonhuman nature?
- How do we listen to nonhuman nature?
- How do we act with nonhuman nature?

To narrow from more-than-human methodology to more-than-human design method, the paper identifies several examples of more-than-human design practice (Baron, n.d.; Veselova & Gaziulusoy, 2019; Vink et al., 2021) as well as more-than-human commons papers (Bresnihan, 2015; Cibin et al., 2021; Heitlinger et al., 2021) and projects (P.D. Commoners, 2020; *Projects*, n.d.) These conceptions of the more-than-human continue to be explored in subsequent experiments, e.g. commoning blueprint (Chapter 0) and commons model canvas (Chapter 0).

Experiment design

The workshop consisted of three sets of exercises:

1. Human and non-human commoner map, three minutes per map (Figure 36, Figure 37);
2. Human persona and non-human commoner persona, six minutes total per persona (Figure 38, Figure 39); and
3. Human commoner journey, non-human commoner journey, and interactions/conflicts between commoners, ten minutes total (Figure 40).

For all exercises, participants conducted the exercise first with human commoners then with non-human commoners to move from familiar to unfamiliar territory.

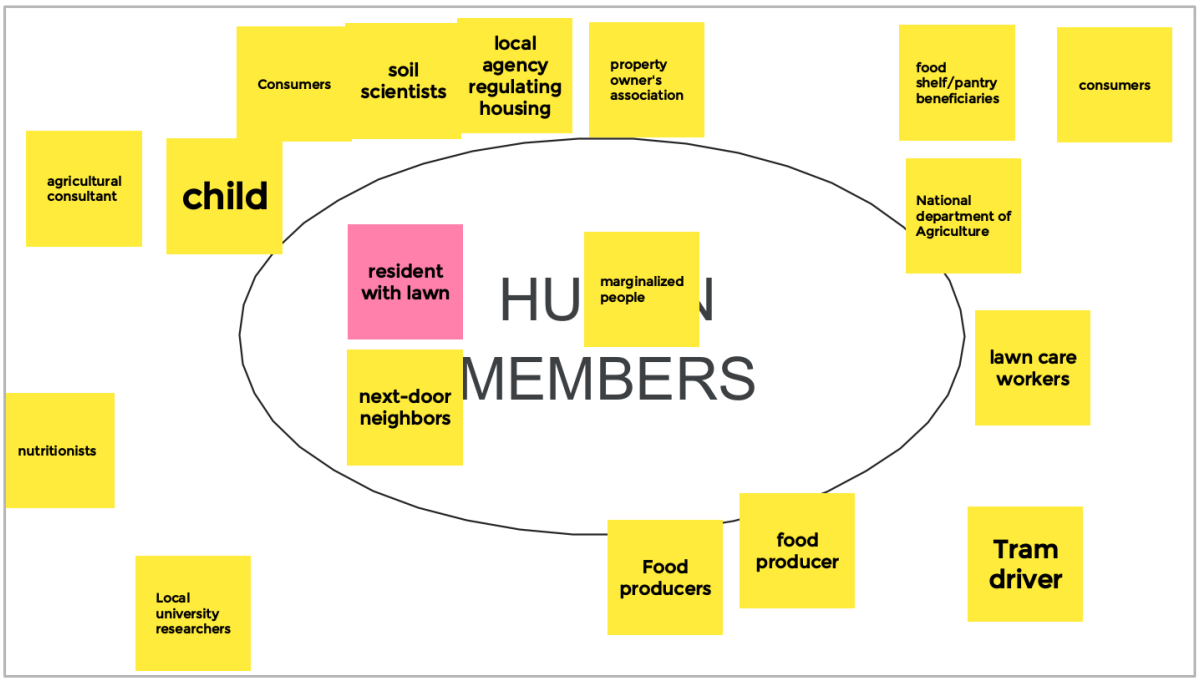


Figure 36. Completed human commoner map (Sacks, 2022a).

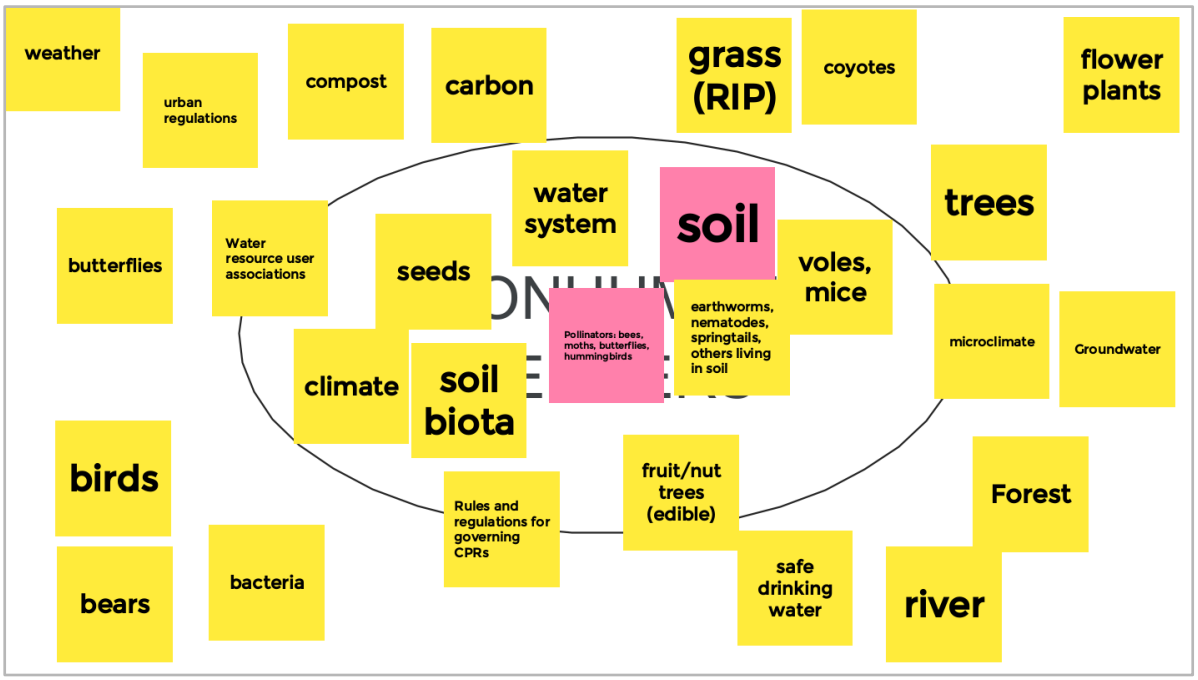


Figure 37. Completed non-human commoner map (Sacks, 2022a).

1.63. Act/Make

For exercise 1, participants were first asked to identify commoners of this fictional food commons, then participants were asked to move sticky notes closer to the centre of the circle if they felt the commoner was critical to or most affected by this food commons. For workshop timing, I selected the human commoner to be used in subsequent exercises ('resident with lawn') and selected two commoners in the centre of the non-human commoner map, 'soil' (representing an ecosystem) and 'pollinators' (representing a species), for a vote. The majority of participants voted for pollinators, so pollinators became the non-human commoner for subsequent exercises.

Exercise 2 was completed in two steps for each commoner persona. First, participants were instructed to generate questions to answer in order to create a commoner persona and to place these questions under either Bio or Goals. Second, participants were instructed to identify who they would ask to answer these questions (Who) and what methods would be used to collect this information (How).

Exercise 3 was completed in five steps. Participants were first asked to identify start points and end points for the human commoner and to place these ideas at either end of the journey timeline (step 1). Participants were then asked to identify points along the way from the start point to the end point (step 2). Participants then repeated this process for the non-human commoner (steps 3-4). Finally, participants were asked to identify points of interaction or conflict between the two commoners by moving these sticky notes to the centre line labelled 'Conflict Points' (step 5).

1.64. Observe

The primary research question stated in the paper was: 'How can user research tools support communities to create a more-than-human food commons?' (Sacks, 2022a). The proxy for evaluating how well these tools performed was the SES framework. I coded the results in two ways: first, to assess how the results related to the SES framework variables; second, to explore demonstrations of more-than-human thinking provoked by the tool adaptations.

Language/Ideas

The paper summarises my approach to observing language/ideas:

> The results of the user research workshop were coded against the SES framework to qualify how useful the tools were at supporting more-than-human thinking for a food

commons. How many of the SES variables did participants cover during the short workshop? (Sacks, 2022a)

The paper meanwhile concedes that, 'Coding results is a subjective rather than positivist task. Variables remain subject to ongoing revision by scholars as they apply them with communities (Cox, 2014; del Mar Delgado-Serrano & Ramos, 2015).' (Sacks, 2022a).

For the coding process:

> The results of the human persona (resident with lawn) were coded against Actors and Resource Systems. The results of the non-human persona (pollinators) were coded against Resource Units. The results of the user journey map were coded against Interactions and Outcomes. (Sacks, 2022a)

Table 17 illustrates how results were coded, while the full coding results can be found in the paper.

Table 17. Example of coding results in the paper. This table presents results from the non-human persona (pollinators) coded against the SES framework variable called Resource Units (RU) (Sacks, 2022a).

	Variable name	**Sticky note**
RU1	Resource unit mobility	Do you want to expand to new locations? Under what conditions do you tend to move out/on?
RU2	Growth or replacement rate	Under what conditions do you thrive?
RU3	Interaction among resource units	Specific sub-species categories? Are you a specialist or a generalist? (one-species pollinated or many)
RU4		--
RU5	Number of units	Size of the colony?
RU6	Distinctive characteristics	What local plants do they prefer? What kind of pollen is the sweetest? How are you affected by agro toxics? What are threats to pollinators?
RU7	Spatial and temporal distribution	Trends in pollinators?

The ‘overall observation of these results is that workshop participants generated ideas that addressed the majority of variables within a very short timeframe.’ (Sacks, 2022a). The principal learning outcome was that ‘In future iterations, prompting questions that address SES variables can be incorporated into these templates to guide participants.’ (Sacks, 2022a).

Relationships/Subjectivities

In the paper, I situated more-than-human design in relationship to pluriversal design, with the following rationale in the paper:

> By pluriversal thinking, this paper draws primarily on Escobar’s work, where the pluriverse means ‘a world where many worlds fit’ (Escobar, 2018, p. xvi). Pluriversal design’s emphasis on indigenous ‘cosmovisions’ that ‘reflect a deeply relational understanding of life’ (Escobar, 2015) extends more-than-human thinking. While more-than-human thinking means reconceptualizing ontology, moving from ‘human exceptionalism’ (Galloway, 2017, p. 475; Jain & Ardern, 2021) to human interdependence, pluriversal design means reconceptualizing epistemologies too. In other words, *who* does the more-than-human thinking and *whose* knowledge counts? (Sacks, 2022a)

Coding results for such pluriversal thinking is less systematic than coding for SES variables but was still instructive. The non-human commoner persona was the primary data source for this coding. To illustrate this coding process, below is a list of sticky notes generated for the ‘Who’ quadrant of the non-human commoner persona:

1. Scientists/naturalists
2. Biologists
3. Local researchers studying the topic
4. Local environment department staff
5. Leader of the pollinators
6. Union of pollinators
7. Local communities (local stewards)
8. Gardeners
9. People with songs/stories about pollinators

The paper describes this ranking as moving from a ‘one-world world’ (OWW) (Law, 2015) perspective to pluriversal thinking:

> OWW thinking, such as (1) biologists and (2) scientists, reflect Global North perspectives about who holds legitimate knowledge about nonhuman nature. OWW

> answers were expected, both for this workshop and from the real-world community, since both are taking place in the Global North. Of equal interest for this assessment are the results that could be classified as pluriversal ideas, i.e. sources of knowledge that represent different ontologies and epistemologies. Local communities (7), gardeners (8), and people with songs/stories (9) are all customary rather than scientific knowledge sources, and these sources are more likely to be available to communities than scientists or researchers. Several participants explored the theme of unions throughout the workshop exercises. A union of pollinators (6) or leader of the pollinators (5) poses an institutioning question: In addition to the source of this information, what institutions should be created to speak and act for pollinators? (Sacks, 2022a)

Two observations about relationships/subjectivities from this coding process are: first, 'Several participants found the term "Who" confusing. One adaptation, used hereafter in this paper, is to rename this quadrant to "Source," which also better expands the framing of this quadrant to nonhuman sources such as sensors.'; and second, 'The capacity to frame these methods in many ways suggests that perhaps the Who/Source is more important to user research than How/Method.' (Sacks, 2022a).

Collective action

The primary collective action objective of this experiment was to find other commons scholars interested in this topic for future collaboration. The experiment failed in this regard, though, in hindsight, this is due to experiment design flaws that point to a key difference between lab and studio experimentalism. A challenge that this research faces, like most academic research, is navigating between research ethics and collective action-building. To fulfil research ethics requirements, I enforced participant anonymity. I did not know who was attending the workshop and did not seek out their identities. This anonymisation of participation is a reasonable approximation of lab experimentation, or as close as an academic conference workshop can achieve since randomising participation is unrealistic. Yet, this approach undermines any attempt at collective action. In hindsight, I should have made this collective action objective more overt and then created clear paths for participants to contact me. I later tried to resolve this conflict in the participant consent documentation where I provide a line that gives participants the option to identify themselves if they wish to be co-authors of future papers.

Artefacts

This experiment placed greater weight on artefacts for analysis and sense-making. This weighting is partly due to the nature of participant engagement, limited to a one-hour online workshop with anonymous participation.

Overall, the commoner personas (Figure 38, Figure 39) were legible and understandable, which is a strength compared to some later artefacts like the commoning blueprint. The commoner personas would certainly benefit from further iteration. Two changes identified in the paper are to: change 'Who' to 'Source' and include prompting questions in each quadrant to support ideation. Similar to the diversity of capitalist user personae, there is scope for many variations of a commoner persona.

The commoner journey map (Figure 40) requires greater modification than the commoner persona; however, in comparison to the next experiment with the commoning blueprint, the commoner journey map offers a simpler, faster design method for mapping out where a community might spend its time to address real or anticipated conflicts. The biggest challenge in completing the commoner journey map was specifying the start and end points of the journey. Does the resident start with a lawn ready for planting or one that requires remediation? Do the pollinators find a thriving or toxic lawn at the end of the journey?

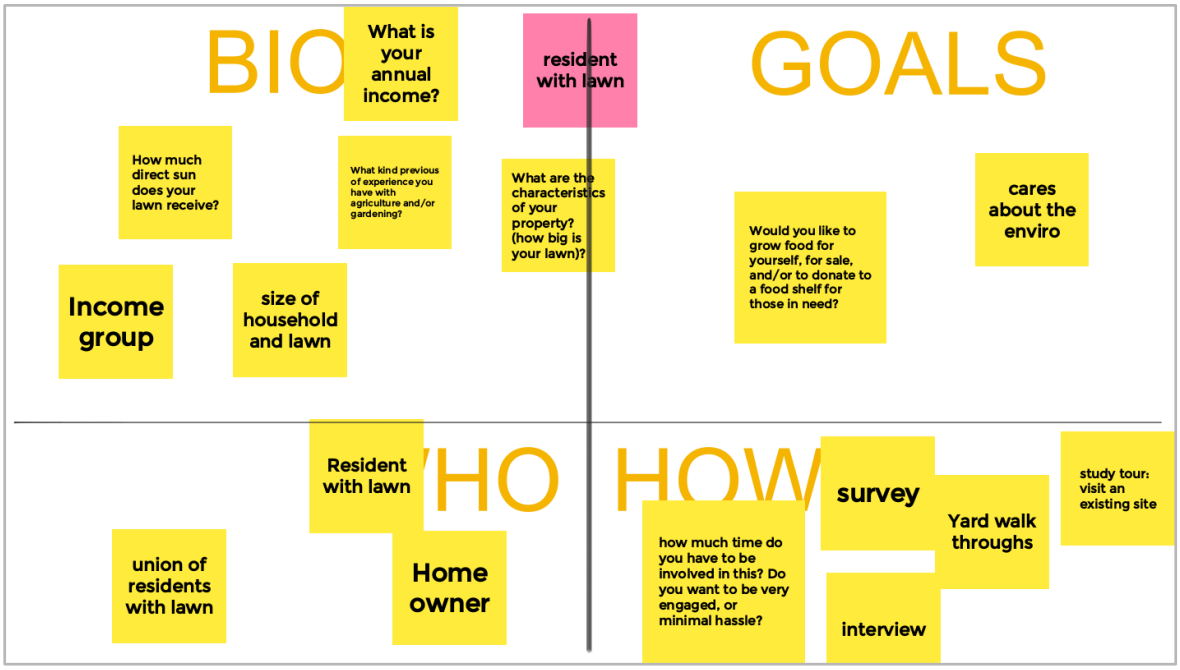


Figure 38. Completed human commoner persona (Sacks, 2022a).

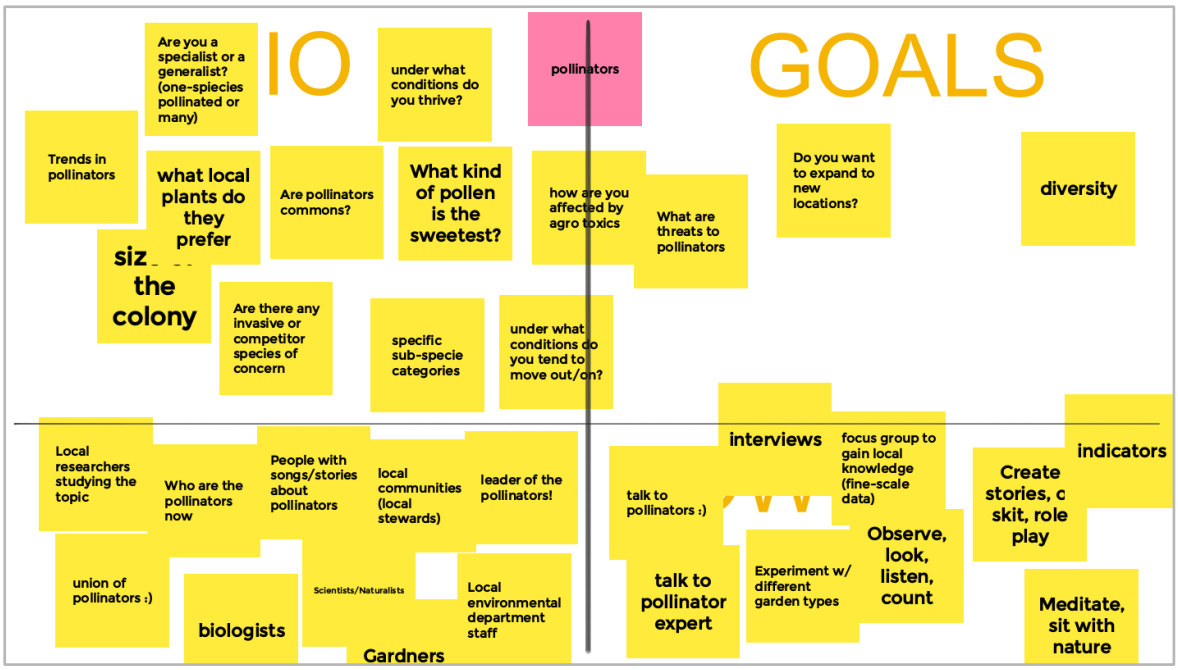


Figure 39. Completed non-human commoner persona (Sacks, 2022a).

Figure 40. Completed commoner journey map (Sacks, 2022a).

1.65. Reflect/Critique

This experiment experienced elements of desk critique, peer critique, and public review, though other experiments better exemplify these forms. There were three learning points from this experiment presented in the paper, which are a combination of critique and reflection, cited here in abridged form.

Critique

The workshop was a form of peer critique, the peer reviews of the paper were a form of desk critique, and my paper presentation at *DRS2022: Bilbao* was a form of public review. While I capture much of the peer review in the paper, the peer review process is undocumented and worth reviewing here.

Alongside a number of comments to improve the paper, there were two important comments that relate to the overall trajectory of #commonize studio. The first reviewer commented that, 'It is a very clear article and the graphics and explanation of the process help others replicate this.'. While I did not engage in studio experimentalism in this paper, the notion of documenting this experiment to support replication is an aspiration for studio experimentalism.

The second reviewer was confused by the 'generative turn' I proposed in this paper and asked, 'What is exactly the generative turn that happened; in what sense has it been/can it be achieved?' This comment compelled me to begin trying to articulate what #commonize studio means by making a generative turn in commons research. The full explanation appears below:

> Moving from analysis of extant commons to design and creation of commons-to-be marks what might be called a 'generative turn' in the commons field. This generative turn requires translating and transforming the theories and frameworks from the commons field into tools and infrastructure that communities can use. … The generative turn taken in this paper entailed the translation and transformation of a respected analytical framework from the commons literature into a generative infrastructure based on user research methods. (Sacks, 2022a)

Reflection

In the paper, I noted three learning points.

First, the 'rule of five' (Nielsen, 2000) from user experience testing proved relevant. This small community generated ideas that addressed the majority of SES variables, suggesting that a real commoning community might generate key insights in a short timeframe. The

paper further observed that 'Preparatory work with project leaders prior to wider community engagement may also catalyze and improve the breadth and quality achieved in the workshop.' (Sacks, 2022a).

Second, 'Numerous participants shared sentiments that described the process as 'fun' and 'enjoyable' (Sacks, 2022a). This lesson would rear its head repeatedly through ARtD cycles. Commons-making must lean into methods that commoners enjoy. To make it pithy: Commons-making must be joyful. This lesson was the result of the feedback requested at the end of the workshop, i.e. the overt peer critique of this experiment.

Third, as cited earlier, these tools need to incorporate the discourse of the SES variables to guide community ideation, especially if hoping to generate results in a shorter timeframe.

Commoning blueprint

The commoning blueprint is an adaptation, or really a very first step towards adaptation, of the service blueprint. #commonize studio conducted two experiments in short succession in late 2021: a three-hour workshop at IASDR 2021 (Sacks & Coulton, 2022) and a two-hour module for an advanced interaction design course for university undergraduates.

1.66. Purpose

The initial purpose of the commoning blueprint was to pre-emptively develop solutions for several commoning communities in conversation with #commonize studio. None of these communities ultimately moved forward, so the pilot experiment represents the most advanced application to date.

1.67. Plan/Design

These pilot experiments emphasized design methods, specifically the service blueprint.

Commons literature

This experiment focused on the action situation. Building on the results of the previous experiment (Chapter 0), when I used the SES framework variables to evaluate the efficacy of the commons-member persona, I thought this experiment could be evaluated using the 10 types of interactions in the SES framework:

- Harvesting
- Information sharing
- Deliberation processes

- Conflicts
- Investment activities
- Lobbying activities
- Self-organizing activities
- Networking activities
- Monitoring activities
- Evaluative activities

The relationship between experiment results and these 10 interaction types is considered in the Reflect/Critique phase.

For the IASDR workshop, the workshop abstract did cover some commons literature concepts. As an early attempt to present a short, publicly accessible reading list, the workshop registration page made three suggestions for publicly accessible literature to read in preparation for the workshop:

- 'Commons and Commoning' (Bollier & Helfrich, 2019, Chapter 1)
- 'Commons in the Pluriverse' (Escobar, 2015)
- 'A Framework for Infrastructuring Commons Creation' (Sacks & Galabo, 2022)

Based on discussions with participants, I do not believe most participants read this material prior to the workshop, so an evaluation of the usefulness of this reading list is not yet possible. For the university module, participants had no advanced preparation to do.

Design methods

This experiment was an experiment in using the service blueprint as a method for commons-making. The service blueprint has a long history in design research, originated by Shostack (1982) in the 1980s within the management studies field. The service blueprint has visually evolved considerably since that time, and, similar to the user persona, there are now numerous visualisations. The use of the service blueprint is popular enough that many online platforms offer service blueprint templates. A brief look at three examples from popular websites illustrates where service blueprints converge and diverge:

- Service Design Tools (Figure 41),
- Miro (Figure 42), and
- Nielsen Norman Group (Figure 43).

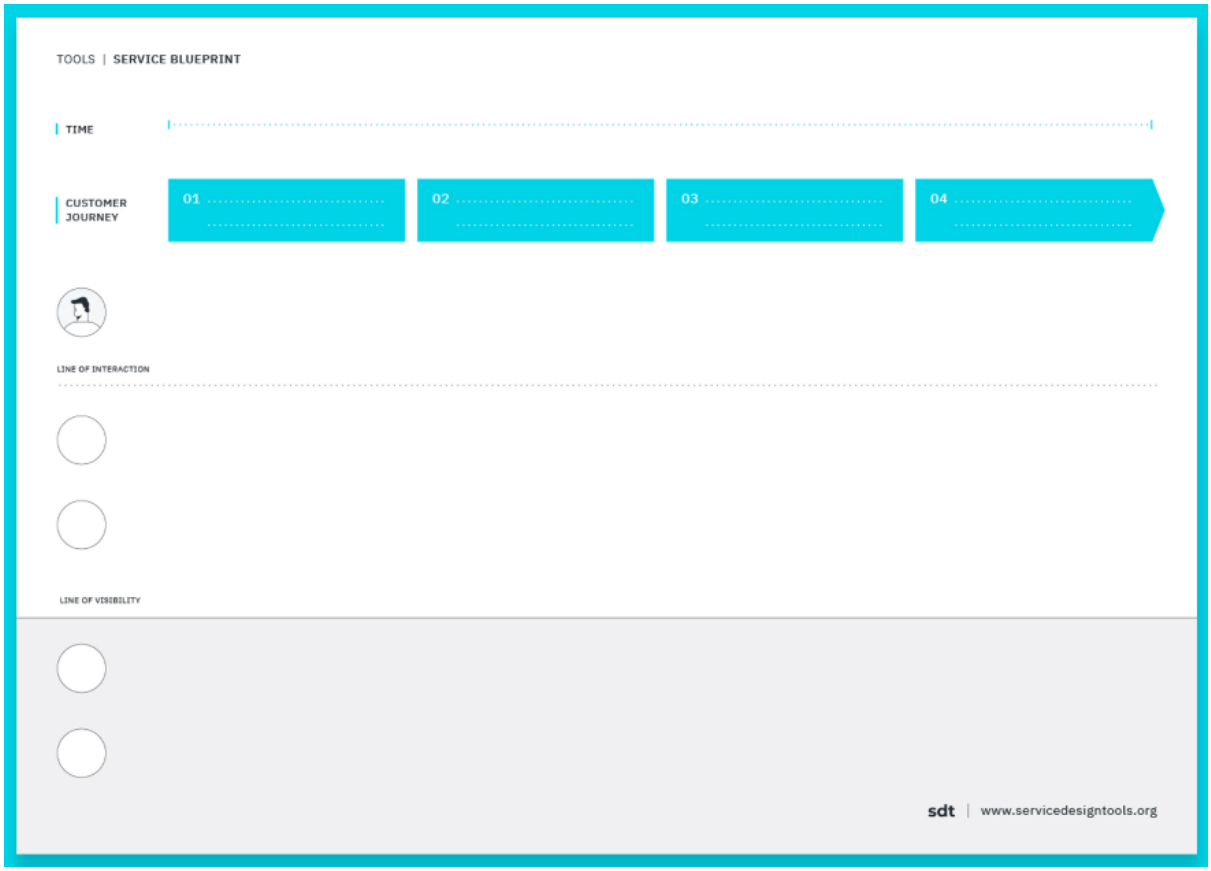


Figure 41. Service blueprint template by Service Design Tools ('Service Blueprint', n.d.).

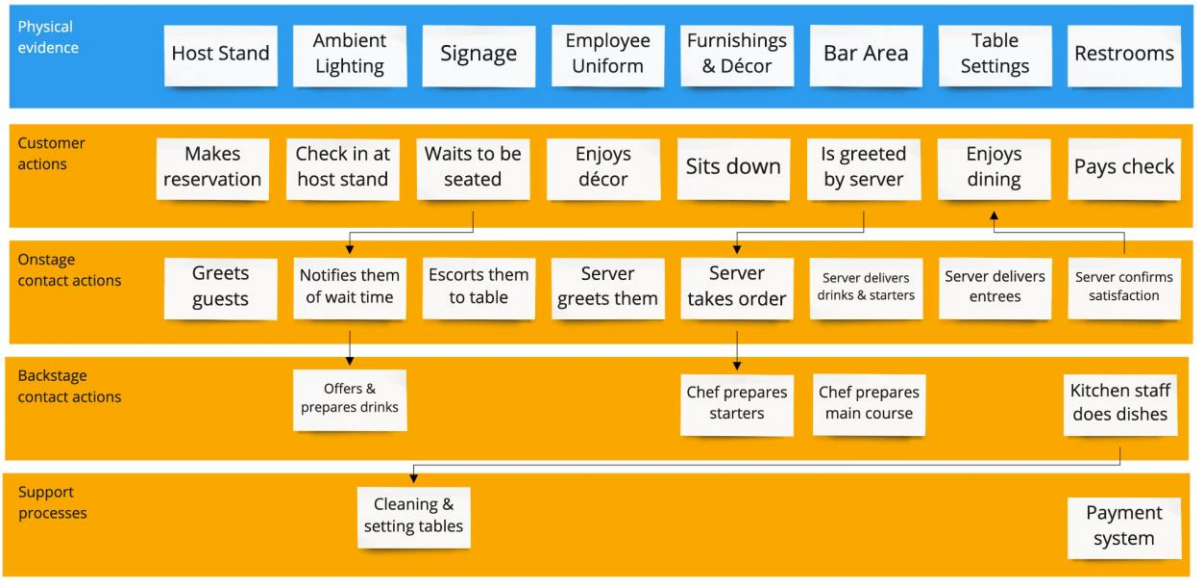


Figure 42. Service blueprint template by Miro. This figure is an example for a restaurant service blueprint, used in the university module (Gilson, n.d.).

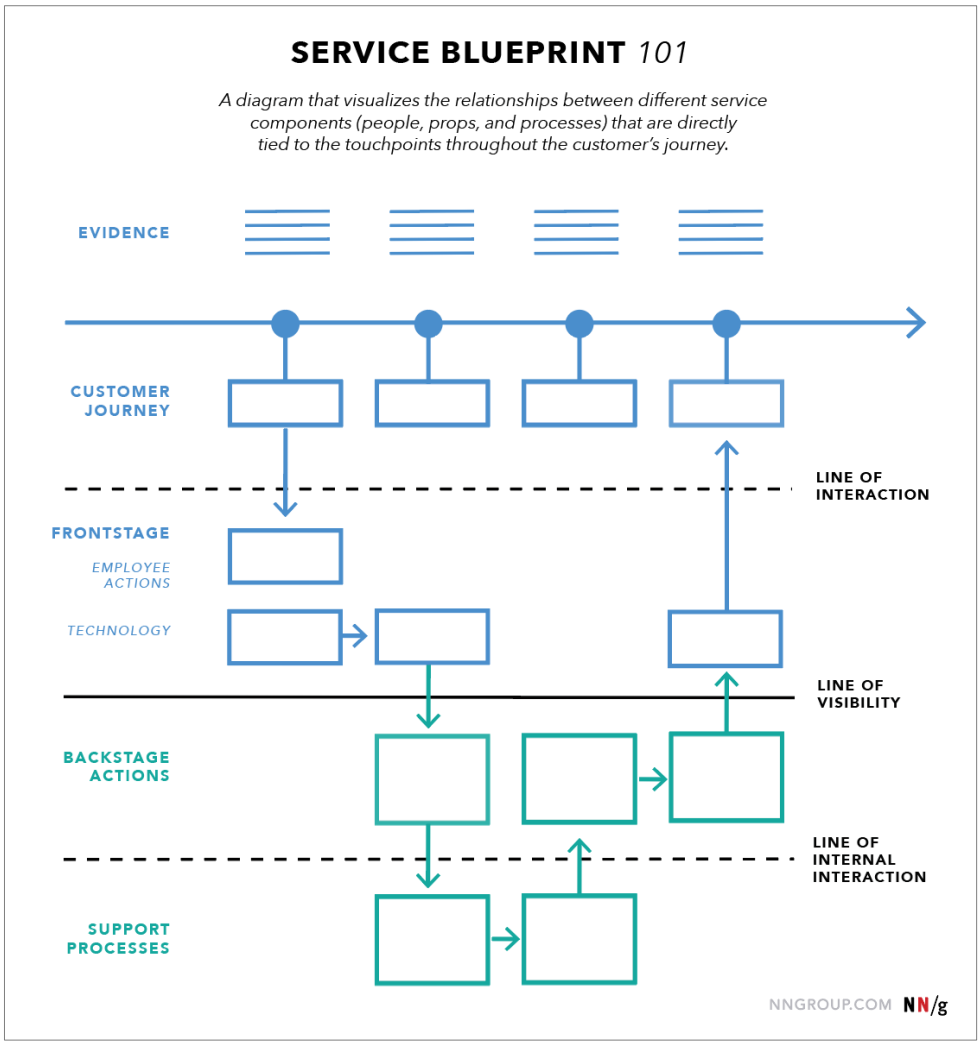


Figure 43. Service blueprint template by Nielsen Norman Group (Gibbons, 2017).

These three blueprints converge on three design features:

- The customer (or commoner) journey tends to plot horizontally along the top,
- The ways the customer/commoner interacts with the service tends to be the next row, and
- The ways the service supports the interaction tends to be the last row.

The 'line of visibility' is a common term, used in both the Service Design Tools (SDT) and Nielsen Norman Group (NNG) templates, to describe the aspects of the interaction that the customer/commoner can observe versus those aspects that take place 'behind the scenes'. These three templates diverge in how they name and organise information in the blueprints. The SDT template leaves the blueprint open, which is useful for a more experienced service designer but might leave others uncertain how to use the template. The Miro and NNG templates name the visible interaction aspects 'frontstage' and the invisible aspects 'backstage' and differentiate between backstage actions versus 'support processes'. The SDT

and NNG templates use a 'line of interaction' to divide the customer/commoner from the service, and the NNG template repeats this line of interaction to divide the service from support processes.

I created and iterated on a simplified version of the service blueprint for the two experiments (Figure 44, Figure 45). For both experiments, there were three rows:

- Bee Actions,
- Frontstage, and
- Backstage.

For the university module, I added a fourth row called 'Support'. This language and structure more closely mirror the Miro and NNG templates, which I found more intuitive. The metaphor of a stage also played well into the live action role play (LARP) method used in the university module. I removed the line of interaction as it did not seem to offer any immediate value. The Miro 'Restaurant service template' was presented to participants in both cycles.

Experiment design

This experiment was conducted as two cycles in quick succession. The IASDR workshop was conducted on a Sunday, and the university module took place three days later on a Wednesday. The three-day gap meant there was some time to reflect and iterate but limited time to make substantial changes. The two key changes made, discussed further in the Reflect/Critique section, were: narrowing discussion to a specific physical location and providing some basic information about the non-human commoner to support meaningful work.

Experiment parameters for the IASDR workshop:

- Venue: IASDR 2021, December 2021
- Workshop time: 3 hours, online
- Participants: 5 conference delegates, unknown to me in advance

The IASDR workshop was planned as four phases:

- Theoretical context: Commons and more-than-human design
- Exercise 1: Create a more-than-human service blueprint
- Exercise 2: Identify violations
- Exercise 3: Solve violations using the design principles

Challenges arose in Exercise 2, so we did not progress to Exercise 3.

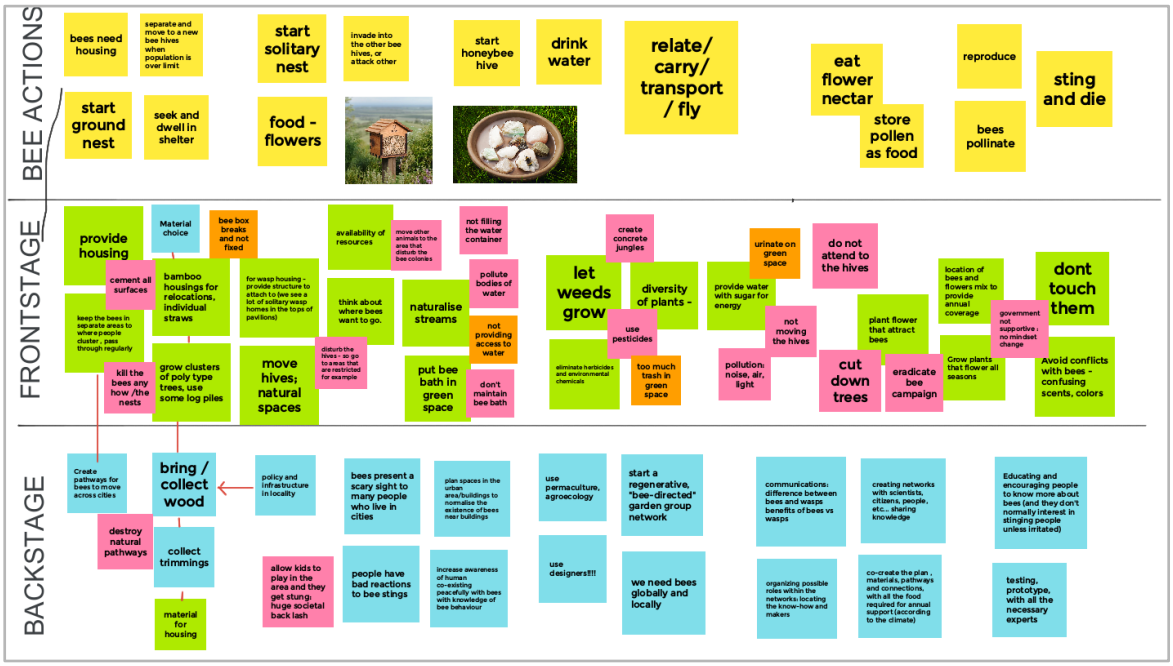


Figure 44. Commoning blueprint template for IASDR 2021 workshop.

Figure 45. Commoning blueprint template for university module.

Experiment parameters for the university module:

- Venue: Lancaster University, December 2021, I conducted the module remotely while the students and module instructor were together in the classroom
- Module time: 2 hours
- Participants: 6 students, unknown to me in advance

The university module was two hours long, versus the three hours for the IASDR workshop. I altered the experiment format in two ways. First, I omitted 'Theoretical context' to save time. Second, I introduced a LARP exercise before exercise 1 using the Miro 'Restaurant service template'.

1.68. Act/Make

IASDR workshop

In response to my earlier critique that commons-making scholars do not share how they communicate commons to commoning communities, I share here how I communicated commons to these workshop participants (Figure 46). We reviewed definitions of commons, the IAD framework, and the design principles for managing commons. I then showed slides from the IASC workshop (Chapter 0) to illustrate how this commoning blueprint might be supported by other service design tools.

Finally, during the break, participants were asked to place examples of the shared urban green space that would serve as their reference point for the remainder of the experiment (Figure 47). Most participants were living in high-rise buildings with shared green space that is managed by the building, and the top left photo is a public city park opposite one participant's home.

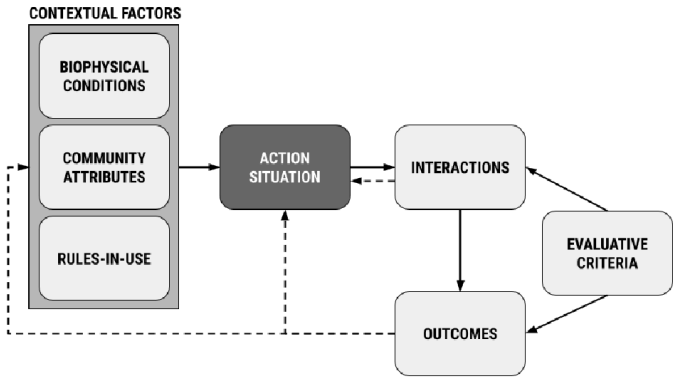
Commons and commoning

"A commons refers to a shared resource that is governed by a community of people." (Galabo & Sacks, 2021)

"Commons are both a shared resource and the governance strategies used by a collective of people to manage that shared resource." (Sacks & Galabo, 2021)

“It’s a collective way of managing a resource. So you have a resource, you have a community that is managing that resource and you have the governance. The governing mechanism is doing things together and doing things together is commoning. The resource is essential for the entire community. Everybody should have a stake in the management of that resource.” (Vivero-Pol quoted in Schweizer, 2021)

IAD framework



Design principles for managing commons

1. Define clear group boundaries.
2. Rules need to fit local circumstances.
3. Those affected by the rules can participate in modifying the rules.
4. Rule-making rights of community members are respected by outside authorities.
5. Rules are enforced by effective and accountable monitoring.
6. Use graduated sanctions for rule violators.
7. Provide accessible, low-cost means for dispute resolution.
8. Commons may be part of nested ecosystems within larger commons.

Figure 46. ‘Theoretical context’ slides presented at IASDR workshop.

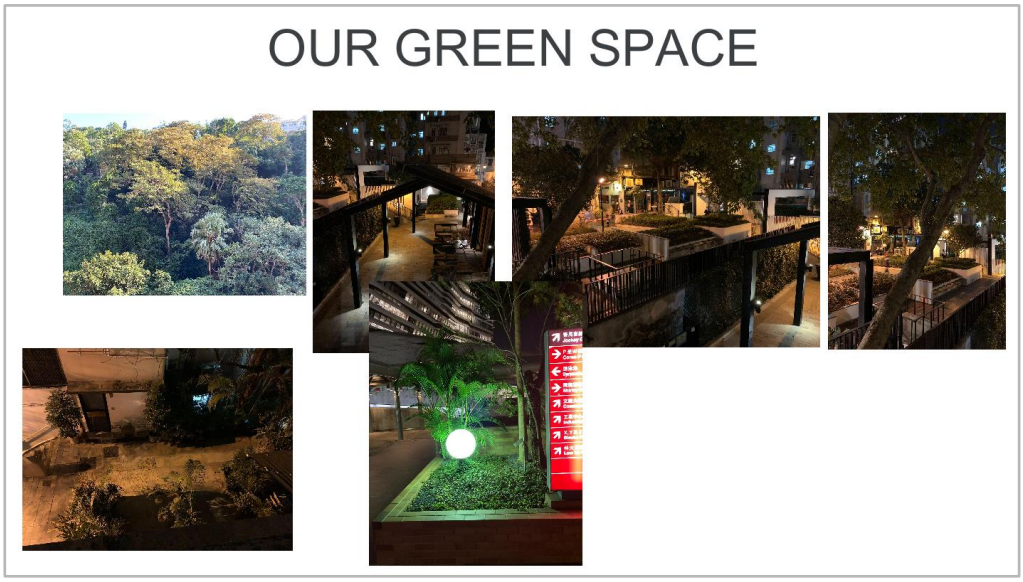


Figure 47. Images of IASDR workshop participants shared green spaces.

We moved from the 'Theoretical context' to 'Exercise 1: Create a more-than-human service blueprint' (Figure 48), which comprised five steps:

1. Identify 'bee actions', which is similar to the top row of the service blueprint detailing the customer/commons-member journey (yellow)
2. Identify frontstage interactions (green)
3. Identify frontstage conflicts (pink, orange)
4. Identify backstage support processes (blue)
5. Identify conflicts arising with backstage support processes (pink)

Challenges arose when the group was asked to select some of the pink sticky notes from step 5 to explore in the next exercise. This conversation is not observable in the slides, so I will discuss the act/make aspects here. The group, some more vocal than others, began identifying systemic challenges to the bees' use of this shared green space. The logic of this challenge, which took some time to unravel in the workshop, was this: rubbish/trash presents the biggest problem to maintaining the shared green space to support bees; much of the visible trash is discarded bottles and packages from the local convenience store; therefore, some participants thought we should address where people dispose of trash from the convenience store in order to maintain the shared green space for the bees. A second challenge we spent considerable time discussing was wild boar, who were lured by this trash and over-running Hong Kong green spaces at the time. So, the fuller challenge was that this trash not only encroached on bee habitat but also lured wild boar into these spaces.

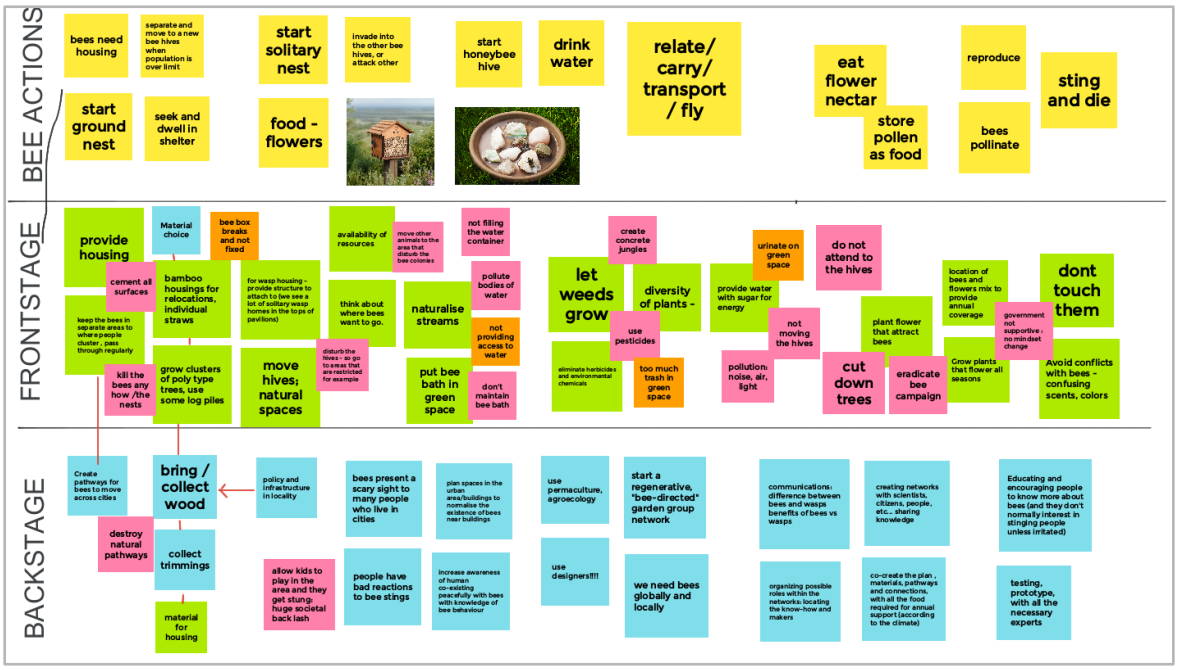


Figure 48. Completed commoning blueprint for IASDR workshop.

University module

The university module was two hours long, versus the three hours for the IASDR workshop. I altered the experiment format in two ways. First, to save time, I omitted the first phase, 'Theoretical context'. Second, I introduced a LARP step before Exercise 1 using the Miro 'Restaurant service template'.

The first step in this experiment was enacting the Miro restaurant service blueprint, turning the classroom into a restaurant. A university lecturer was present in the room, which smoothed out this process. The students were asked to take on roles, and this fortunately did not require any guidance or intervention as students were enthusiastic to take on certain roles. The roles were: customer, host, server, chef. The student in the customer role moved to the classroom door, and the chef and dishwasher moved to the opposite side of the classroom. The restaurant service blueprint remained up on screen as a guiding script (Figure 42). Since this service was intimately familiar to everyone involved, the students were able to improvise dialog moving through the service blueprint. Meanwhile, one student volunteered to take notes about conflicts during the LARP. For example, in the first interaction when the host greets the customers, everyone paused to identify conflicts that might arise, which the student wrote down:

- 'Did not greet guest'
- 'Customer bring an extra person'
- 'Was very busy so customer had to wait because host wasn't notified about arrival'

The entire process took 5-7 minutes and then we took a quick break before moving onto the rest of the experiment. Students had been instructed the week before this class to take photos of the green space nearest their residences, and they were asked to upload these photos to the Google Jamboard slide during the break. No students did this, but it did not noticeably affect this experiment.

Moving into Exercise 1, I explained that the commoning blueprint for the shared green space resembled the restaurant service blueprint we had just performed, except now the customer role was bees. The rest of this experiment was structured very differently than the IASDR workshop. I loaded the first row, 'Bee actions', with three themes, from left to right: housing, water, food. For housing, I explained that there are three bee housing types: hives for honeybees, bee boxes for solitary bees, and tree roots for ground nesting bees. For water, I identified the need for bee baths. For food, I noted the role of flowers. Similar to a design brief given to design students, these became the parameters for the rest of the experiment.

Next, the six students paired off to tackle one of the three themes. They were allocated one hour. Each pair was instructed to ensure that one student took on the role of the bees. I was able to see their progress on Google Jamboard but communication was limited, as anything I said was on the public shared screen. The students were first instructed to identify the types of interactions that the bee might experience using the frontstage row. Then the students were instructed to identify what actions they as humans might take to support these frontstage interactions using the backstage row. Finally, students were instructed to identify support services, including technology, that might support these backstage actions.

Finally, each pair had 10-15 minutes to present and discuss their commoning blueprint with the group (Figure 49).

1.69. Observe

While these artefacts are nearly impossible to read or make sense of, the processes embedded in them proved highly informative to future experiments with Soil Trust and Hack4Blood. One caveat for all observations is that, similar to economics lab experiments, behaviour in these artificial settings is dissimilar to behaviour in a real commoning community. Similar to the previous experiment with commoner personas, observations seek to make sense of the broad strengths and areas for improvement for the commoning blueprint.

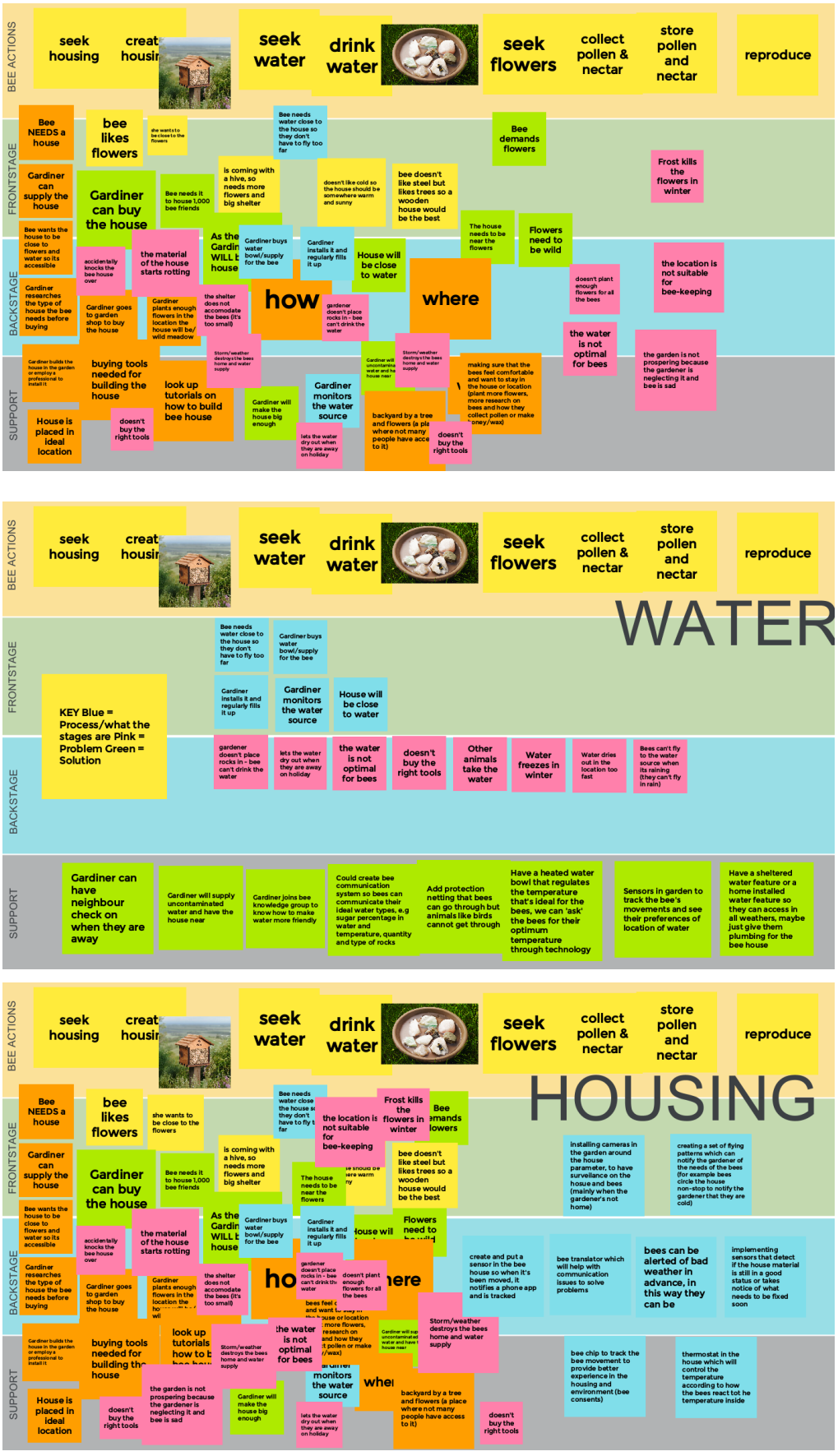


Figure 49. Commoning blueprints created by the three student pairs: food, water, housing.

Languages/Ideas

The nomenclature of the commoning blueprint generated mixed results. For the IASDR workshop, where I facilitated the entire workshop directly, participants developed ideas appropriate to the three rows (bee actions, frontstage, backstage). For the university module, where I could only observe, students placed sticky notes that crossed between rows as well as reconfigured the rows.

Relationships/Subjectivities

Participants were asked firstly to imagine themselves as a real commoning community and secondly as a more-than-human commons with bees as equal commoners. These are difficult relational steps. The university module was far more successful in generating joyful and empathic relationality. This difference may be due to the changes made from the IASDR workshop, namely the use of LARP as a first exercise, but there were many other contextual differences between these two workshops so the reason may lie elsewhere, e.g. IASDR was entirely online while the university module was in-person.

Similar to the commoner persona, this experiment showcased the complexity of more-than-human commoning. The experiment asked participants to consider one species, bees, yet participants in both experiments identified other non-human species that seemed critical to the commoning blueprint, e.g. wild boar and wasps. Also similar to the commoner persona, this experiment underscored the necessity of more-than-human knowledge. Where do commoners obtain bee knowledge for the commoning blueprint? Who represents bees? One immediate adaptation is to narrow the action situation. The commoning blueprints essentially presented a network of focal action situations, e.g. feeding bees, housing bees, multiple green spaces, etc. Instead, the commoning blueprint might be more effective, at least for initial use, by addressing specific action situations, e.g. housing bees in a specific green space.

Collective action

Collective action was neither a planned nor an observable feature of these experiments; however, considerable collective action did take place. The IASDR workshop is how I met Dr Wernli, the Soil Trust commons-maker (Chapter 1.71). In this sense, this academic workshop served its ideal purpose of coalescing scholars with shared interests to collaborate into the future. The collaboration with Dr Wernli has generated both studio experiments profiled in this thesis as well as future research bids.

Artefacts

The most obvious observation is that these service blueprints are incredibly difficult to read or to make sense of. This is a visual observation rather than an analytical one, as the text in the sticky notes reflects critical thinking and engagement with many of the SES Interaction variables. The takeaway from these experiments that was incorporated into future work with Soil Trust and Hack4Blood was the need to drill down, and down and down and down. By drill down, I mean in terms of the focus of the commoning blueprint. The most visually successful commoning blueprint is the university module water blueprint (Figure 49, middle). An external observer could read this commoning blueprint and make sense of it, and an external observer could certainly follow along as the students described it. There was not an opportunity to unearth why this pair organised information differently than the other two groups, but we can observe that they remained relatively laser-focused on water.

1.70. Reflect/Critique

The commoning blueprint is the only experiment to be performed twice with two different communities. While this experiment was informed by no critique, the observations across the two iterations led to several reflections.

Critique

The commoning blueprint received no critique. I had performed a dry run of the previous experiment, commoner persona and journey map, with family members. This was possible because the experiment was one hour long. The first commoning blueprint experiment, in contrast, was three hours long, which was a more demanding request. While we might say that obtaining some sort of desk or peer critique is vital to studio experimentalism, this is not always possible. The more pragmatic lesson from this ARtD cycle was to consider keeping experiments shorter and simpler, especially if they are delivered by commons-makers without my involvement.

Reflection

The primary reflection from this repeated experiment is about what design methods to use when. A major change between the two experiments was 'pre-loading' the commoning blueprint, i.e. I supplied some information about bees and set some parameters that formed the design brief. Even with this pre-loaded information, the university module group continued to develop ideas that would help them understand community attributes, such as:

- Water: ‘Have a heated water bowl that regulates the temperature that's ideal for the bees, we can “ask” the bees for their optimum temperature through technology’
- Housing: ‘thermostat in the house which will control the temperature according to how the bees react to the temperature inside’
- General: ‘creating a set of flying patterns which can notify the gardener of the needs of the bees (for example bees circle the house non-stop to notify the gardener that they are cold)’

These ideas suggest that there is some work for the group to do before using the commoning blueprint. The commoner persona would be one way for the group to gain more insight about bees before moving to the more complex commoning blueprint. As a consequence of this reflection, the next experiment, commons model canvas (Chapter 0), attempts to back up to a more schematic-level design method that might be used before the more detailed commoning blueprint.

The secondary reflection, carried into subsequent experiments like the action situation canvas (Chapter 0), was the importance of narrowing the action situation, i.e. being very specific about the site of interaction. Overtly focusing the action situation to the shared urban green spaces in the second experiment seemed to enhance experiment outcomes. Both experiments still identified other non-human commoners that affected this action situation, such as wild boar for the IASDR experiment and ‘Other animals take the water’ in the university module. This tension between engaging deeply with bees and recognising other non-human species that interact with bees underscores the practical difficulty of doing more-than-human design. Nevertheless, this narrowing of action situation seemed to favourably impact the ability of participants to stay focused on bees.

A final reflection from the two more-than-human commoning experiments (Chapters 0 and 0) is the overwhelming complexity of doing more-than-human commoning. These experiments focused on a more visible and beloved non-human species. Yet, participants in both experiments identified the interdependencies between bees and other species. Even among bees, there is a need for more complex thinking. For example, several global studies found that urban beekeeping is harming ecosystems because, ‘In some places, such as London, so many people have established urban hives that the honey bee populations are threatening other bee species.’ (Antonelli et al., 2020, p. 55; Pavid, 2020). The unintended negative consequences of urban beekeeping illustrate a tension for more-than-human commoning: How can this group practically manage their shared green space to benefit the more-than-human community without being so overwhelmed by the unknowable complexity of the natural world that they give up trying?

SES framework interactions

As mentioned at the beginning of this ARtD cycle, one objective of these experiments was to evaluate how the commoning blueprint might support engagement with the SES framework variables, primarily the Interactions variables. A rapid coding process (Table 18) generated similar findings to the commoner persona and journey map (Chapter 0). The commoning blueprint did evoke a reasonable breadth and depth of consideration of Interactions variables, and it could better evoke coverage of these variables with some clearer prompting language.

The more compelling observation from ARtD cycle, particularly from the second experiment, is the potential need for a new type of Interactions variable: Translation activities. A reasonable proportion of ideas generated by the university module group essentially considered how humans could better understand bees in order to support bees, i.e. how to translate from Bee to Human (Table 19). Translating would not have arisen in the earlier SES framework since all commoners were humans, and generally also spoke the same language. These 'Translation activities' draw from ideas that would otherwise be categorised as Information sharing (I2) or Monitoring activities (I9).

Including bees provokes a human question too: How might humans translate between each other in future commons, not only between different languages but also different cosmologies?

Table 18. Coding of sticky notes from the university module water blueprint against the SES Interactions variables.

Interactions (I) variables		Sticky note text (uncorrected)
I1	Harvesting	Gardiner will supply uncontaminated water and have the house near
I2	Information sharing	Could create bee communication system so bees can communicate their ideal water types, e.g. sugar percentage in water and temperature, quantity and type of rocks
I3	Deliberation processes	–
I4	Conflicts	gardener doesn't place rocks in - bee can't drink the water lets the water dry out when they are away on holiday the water is not optimal for bees doesn't buy the right tools Other animals take the water Water freezes in winter Water dries out in the location too fast Bees can't fly to the water source when its raining (they can't fly in rain)
I5	Investment activities	Gardiner buys water bowl/supply for the bee Gardiner installs it and regularly fills it up Add protection netting that bees can go through but animals like birds cannot get through Have a sheltered water feature or a home installed water feature so they can access in all weathers, maybe just give them plumbing for the bee house
I6	Lobbying activities	–
I7	Self-organizing activities	Gardiner can have neighbour check on when they are away
I8	Networking activities	Gardiner joins bee knowledge group to know how to make water more friendly
I9	Monitoring activities	Gardiner monitors the water source Sensors in garden to track the bee's movements and see their preferences of location of water
I10	Evaluative activities	Have a heated water bowl that regulates the temperature that's ideal for the bees, we can 'ask' the bees for their optimum temperature through technology

Table 19. Coding of sticky notes from all university module blueprints showing sticky notes that address 'Translation activities'.

Interactions (I) variables		Sticky note text (uncorrected)
I2	Information sharing	Could create bee communication system so bees can communicate their ideal water types, e.g. sugar percentage in water and temperature, quantity and type of rocks
I2	Information sharing	creating a set of flying patterns which can notify the gardener of the needs of the bees (for example bees circle the house non-stop to notify the gardener that they are cold)
I2	Information sharing	bee translator which will help with communication issues to solve problems
I9	Monitoring activities	Sensors in garden to track the bee's movements and see their preferences of location of water
I9	Monitoring activities	thermostat in the house which will control the temperature according to how the bees react to the temperature inside
I10	Evaluative activities	Have a heated water bowl that regulates the temperature that's ideal for the bees, we can 'ask' the bees for their optimum temperature through technology

Field experiments

What does a field experiment look like when everything is remote? Due to the Covid-19 pandemic, I had to develop research processes with commons-makers I had never met, making commons in places I had never been. In short, what is a field experiment when the researcher can never go into the proverbial field? In my review of design research and commons literature (Chapter 0), I had not observed any remote processes. The researchers always spent some time on-location and in-person with commoners. These exigencies birthed the #commonize studio experiment method that centred on direct support to individual commons-makers through remote-only engagement (Chapter 1.46).

The field experiments described here are drawn from two commons. I initiated discussion with a number of other commons-makers over the course of this research, but the two commons discussed here offer the most complete and robust data. The first set of experiments were performed with Soil Trust in Hong Kong, a commons-in-formation in Hong Kong. The second set of experiments were performed with Hack4Blood, an aspirational commons in Botswana. These two commons also highlight important emerging concerns in design research, which could be referred to as pluriversal design. Soil Trust

centred soil as the shared resource and sought to shift relationality between commoners and the soil. Hack4Blood centred the Indigenous cosmologies of the kgotla village governance model in thinking about commons where blood was the shared resource.

1.71. Soil Trust, Hong Kong

Soil Trust was originated by Dr Markus Wernli, Research Assistant Professor at the School of Design at The Hong Kong Polytechnic University (PolyU). Dr Wernli and I met at IASDR 2021, when Dr Wernli was a participant in my workshop (Sacks & Coulton, 2022). This encounter became the start of a longstanding collaboration, sometimes speaking weekly. Dr Wernli had commenced Soil Trust in autumn 2021, a few months prior to the workshop, and I supported some aspects of his work until the closure of the project in April 2023.

The following excerpt is an edited version of how Dr Wernli explained Soil Trust in an unpublished manuscript originally submitted to Participatory Design Conference 2022 (PDC22):

> Responding to the absence of household-level organic waste recovery in Hong Kong, Soil Trust is building a commons around recovering food scraps that brings together food consumers and producers for mutually invigorating local soils. Particular attention is paid to the processes involved to make grassroots nutrient-cycling desirable for urban households without land access. Mindful of storage limitations, cultural acceptance issues, and the subtropical conditions of Hong Kong, Soil Trust applies bokashi fermentation to ensure cleanliness and soil regeneration. In bokashi fermentation, layers of kitchen scraps (of all kinds) are pressed with alternate layers of inoculated rice bran into an air-tight bucket for maturation. What effectively is an anaerobic, pH-lowering pickling process locks up nutrients over time, prevents methane and malodors, proliferates valuable fungi and microbes essential to soil life, functions independently from any electricity and chemicals, and affords direct community engagement.
>
> For exploring bokashi fermentation as metabolic link between urban households and local production farms, Soil Trust launched the university-endorsed urban soil care pilot Belonging-To-The-Field (回歸田嘢) in autumn 2021. For stimulating agricultural innovation with bokashi, Soil Trust established a field trial inside the Kangmiao Organic Farm (康苗有機農場) with 17 member households of the community-supported agriculture (CSA) platform TinYeah (回歸). The Soil Trust team with the support from the Research Institute for Future Food (香港理大未來食品研究院)

> provides the necessary know-how transfer, scientific validation, social arena, and material supplies for orchestrating this "native" bokashi collective. "Native" bokashi means to "upcycle waste with waste" (Wernli, 2021) and source all inputs and tools locally from recovered materials, including: rice bran (bedding), citrus peels (enzyme starter), sawdust (composting), cardboard (mulching), and recycled plastic containers (fermentation). (Sacks & Wernli, 2022b)

The three experiments have been organised chronologically and follow a path of greater granularity in commons-making. The first experiment, commons model canvas, made visible the need to break down future commons-making into singular action situations or a more limited network of focal action situations. The second experiment, action situation canvas, then focused on a specific network of action situations and made visible the role of performance in commons-making. The third experiment, body histories, then explored performance as a design method for commons-making. Most of these experiments are unpublished to-date, except for a workshop abstract for PDC22, 'Co-Design of the Pluriversal Commons Model Canvas' (Sacks & Wernli, 2022a).

1.72. Hack4Blood, Botswana

Hack4Blood is an idea-stage start-up initiated by a Botswanan social enterprise called Spectrum Analytics. Taking place from September 2022 through March 2023, this set of studio experiments benefited from learning gained from previous studio experiments. On the other hand, Hack4Blood was the only studio project that involved multiple commons-makers, which presented novel challenges not faced in the other studio projects.

#commonize studio entered this project as an academic collaboration with Dr Badziili Nthubu at Botswana International University of Science and Technology (BIUST), initially facilitated by Dr Rosendy Galabo at Lancaster University. The first experiment was an experiment in knowledge construction detailed in Chapter 0. The outcome of this experiment was an exploratory paper for the Participatory Design Conference 2022 (PDC22) titled 'Botswana Blood Commons: Visualizing Blood Services as a Public-Commons Partnership' (Sacks et al., 2022). This paper was shared with Spectrum Analytics, who in turn shared the paper with National Blood Transfusion Services (NBTS), the government organisation responsible for blood donation as well as coordination for testing, storage, and distribution. The second experiment, '#commonize studio design brief', explored how #commonize studio might use the design brief, a tool used across design practice, to engage with partners. The insights from this experiment informed the organisation of the third

experiment, ‘Action situation blocks’, where Spectrum Analytics organised a workshop with NBTS to perform the very first step of the process outlined in the PDC22 paper.

An important component of these Hack4Blood studio experiments was centring the commons ecosystem on the Indigenous kgotla (Figure 50):

> The Indigenous kgotla system operates alongside Botswana’s Parliamentary republican system and plays a particularly significant role in rural villages. Kgotla is the name for both the customary governance system in these villages and the physical space where meetings take place. A kgotla is typically led by a chief with a group of ward heads, though structure varies. The kgotla is both a forum for discussing the developmental agenda of the village and a justice system for resolving community conflicts. The kgotla typically adjudicate civil cases rather than criminal cases, and cases are resolved using kgotla customary law rather than state penal law. (Sacks et al., 2022, p. 85)

Figure 50. Typical Botswana kgotla (OLDitshweu, 2013).

Discourse as data source for economy design

Before moving into the experiments, it is worth reviewing the discourse about Hack4Blood produced by Spectrum Analytics. This discourse provides a type of record of how #commonize studio’s experimentalism affects the economic ideologies of partners. This project is ongoing at the time of writing, so this thesis captures the before and during rather than before and after.

There are two discourse sources for how Spectrum Analytics ideologically perceives Hack4Blood: the Hack4Blood website (n.d.) and a rejected journal paper authored independently (Mogaleemang & Mongale, 2022).

According to the Hack4Blood website:

> Hack4Blood is an ecosystem driven initiative leveraging collective creativity and innovation to solution for blood shortage crisis in Botswana. The project approach is inspired by on our cultural spirit of self-reliance and collaboration, succinctly captured in the adage 'motho le motho kgomo', which has had significant impact in the early development of our country.

I am deliberately not explaining to you what 'motho le motho kgomo' means because it was not explained to me, nor was it explained in the website or journal paper. This is the best way to allow you to share feelings of performing #commonize studio along with me. In all field experiments, I encountered language I did not know and that commons-makers often struggled to explain. This challenge impacted the two field experiments where the commons-maker and I invited workshop participants to perform peer critique (Chapters 0 and 0). In both experiments, we realised how many layers of meaning and context we needed to convey in order for peers to take a step forward together.

The rejected journal paper details this ecosystem approach in more detail:

> By framing the shortage of blood as an ecosystem challenge, Hack4Blood aims to unlock possibilities that can appear from using research, data, and technology to build informed insights and make evidence driven interventions to address the challenge. The project aims to harness system design approach to harness our collective human intelligence and resources to improve blood supply across Blood Banks and save lives.

The paper also explains that 'We reframed the problem to be more than collecting enough blood units but expanded its scope and make it about building an engaged and proactive blood donor ecosystem.'.

Both sources present ideologically agnostic language, similar to the comparison group context; that is, this ecosystem could become a neoliberal, reformist, or counter-hegemonic commons. This ecosystem could also not become a commons at all. Instead, Spectrum Analytics could seek to become the Uber for blood donation and use 'open innovation' (Chesbrough, 2003), in which the 'collective human intelligence' of the ecosystem is harvested and enclosed to create proprietary data systems for a private company. The #commonize studio experiments with Hack4Blood became, therefore, experiments in

constructing a shared economic ideology centred in reformist or counter-hegemonic commons.

Scaffolding commons-makership

I have organised this chapter differently from all other chapters in order to cover the topic of scaffolding across all pilot and field experiments. The most important research 'outputs' of #commonize studio were people, not artefacts. In this thesis, I call these people commons-makers. We engaged in action research projects with varying durability, but these commons-makers continue to pursue commons-making in their own ways. In a public-facing summary document (Appendix 4. #commonize studio summary), I refer to us as the nascent collective that is #commonize studio. Each commons-maker agreed to being listed and is featured in this summary documentation.

I have organised most phases of this chapter by commons-maker (all are he/him) and their position at the time of writing:

- Dr Rosendy Galabo, Postdoctoral Research Associate, ImaginationLancaster, Lancaster University
- Dr Markus Wernli, Research Assistant Professors, School of Design, The Hong Kong Polytechnic University (PolyU)
- Dr Badziili Nthubu, Lecturer, Botswana International University of Science and Technology (BIUST)

This chapter focuses on the scaffolding process with Drs Galabo and Nthubu. The scaffolding process with Dr Wernli has been adequately captured in Chapter 0, 'Commons model canvas'. The scaffolding process with Dr Galabo is recorded in two conference papers:

- 'A Commons Creation Framework for Co-Designing New Commons' (Galabo & Sacks, 2021)
- 'A Framework for Infrastructuring Commons Creation' (Sacks & Galabo, 2022)

The scaffolding process with Dr Nthubu is recorded in the conference paper:

- 'Botswana Blood Commons: Visualizing Blood Services as a Public-Commons Partnership' (Sacks et al., 2022).

1.73. Purpose

I have called this ARtD cycle 'scaffolding commons-makership' because the purpose that revealed itself over time was to support other people to make commons. The scaffolding

experiments I describe here are reasonably consistent because the three commons-makers in this chapter are peer design researchers. These commons-makers all possessed design research expertise but lacked commons literature knowledge. The scaffolding process primarily focused on layering these two knowledge bases together into something that was relevant and important to the commons-maker. I did engage with a more diverse range of people during my doctoral research phase, but none of these other collaborations materialised into action research within my PhD timeframe. There were so many variables at play during this period that I hesitate to extrapolate why I ended up only with other design researchers. At minimum, I had more access and exposure to other design researchers.

Overall, I would summarise the purpose of scaffolding commons-makership as 'field-building' (Eddy-Spicer et al., 2020; Farnham et al., 2020). Field-building, which originates with philanthropy, resembles institutioning in the commons-making literature, especially intermediation as institutioning (Teli et al., 2022). The objective of field-building intermediaries, which is what #commonize studio might be described as, is 'to help the field meet its evolving needs by filling key "capability gaps" across a range of disciplines.' (Hussein et al., 2017). In this sense, the purpose of this scaffolding was to grow the number of people with commons-making capabilities. Another aspect of field-building that I considered through these ARtD cycles was my role as a 'network entrepreneur', dedicated to ' developing capacity in the field and a culture of distributed leadership that dramatically increases the collaboration's efficiency, effectiveness, and sustainability' (Wei-Skillern et al., 2015). To this end, I tried to foreground commons-makers, and in some cases was entirely invisible to the rest of the community.

Dr Galabo

This collaboration was set in motion when a supervisor connected me with a peer in my department who had expressed interest in commons. Since paper publishing is a principal success metric in academia, we identified a conference that would provide the motivation to collaborate. #commonize studio has used conference papers as a motivation for advancing most collaborations.

The stated research question behind both papers was: 'How can co-design support communities to create commons?' (Sacks & Galabo, 2022). Whereas Drs Wernli and Nthubu had approached #commonize studio with a problem already identified, Dr Galabo and I spent several weeks sharing commons and co-design literatures to identify where the commons literature intersected with Dr Galabo's interests. We described our exploratory research process as follows:

> This paper considers how co-design's focus on infrastructuring can address the gap in the commons/commoning literature. First, we outline the primary framework and language used to analyse an existing commons. Second, we propose a framework to organise the infrastructuring process. Third, we review the tools created by a project to support a community to manage a library to test how this framework could be populated by socio-material structures to support commoning. Finally, we discuss how the framework could support the research agendas in both the commons/commoning and co-design fields. (Galabo & Sacks, 2021)

We settled on a retrospective problem based on a project the commons-maker completed in 2018 called Leapfrog, which was about commons-making even though no one used that term. The rationale behind this choice was explained in the papers as follows:

> In this project, the research team collaborated with library practitioners in Lancashire UK with the aim to transition half of the county's libraries into 'neighbourhood centres' that would respond to local needs. Participants co-designed a set of tools through a series of workshops to help them engage with the community to make this transition. We selected this case because, while the project did not result in a commons, the project did require participants to develop tools to address commoning that are very similar to the contextual factors of the IAD framework. (Galabo & Sacks, 2021)

At the time, I believed the purpose of developing this 'framework for infrastructuring commons creation' was to apply it to a community of interest to Dr Galabo. The primary purpose of these papers was, instead, to construct commons-making knowledge for Dr Galabo that he would activate in two years' time (after this thesis), for a UKRI-funded action research project called 'Cooperativa Digital' (n.d.).

Dr Nthubu

Dr Nthubu was introduced to me by Dr Galabo, who knew each other because they had completed their PhDs at ImaginationLancaster prior to my arrival. Dr Nthubu was now a lecturer in Botswana. Dr Nthubu came to the scaffolding process with a specific commons in mind, the 'blood donation ecosystem' as he called it (Nthubu, 2022). In this case, we built upon Dr Nthubu's previous work on ecosystem visualisation and the framework he created for this process, Jigsaw Framework (Nthubu, 2021). Dr Nthubu had previously used this Jigsaw Framework to perform ecosystem visualisation for small business development in Botswana, and we extended the process to the Botswana blood donation ecosystem in the paper. The research question behind the paper we wrote was: 'What role can the commons play in improving citizen trust in healthcare services?' (Sacks et al., 2022). The paper abstract best summarises the purpose of our collaboration:

> We explore this question in the context of the chronic blood supply shortage in Botswana, where the Indigenous kgotla village governance system operates alongside the republican state. To address barriers to trust in the blood services ecosystem, we review the public-commons partnership model as a commons ecosystem model that could support participatory design of blood services between the kgotla and state. We apply this model to the ecosystem mapping tool used in the Jigsaw framework, a method previously used in Botswana to support ecosystem visualization, to prompt state consideration of this alternative public-commons partnership as a solution to the blood supply shortage. We also explore the re-visualized ecosystem as a pluriversal commons, where the kgotla and state cosmologies must interact to solve the collective action challenge of blood supply. (Sacks et al., 2022, p. 84)

In short, the scaffolding process entailed the weaving together of Dr Nthubu's knowledge about ecosystem visualisation with my knowledge of commons literature.

1.74. Plan/Design

The plan/design phase was similar for all commons-makers. I shared commons literature and the commons-makers shared literature from their domains. Each paper drew on a different combination of commons literature concepts. For each paper, we also had to select a design method as the foundation for commons-making infrastructure. The papers with Drs Galabo and Nthubu built on the design methods they had developed, while the paper with Dr Wernli built on a widely used design method created by others.

Dr Galabo

Commons literature. These two papers were my first attempt at scaffolding commons-makership and at presenting to design research audiences. The papers draw on the design principles, IAD framework, and choice levels. The way that we chose to explain these concepts is already documented in Chapter 0. The primary challenge for each of these concepts was deciding how to present them. For the IAD framework, we chose to present a simplified version developed later by Ostrom (Ostrom, 2010) rather than the original version (1990) that is still used by some scholars (Anderies & Janssen, 2013). For the choice levels, we decided to use this phrase instead of 'arenas of choice' (McGinnis, 2011). For the design principles, I created an original set by compiling language used in posts on *Medium*. Both papers were accepted with minimal revisions, and reviewers generally commented that the paper was clear. This early critique certainly motivated me to continue and indicated that we were on the right track.

Design methods. There were two sources for design research methods in this experiment: the commons-maker's doctoral research that yielded an 'improvement matrix' for creative engagement (Galabo & Cruickshank, 2022) and the tools created as part of the Leapfrog project (Cruickshank et al., 2017; 'Tools & Toolboxes', n.d.). Dr Galabo locates the improvement matrix as a design method within the fields of co-design and creative engagement. The improvement matrix for creative engagement (Figure 51) comprises three 'layers' and three 'dimensions'. The layers refer to co-design functions: planning, facilitating, and doing. The dimensions refer to tool properties: instruction, functionality, flexibility. The tools created for the Leapfrog project are drawn from a range of design research methods (Figure 52). The three tools explored in the papers could be located within modern service design.

Dimensions / Layers	INSTRUCTION	FUNCTIONALITY	FLEXIBILITY
PLANNING Design	Challenge/Briefing	Interaction models	(Build) Resilience
ENABLING Facilitation	Facilitator notes	Resources produced by facilitators	(Encourage) Facilitator response
DOING Application	Example or use notes	Design of material	(Enable) Contrary activity

Figure 51. The Improvement matrix created by the commons-maker (Galabo & Cruickshank, 2022, p. 511).

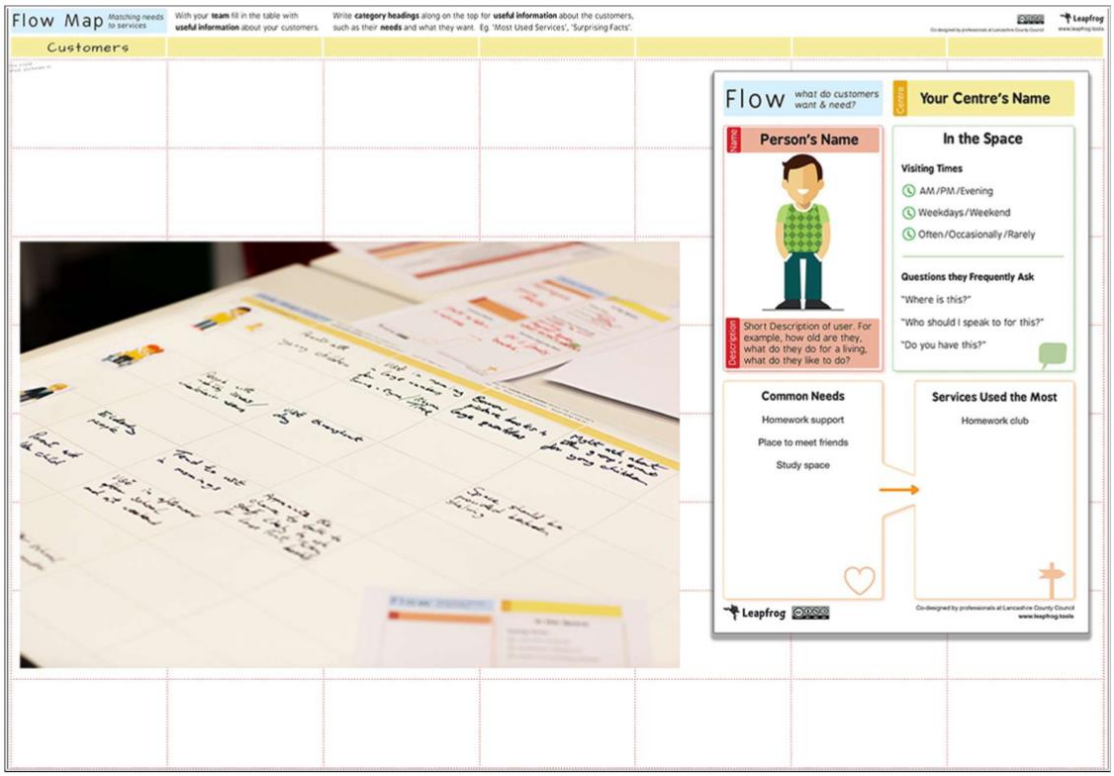


Figure 52. Example of a Leapfrog tool. This tool is called Flow Customer, created to help librarians understand how to meet the service needs of the diverse groups within the community (Sacks & Galabo, 2022).

Commons literature. The Botswana blood commons presented a type of ecosystem of actors. For this experiment, I identified the public-common partnership model (Figure 53) developed by Milburn and Russell (2018, 2019) as a starting point for iteration, a way to use the concept of polycentricity from the commons literature (Ostrom, 2010; Ostrom & Parks, 1999). Adapting this theoretical model for the Botswana blood commons revealed a number of problems, yet it provided a useful foundation from which to iterate. There are three ecosystem actor groups in this model, each of which comprises one-third of a board that controls a joint enterprise:

- Common association,
- Local authority, and
- An unlabelled box on the top of the model I later term 'Other stakeholders' (e.g. trade unions, university experts, etc.).

The key institutional jump in this model is the formation of a 'common association', some type of institution that can legally represent the members of the commons.

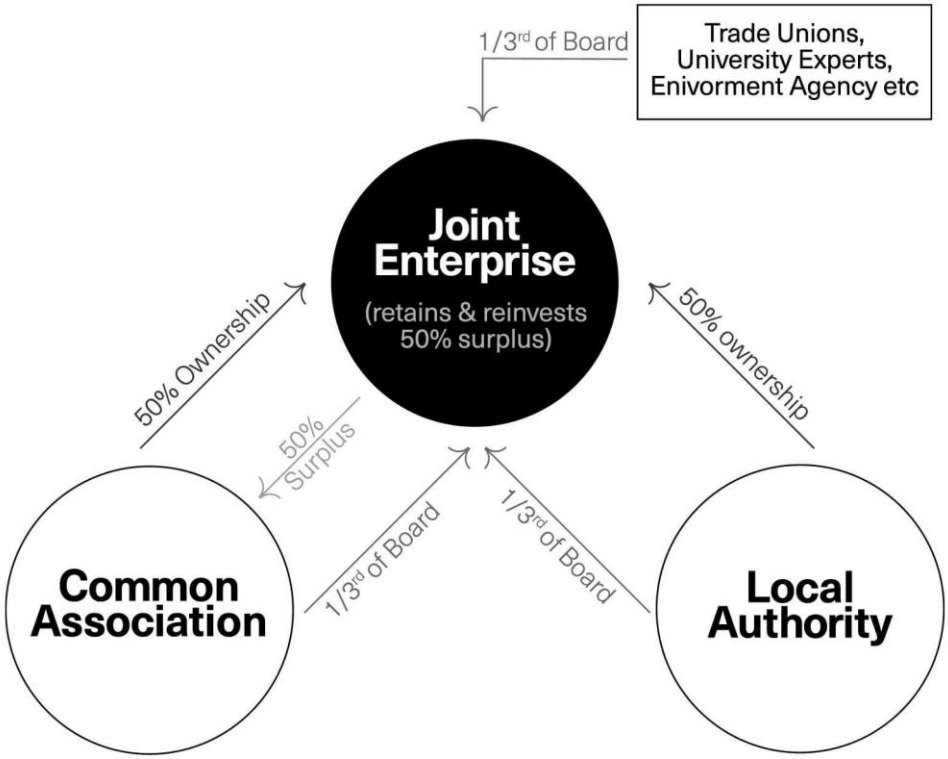


Figure 53. Public-common partnership model (Milburn & Russell, 2018, 2019).

Design methods. This experiment sought to build on the commons-maker's design framework, which he called Jigsaw Framework (Figure 54). Within this larger Jigsaw framework, we focused on the methods used in the first step, 'Initiate', which we described as, 'Promoting dialogue and formulating criteria for engaging other actors.' (Sacks et al., 2022, p. 86). We proposed using the position-generator method (Lin et al., 2017) to map the ecosystem, and the choice levels concept from the commons literature as a way to categorise these social ties. We also specifically considered how this ecosystem mapping might engage with pluriversal design:

> The ecosystem mapping tool was developed based on the longstanding position generator method (Lin et al., 2017) to identify stakeholder positions and measure connection strength between stakeholders. This approach was selected and adapted to address gaps identified in previous ecosystem mapping workshops with Botswana SMEs [small and medium-size enterprises], namely, the need to align diverse ecosystem worldviews (Nthubu, 2021). (Sacks et al., 2022, p. 87)

1.75. Act/Make

The act/make phase for Drs Galabo and Nthubu was similar to the process with Dr Wernli. I could summarise this act/make process as three phases:

1. Share literatures
2. Construct models based on commons-maker's domain expertise
3. Evaluate/critique ideas

For the first phase, Share literatures, three questions emerged that might inform future experiments:

- What are the commons-maker's entry points to commons literature?
- What literature does #commonize studio suggest?
- What literature does the commons-maker suggest from their domain?

> The second and third phases have taken less consistent forms between commons-makers.

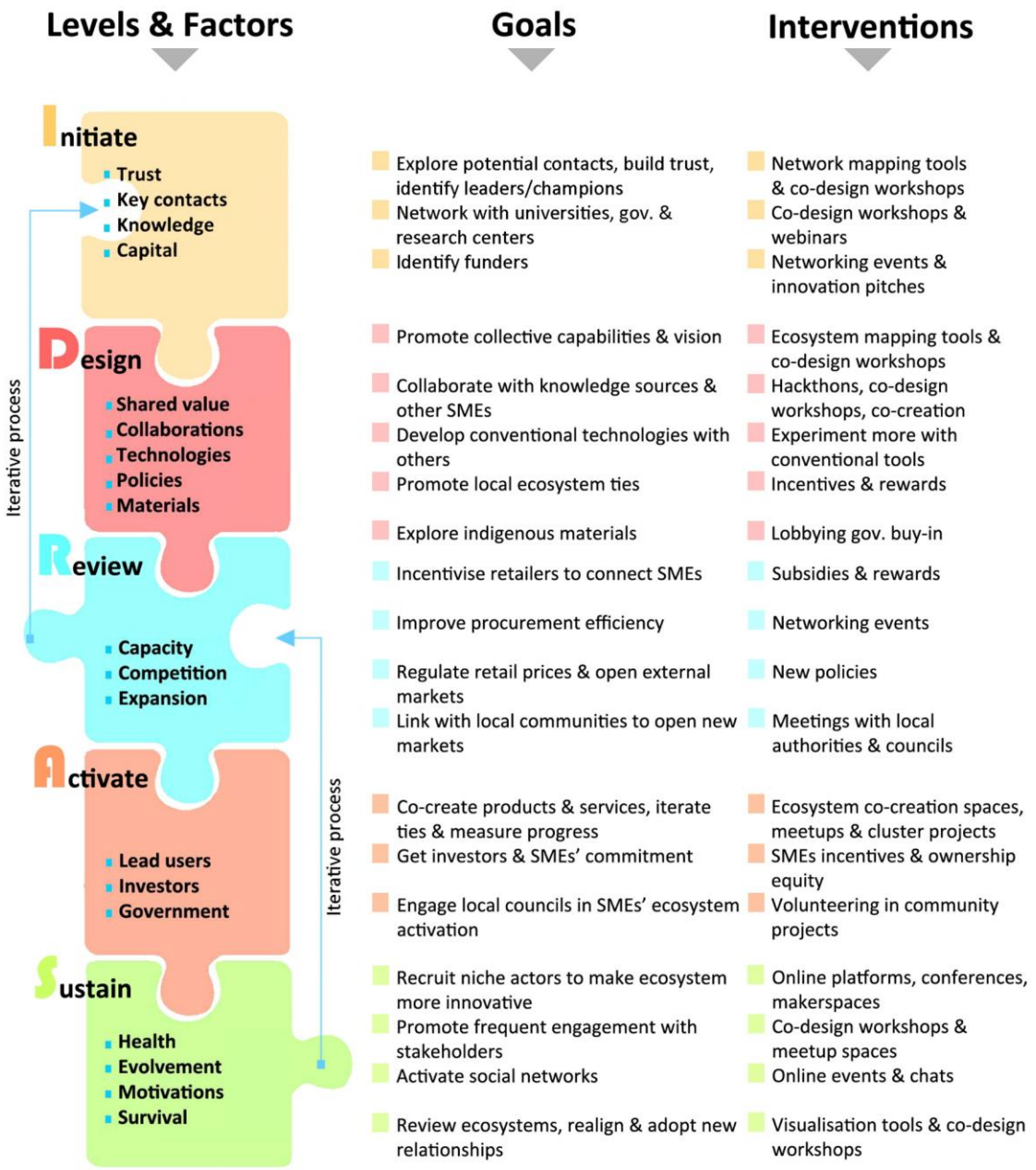


Figure 54. Jigsaw Framework developed by commons-maker (Nthubu, 2021). We focused on the first piece, Initiate.

Dr Galabo

For the first phase, the commons-maker's entry point to commons literature was *Commonism: A New Aesthetics of the Real* (Dockx & Gielen, 2018). The book explores counterhegemonic politics of the commons but none of the analytical concepts that #commonize studio uses. The primary literature I suggested at this time was *Sustaining the Commons* (Anderies & Janssen, 2013). I recommended this book over *Governing the Commons* (Ostrom, 1990) because it is freely available as PDF or EPUB, it has been written expressly for undergraduate students so is easier to digest, and it remains close to Ostrom's

original discourse. The commons-maker shared a number of papers about co-design, his domain expertise, which were new to me at the time. The literature we found useful was cited in our papers, e.g. co-design (Iversen & Dindler, 2014; R. C. Smith & Iversen, 2018), infrastructuring and design Things (Björgvinsson et al., 2012), and framing (Lawson & Dorst, 2009; Paton & Dorst, 2011).

For the second phase, the papers document the construction approaches that combine commons concepts with the commons-maker's Improvement matrix. In the second paper, we articulate this construction as a 'framework for infrastructuring commons creation' comprised of two steps or matrices (Figure 55). The first step is a commoning matrix that incorporates ideas from the IAD framework and choice levels (Figure 56). The second step or matrix is the Improvement matrix previously developed by the commons-maker (Figure 51). In principle, commoners can use the commoning matrix to help them identify tools to use to support commoning, and they can use the Improvement matrix to help them adapt these tools to their context.

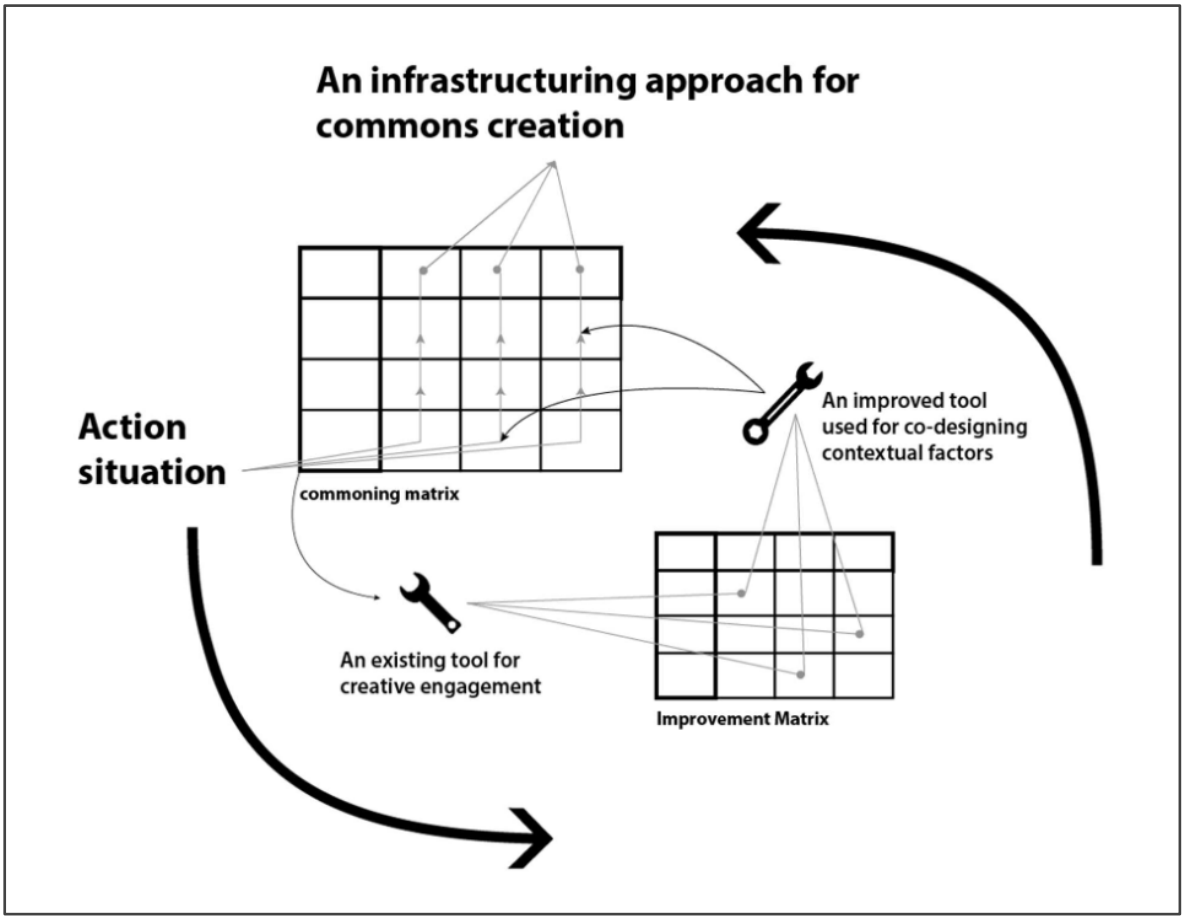


Figure 55. Visualisation of the 'framework for infrastructuring commons creation' (Sacks & Galabo, 2022).

Action Situation: Repair damaged toy			
Factors / Choice	Rules-in-use	Biophysical conditions	Community attributes
Constitutional	Who should be involved in making this policy?	Should we buy toys that are harder to damage?	Do we have members with repair skills?
Collective	What toy repair policies will we put in place?	How will we acquire repair materials?	How can we help members repair toys?
Operational	How will we enforce our toy repair policies?	How do members use repair materials?	How do members get repair materials from the library?

Figure 56. Commoning matrix. The top row names the action situation. The x-axis is contextual factors from the IAD framework. The y-axis is choice levels.

Factors / Choice	Biophysical conditions	Community attributes	Rules-in-use
Constitutional		How would the community know if a member has repair skills?	
Collective		How will we connect members with repair skills to members with damaged toys?	
Operational		How will a member with a damaged toy convey the toy to the member-repairer?	

Figure 57. Speculative commoning matrix for Flow Customer tool (Sacks & Galabo, 2022).

Dimensions / Layers	Instruction	Functionality	Flexibility
Planning	Describe how the tool can enable two-way communication		
Enabling	Written instructions to enable creative dialogue		
Doing	Replace customer with 'member'		

Figure 58. Speculative Improvement matrix for Flow Customer tool (Sacks & Galabo, 2022).

The third phase, evaluate/critique ideas, was conducted as reflection-in/on-action in the papers. We evaluated our artefact by speculating how we would use three service design tools from the Leapfrog project. For example, we selected the Flow Customer tool (Figure 52) to explore the contextual factor called 'community attributes' in the commoning matrix (Figure 57). We then considered how to improve the tool using the Improvement matrix (Figure 58). In the Flow Customer example, we considered how the instructions might be improved to support commoning, e.g. changing the word 'customer' to 'member' to reflect the different relationality of a commons to a public or private sector service.

Dr Nthubu

For the first phase, the commons-maker had not read anything but had been referred to #commonize studio by Dr Galabo. By this point in my research, I was able to direct the commons-maker to my published conference papers to explain commons. I ultimately whittled the literature for the commons-maker down to one paper, 'A Framework for Infrastructuring Commons Creation' (Sacks & Galabo, 2022). The commons-maker needed #commonize studio to engage with two literatures: his research leading to the creation of the Jigsaw framework (2021, 2022) and papers explaining the Botswanan context (Moumakwa, 2011).

For the second phase, our paper took the reader methodically through our construction process better than I had done in previous papers. The first step was changing the generic actor labels from Figure 53 with appropriate labels for this public-common partnership (Figure 59). 'Local Authority' became National Blood Transfusion Services (NBTS) and 'Common Association' became an imaginary 'Kgotla Association'. We also had to confront components of the generic model that were inappropriate for this context. For example, 50 percent of any surplus returns to the Common Association in the generic model. What does that mean in this blood commons? In the paper, we propose:

> …one way to resolve some of the barriers raised earlier is to guaranty the Kgotla Association, and each kgotla within this association, that some share of blood donated by the community will flow back to the community. In commons parlance, this might address fears about the "free rider" problem (Olson, 1965), where some communities receive blood from the commons while donating nothing.' (Sacks et al., 2022, p. 90)

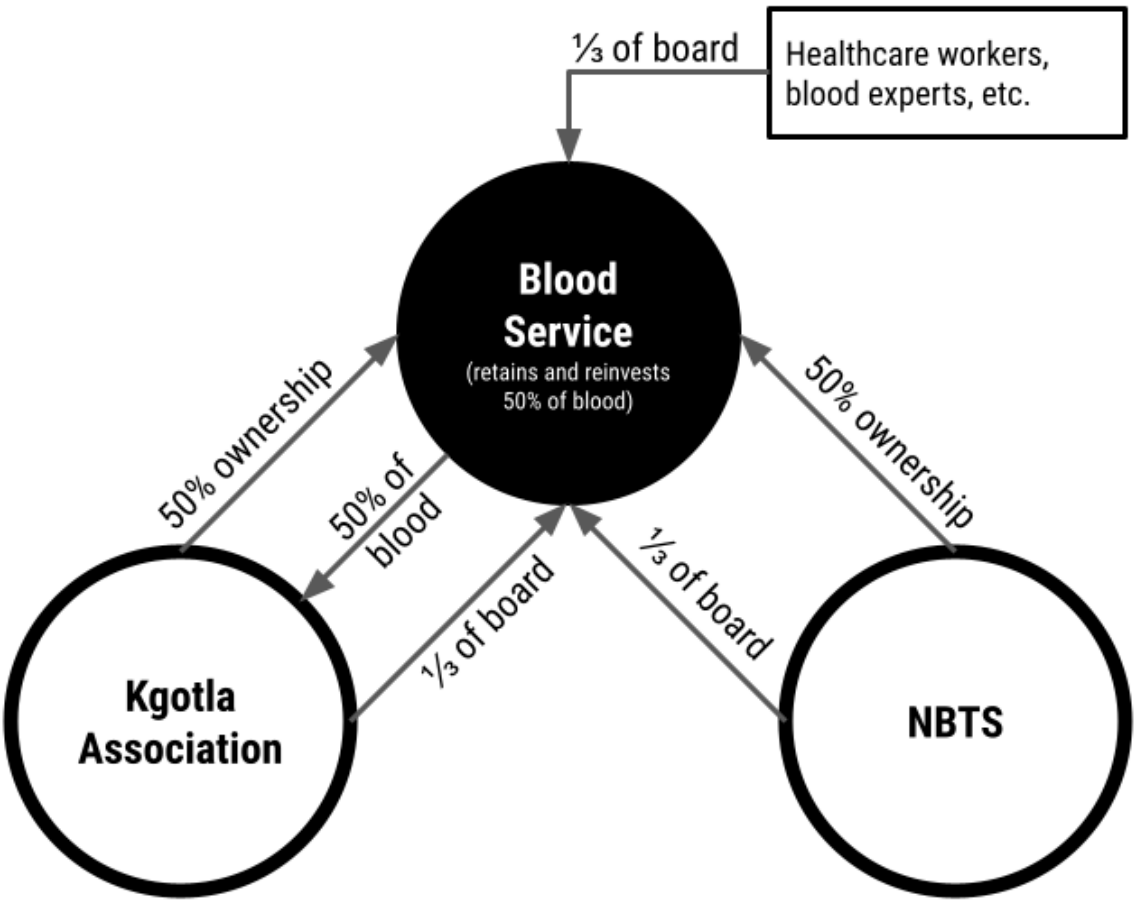


Figure 59. Adaptation of the generic public-common partnership model for this blood commons (Sacks et al., 2022).

The next steps transposed this public-common partnership onto the ecosystem mapping tool of the Jigsaw framework. In short, we transposed the choice levels onto the original ecosystem mapping tool (Figure 60) and then zoomed out to show how this process might be repeated with the other actors in the public-common partnership. We briefly narrated how the mapping process might work for the Kgotla Association:

> In this example, each kgotla (constitutional-choice level) might elect a group of people to participate in the Kgotla Association (collective-choice level), and one person from this group may then participate in regular Blood Service meetings (operational-choice level). (Sacks et al., 2022, p. 90)

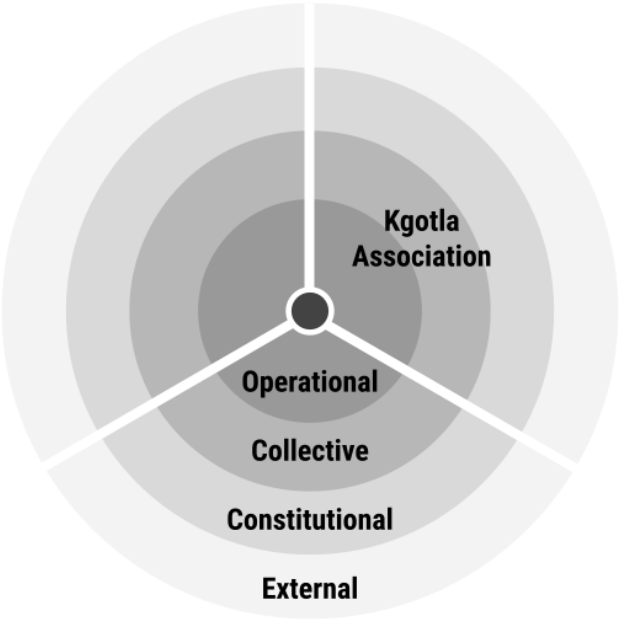


Figure 60. Application of choice levels to the position generator method used in the Jigsaw framework (Sacks et al., 2022).

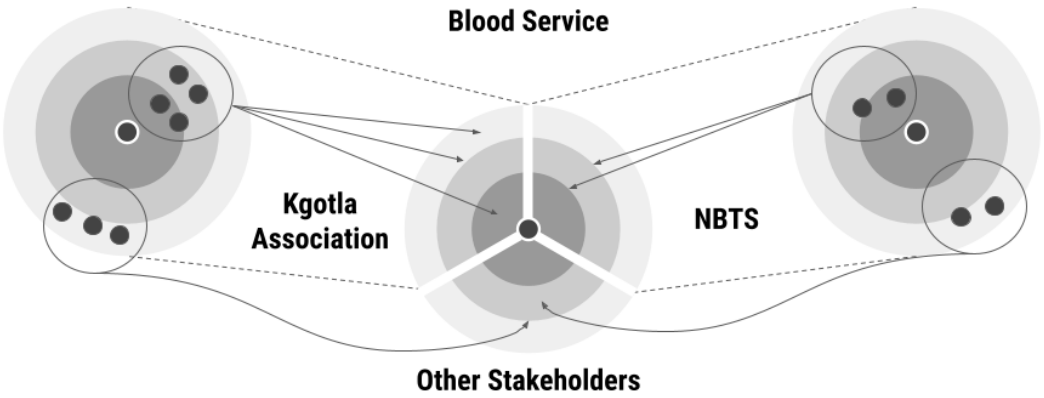


Figure 61. The final iteration of the Jigsaw framework visualisation tool, in which separate mapping processes combine to form the blood services ecosystem map (Sacks et al., 2022).

1.76. Observe

Scaffolding commons-makership led to similar artefacts, conference papers. Each commons-maker took different next steps, but overall the scaffolding process improved the commons-makers' ability to engage other stakeholders in commons-making.

Language/Ideas

The collaboration with Dr Galabo generated two important observations. The first is novel ways to describe commons-making through the lens of co-design, which are described in more detail in Relationships/Subjectivities. The second is the care required for naming action situations, which would eventually develop into 'action situation statements'. In the papers, we name the action situation as 'Repair a damaged toy from the toy library' (Galabo & Sacks, 2021) or 'Repair damaged toy' (Sacks & Galabo, 2022). This action situation name is intended to focus commons-making to a more specific set of interactions, versus, say, what the community does when a member loses a toy.

For the collaboration with Dr Nthubu, we identified one of the most profound insights that I think might inform future #commonize studio experimentalism:

> Numerous commons scholars have researched kgotla as commons, dating back to at least the 1990s (Poteete, 1999); however, this research focuses on kgotla management of natural resource systems like grazing land (DeMotts et al., 2009; Makepe, 2006). There is no known commons literature that extends kgotla practices beyond natural resource management to social policy areas like blood services. (Sacks et al., 2022, p. 85)

The kgotla system signifies an intact community governance system that could inspire Global North scholars and commons-makers. Milburn and Russell's public-common partnership model must imagine a common association that rarely exists in the Global North. Meanwhile, the kgotla are formally represented in the Botswanan central government as the House of Chiefs. The foundation for a common association already exists.

Relationships/Subjectivities

For the collaboration with Dr Galabo, we addressed the relationship between co-design and commons. First, the commons-maker generated this pithy statement to describe commons-making: 'a commons is a product of constant co-design by commons members' (Galabo & Sacks, 2021). Second, the commons-maker described commons-making through the lens of co-design discourse:

> In co-design events, a community of people work together to make sense of their current situations and co-create ideas using familiar elements that enable them to be creative in their own social practice. In the case of commons creation, co-design might focus on creating design structures that support creation of the physical, digital, and institutional infrastructures of a commons. (Sacks & Galabo, 2022)

Third, the commons-maker helped us construct commons knowledge within current scholarship on design things and infrastructuring. These descriptions resonated with paper reviewers and continue to be used and cited in subsequent papers.

For the collaboration with Dr Nthubu, the primary shift was expanding the possibility of resource governance from NBTS to a more polycentric model involving kgotla in a way that felt pragmatic rather than idealistic. Current engagement between NBTS and kgotla was unidirectional, where the kgotla are used to boost participation but do not govern any part of the service.

Collective action

The most important observation about collective action is that there may be a significant gap in time between a scaffolding process and collective action. Be patient!

My collaboration with Dr Galabo compelled me to revise what I thought collective action might look like with commons-makers. In our papers, we wrote that 'Further research could explore adaptations to the framework and learning from application by communities seeking to create a commons' (Galabo & Sacks, 2021) and 'Another further project involves sharing this framework with commons scholars to discuss ongoing improvement' (Sacks & Galabo, 2022). The commons-maker performed neither of these steps, so I believed that perhaps our collaboration had generated no collective action. Instead, the commons-maker identified a research grant to advance commons-making. In summer 2023, we developed a successful research bid expressly addressing commons-making, 'Cooperativa Digital' (n.d.). The scaffolding process had given the commons-maker the foundation required to advance commons-making research, albeit two years after our scaffolding process.

My collaboration with Dr Nthubu also led to collective action many months after the scaffolding process and publishing the paper. In this instance, the gap between paper and action was in part due to the behind-the-scenes work by the commons-maker to advance the ideas presented in our paper. The scaffolding process equipped the commons-maker to engage with other stakeholders to advocate for this approach, and the paper acted as a concrete vision that showed how other stakeholders might collaborate with us.

Artefacts

Scaffolding commons-makership with all three commons-makers produced conference papers as artefact, an artefact that is clearly more relevant to commons-making researchers at universities than for other people. These papers differed considerably in content and objective. The two papers with Dr Galabo developed commoning infrastructure for a speculative commons. The paper with Dr Nthubu acted as a visioning exercise for the

creation of a real commons based on an existing situation. The paper with Dr Wernli, captured in Chapter 0, was reflection-in-action to create a design method to use with real commoners. As a collection, they demonstrate that scaffolding commons-makership can take many forms. The only consistent lesson is that conference papers are a better fit for scaffolding with commons-making researchers, as conference papers generally invite this more exploratory, theoretical work.

1.77. Reflect/Critique

The primary source of critique across these scaffolding experiments was paper reviewer comments. The conferences for which these papers were produced all took place during the Covid-19 pandemic and generated no critique. The format for all conferences (EAD, IASDR, PDC) entailed pre-recording a 10-minute paper presentation, playing this presentation during the virtual paper session, and then fielding one question from the moderator. In the future, conferences may provide a better forum for peer critique or interim review.

Dr Galabo

Both of our conference papers were accepted with minimal corrections, which was an early validation for #commonize studio. Reviewers commented that the papers were 'well argued…and justified', 'relevant', 'coherent', 'precise', and 'an important topic as humanity transitions to new ways of being and doing'. One comment captures the gist of positive and negative feedback across the two papers:

> One of the key strengths of this paper is the simplicity of the proposed framework and its potential to instigate conversations about the relations and alignment of the co-design literature/approaches with the literature on the creation of commons. Having said that, one of the key limitations of the paper is that these reflections are currently at a very basic level. At the current stage of the development, the proposed framework may be a bit too crude and abstract to capture the complexities of commoning process.

With each #commonize studio ARtD cycle, I was reminded of the challenge of moving from theory to practice. That is why the research question for Part C is: How can these two literatures support *commons-makers*? In this case, the commons-makers are also design researchers, but this will not always be the case. The artefacts discussed in this chapter were useful for scaffolding commons-*makership*, the capacity for commons-making, but none of them could be used for commons-*making*.

Dr Nthubu

This conference paper scored the highest with paper reviewers and received the most positive reviews of all the conference papers I produced. The first reviewer nicely summarised the polemics the paper raised, demonstrating that we had successfully communicated the complexity of our proposed public-common partnership:

> For those outside the matter, the presentation of the kgotla in the country of Botswana, in itself, is novel, both as questions are raised for an extraordinary use of it, with reflections on the difficulty of saving the politicized comprehensive framework imposed by ideas such as ecosystems, the idea of revising the services of donation and blood supply common ecosystems, from local ways of acting, unfolds an interesting dialogue between the knowledge of the North, and traditional ecological knowledge.

Among the first reviewer's critique, one point stood out in particular:

> … it would be very valuable to capture some reflections on the possible scenarios after the revisualization exercise proposed by the text … about whether there may be alternatives to the idea of 'ecosystem', pre-politicized, due to its institutionalization from the western concept of ecosystem that would be the only one in reality.

We had not considered the politics and framing of 'ecosystem'. In future experiments, it is worth considering how other actors, particularly coming from other cosmologies, describe such systems.

Finally, the first reviewer presented one question that has since become a much more important feature of #commonize studio experiments:

> When speaking of the pluriversal encounter in different ways of 'being', is not, perhaps, a basic asymmetry established between the thought from which the idea of PD arises, and also that of being, could there not be equivalents in local words of these?

I describe in Chapter 0, action situation blocks, the potential downside of spending time explaining commons in a workshop with NBTS. On reflection, I recognise that a better approach might be to use the language and ideas already understood locally, rather than try to create equivalency with English terms. I include this observation in Chapter 1.106 as 'Activating existing language'.

Commons model canvas

The commons model canvas is an attempt to adapt the well-known Business Model Canvas to support 'start-up commons'; that is, people trying to create commons instead of capitalist enterprises. The name consistently provoked interest, positive and negative. Did the term 'commons model canvas' destabilise capitalist meaning or did it subjugate commons to capitalist logic?

1.78. Purpose

The commons model canvas served two purposes, which I later termed 'internalising' versus 'externalising' processes. I developed these terms from reflecting on the critique offered during the PDC22 workshop. Internalising processes support commoners to strengthen their commoning practices. Externalising processes support commoners to engage non-commoners, such as funders and local government workers.

The internalising purpose of the commons model canvas was to shift commoner subjectivities. As the pilot project neared the end of its university-funded term, the commons-maker was concerned about how the commoners might sustain Soil Trust without PolyU. In principle, the commoners possessed all of the contextual factors for sustaining Soil Trust, but members still turned to the commons-maker for leadership and operational oversight. The commons model canvas might be one way to shift subjectivities by engaging members in developing shared wisdom and vision for their commons.

The externalising purpose of the commons model canvas was to raise bridge funding, to use a start-up term. The university pilot funding covered the major start-up costs for the commons, which included the time of the commons-maker to develop low-cost or free solutions to sustain the commons. These solutions ranged from sourcing bokashi containers to bokashi bedding ingredients like eggshells and rice bran. The commoners would need to continue to navigate how to source these ingredients. Bridge funding would offset costs for these ingredients while commoners developed their own solutions.

In Dr Wernli's words:

> Launched in November 2021, the Soil Trust organizers are exploring ways to extend the bokashi field trial since initial research funding expires in spring 2022. This CMC [commons model canvas] research responds to the organizers' need to justify this fledgling, soil-building commons to insiders and outsiders (including the government), find ways to sustain its care practices (by redistributing responsibilities), secure new funding (or substitution models), and tailor follow-up interventions with the insights

> gained (since soil health depends on long-term commitment). The CMC was developed to evaluate and stimulate the self-enabling processes involved for equipping people with agency to self-manage place-bound, pluriversal commoning. (Sacks & Wernli, 2022b)

This statement is paraphrased in the publicly accessible workshop abstract (Sacks & Wernli, 2022a, p. 227).

The overall research question of this unpublished manuscript, which guides this experiment, was: 'How can we adapt the Business Model Canvas to support the emergence of pluriversal commoning?' (Sacks & Wernli, 2022b). This research question, therefore, built on pluriversal design work conducted in previous experiments (Chapters 0 & 0) to explore a different design method, the Business Model Canvas.

1.79. Plan/Design

The plan/design phase took place over several months and became a studio experiment in its own right, experimenting with a process for co-designing a design artefact through problem-posing (Freire, 2014) in order to re-frame or counter-frame commoning. We used Google Slides as our joint sketchbook and created 48 slides before the act/make phase.

Three sets of examples illustrate our reflection-in-action process. Early on, we focused on articulating the many social practices of Soil Trust. The commons-maker created two slides (Figure 62, Figure 63) to help me understand Soil Trust, combining practices with a timeline. The complexity of this figure led us to a realisation that we should think about Soil Trust as nested commons (design principle #8). We created slides (Figure 64, Figure 65,) to represent this nesting, which the commons-maker called 'commonscaping'. In these slides, the commoners engaged in making bokashi are connected to but separate from the commoners that make mulch for the farm.

Finally, we iterated considerably on one-page formats (Figure 66). We eventually settled on the Business Model Canvas as our visual point of reference. We created multiple arrangements that sought to move away from the strict rectilinearity of the Business Model Canvas but ultimately settled on this rectilinear format because it is easy for people to reproduce locally.

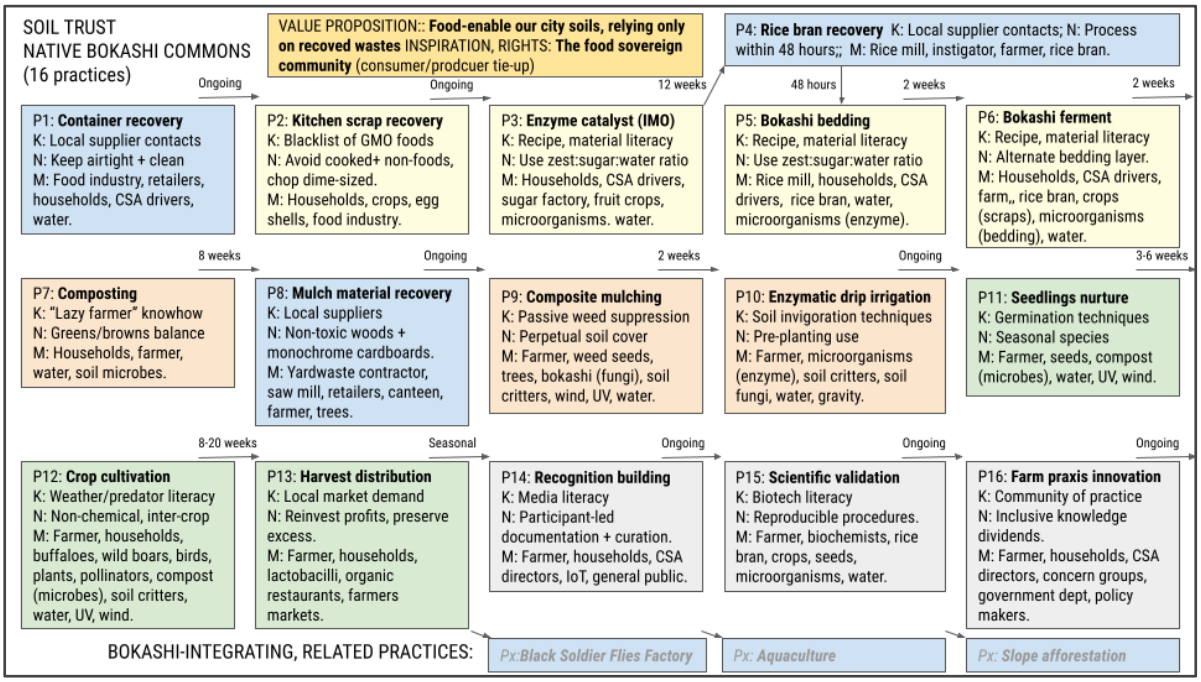


Figure 62. Initial visualisation by commons-maker, with practices contained in boxes moving chronologically from left to right and top to bottom.

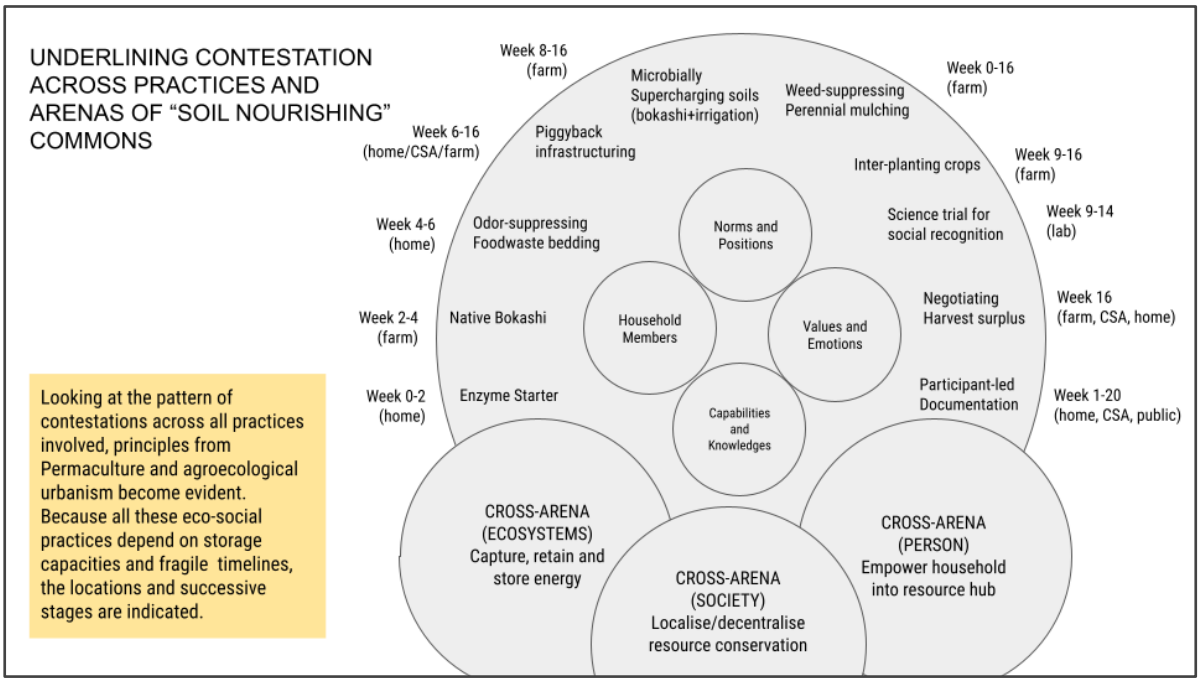


Figure 63. A visualisation of the many Soil Trust practices by the commons-maker.

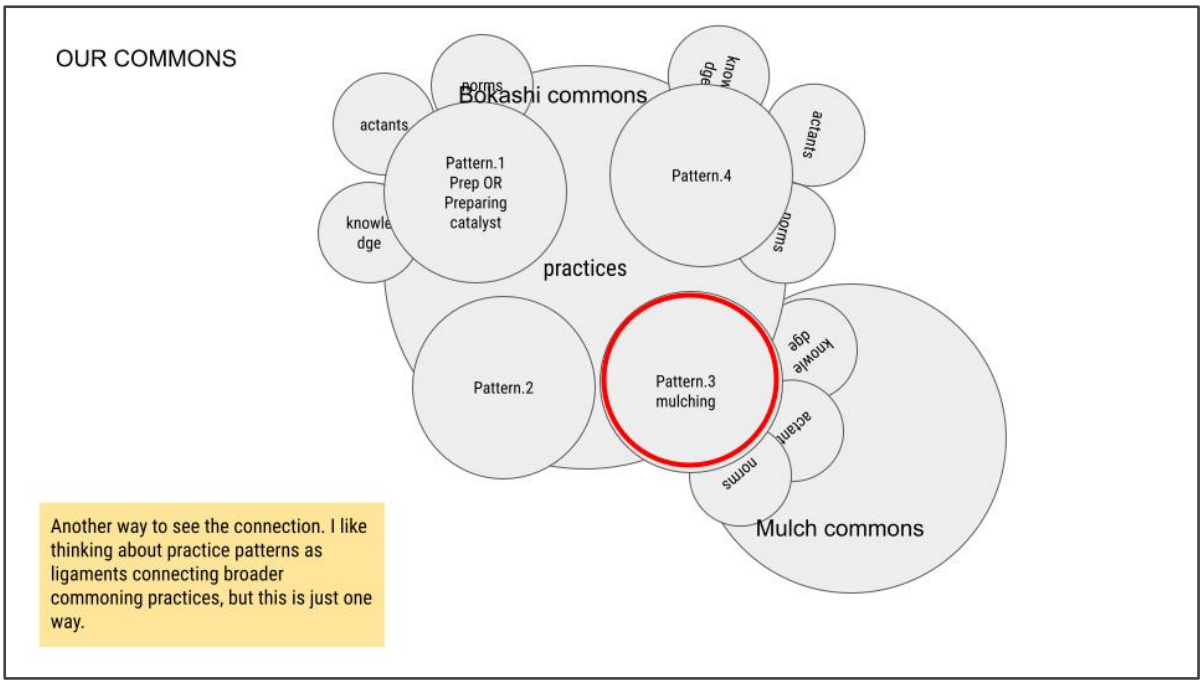


Figure 64. In this visualisation of Soil Trust as a nested commons, there is a core set of practices from which a number of patterns' emerge, such as mulching and making bokashi.

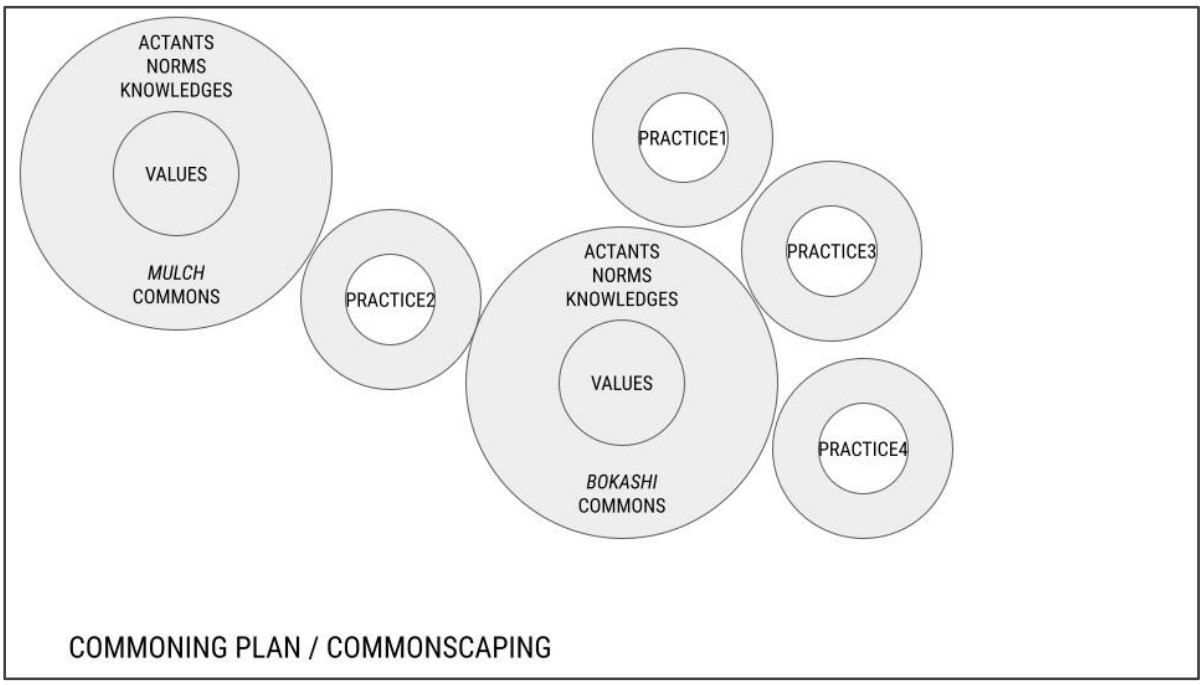


Figure 65. The commons-making visualises the bokashi commons as four practices, and 'practice 2' connects it to a commons that makes mulch; the commons-maker called this 'commonscaping'.

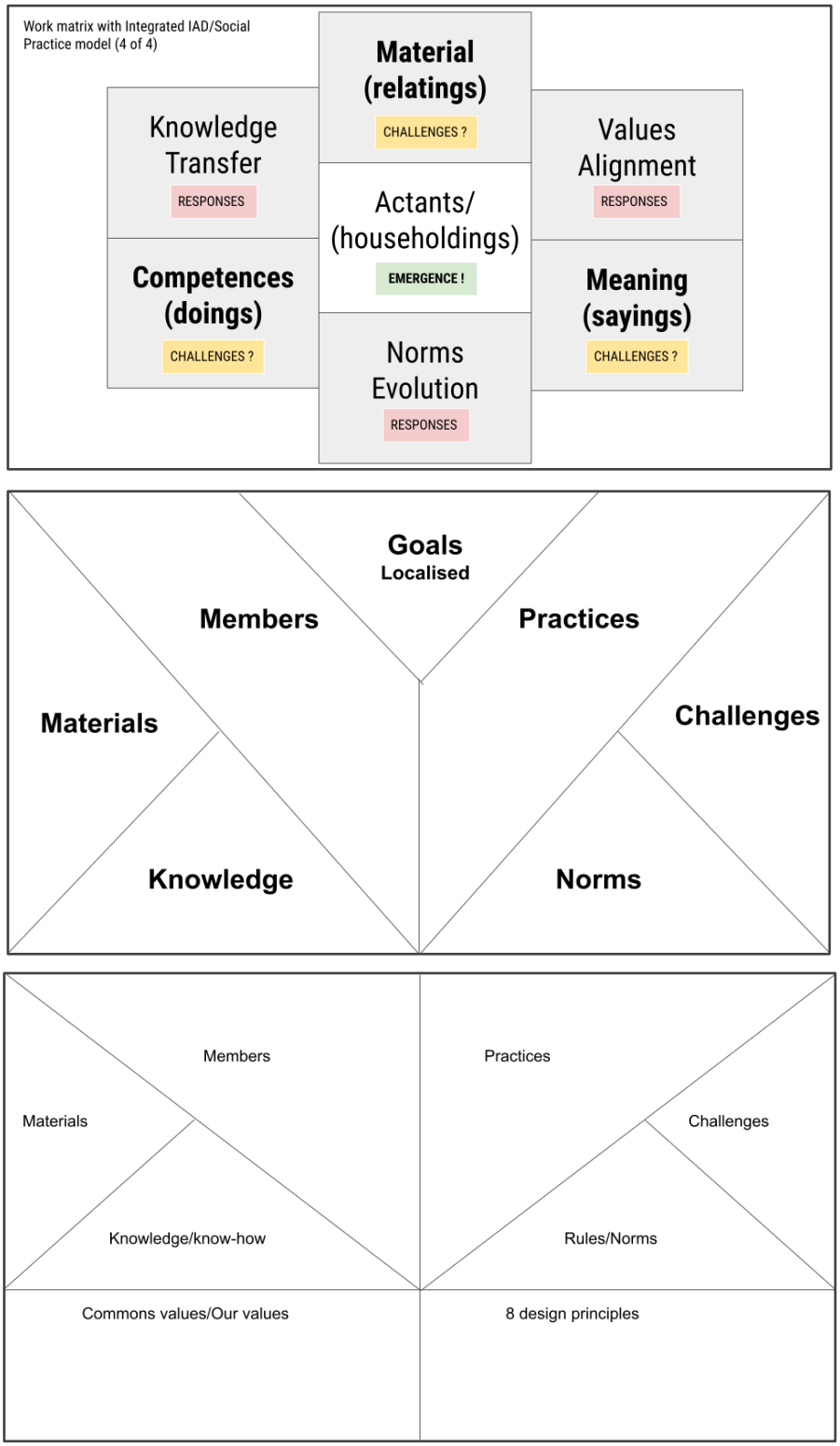


Figure 66. One-page iterations of the commons model canvas: (top) visualizing social practice theory, (middle) representing categories with a less rectilinear aesthetic, (bottom) incorporating design principles for managing commons.

Commons literature

Our starting point for re-framing commoning was existing commoning frameworks. How do they currently frame commoning, and what needs to change to support the emergence of pluriversal commoning? The prevailing frameworks in the commoning literature (Chapter 1.8) frame humans as separate from nature. Non-human nature is labelled as 'biophysical conditions' in the IAD framework and 'resource systems' and 'resource inputs' in the SES framework.

These frameworks therefore elicited a participatory design challenge: *who/what* are the actors in these frameworks and *whose* action situations are the subject of this co-design process? The implicit assumption in commoning frameworks is that only humans can be actors and that only human action situations matter. One can easily imagine re-labelling the SES framework inputs with a pluriversal lens, e.g. 'actors' becomes 'human actors' and 'resource systems' becomes 'ecosystem actors'. The participatory design challenge here is a discourse challenge. How can we re-frame the discourse of commoning frameworks to support pluriversal commoning?

Within the commoning literature, we found the work of scholars adapting these frameworks to address power and equity to be the most useful. The best example we found was the Critical IAD (CIAD) framework (Whaley, 2018) (Figure 67), which was in turn developed from the 'politicised' IAD framework (Clement, 2010). In short, the modification made in these frameworks seek to draw attention towards the 'hidden and even invisible aspects of the social world' (Whaley, 2018, p. 145).

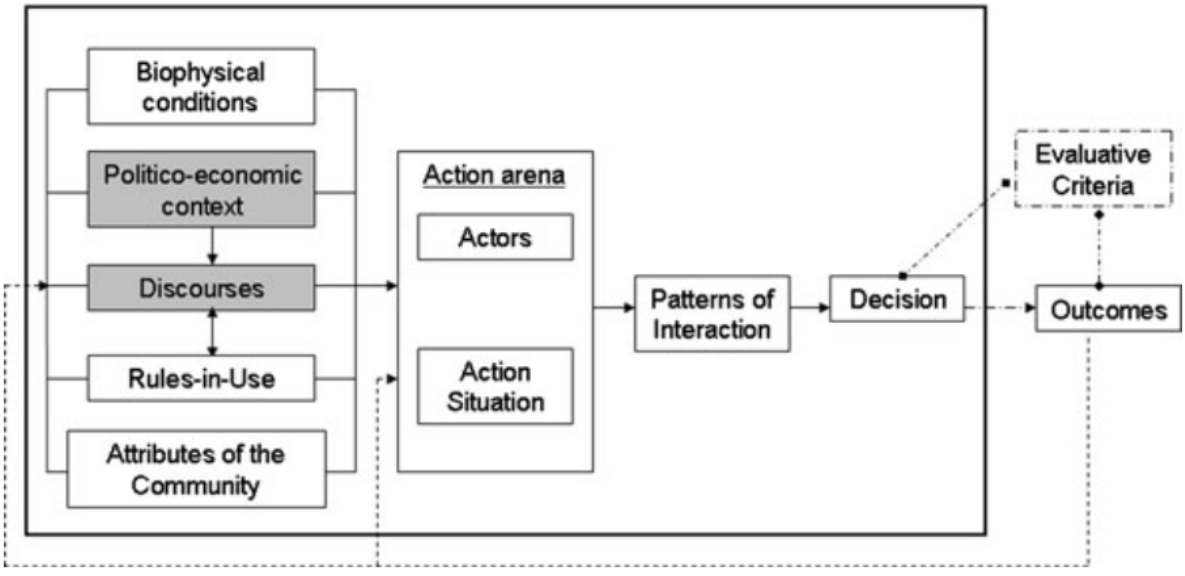


Figure 67. Critical IAD (CIAD) framework (Whaley, 2018).

Design methods

The principal design method used for this experiment was co-design rooted in the Business Model Canvas.

We started with the Business Model Canvas (Figure 68) because it is a respected and widely cited business development tool (Osterwalder & Pigneur, 2010). The Business Model Canvas is also used in applied design, particularly service design (Stickdorn et al., 2018). The Business Model Canvas visually represents an overall business model, or business logic, on one page. The success of the Business Model Canvas is rooted in the re-framing of business modelling as a collaborative, interactive, and visual process. It is worth noting that Osterwalder's (2004) PhD thesis title that originated the Business Model Canvas is, 'The Business Model Ontology: A Proposition in a Design Science Approach'. Re-framing the Business Model Canvas for a commons means re-framing ontology, not only between human members but also, as Soil Trust sought to do, between humans and non-humans. What is a pluriversal commons model ontology?

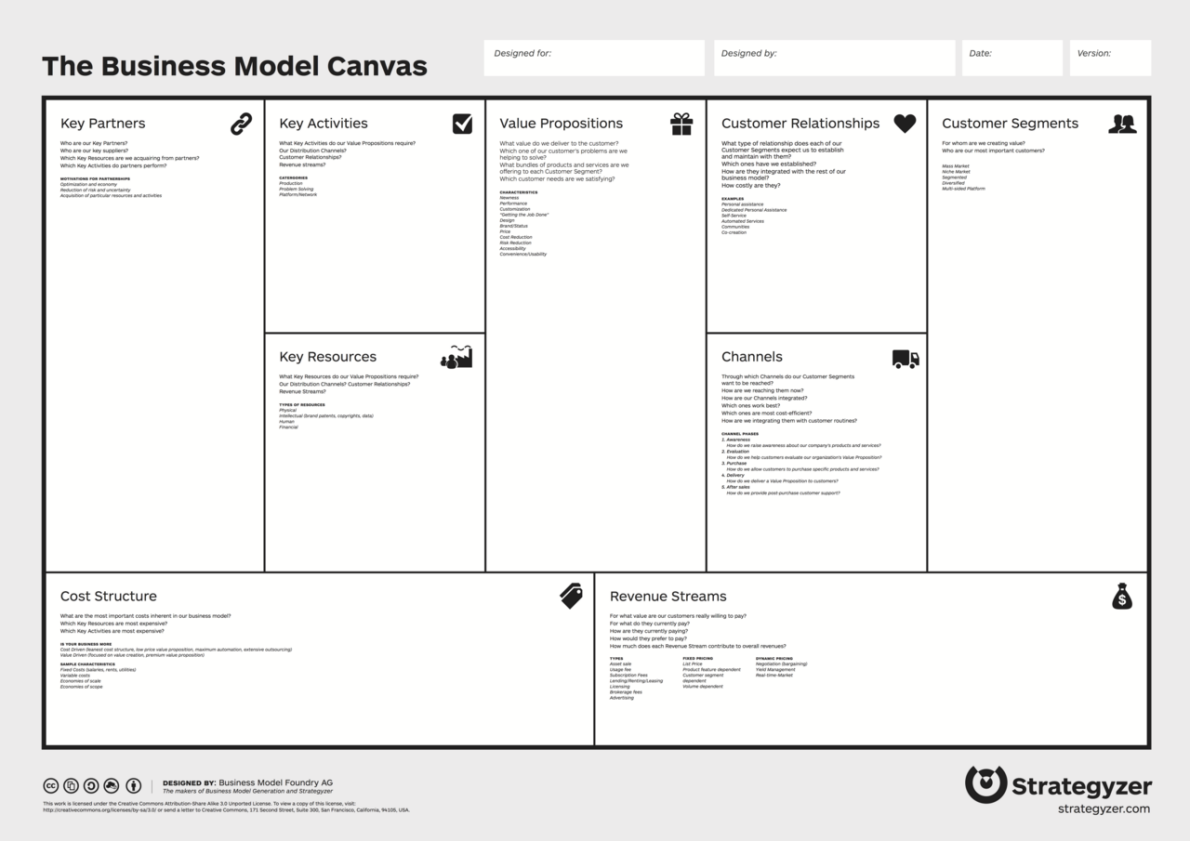


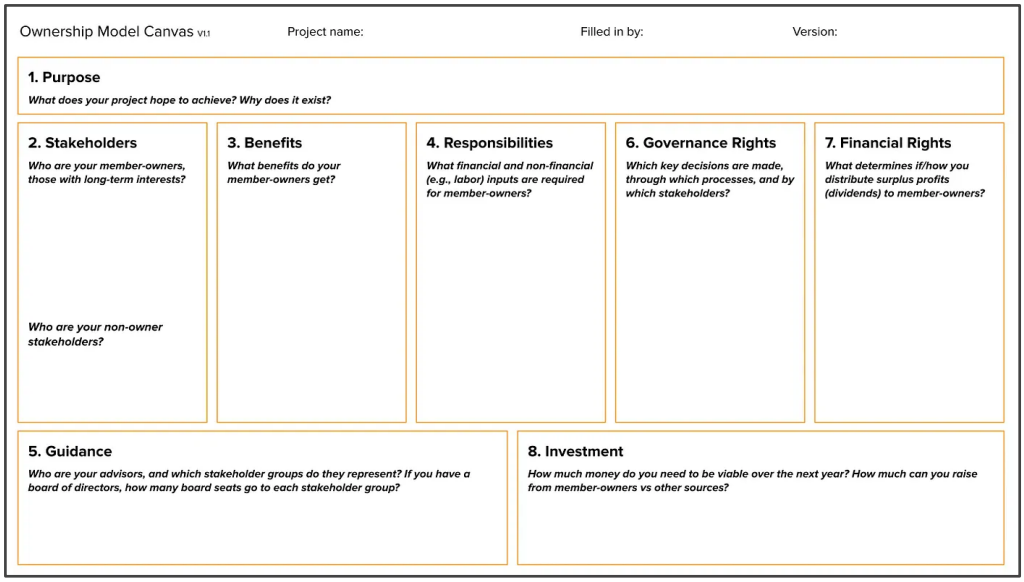
Figure 68. Business Model Canvas (Osterwalder & Pigneur, 2010).

The principal features of the Business Model Canvas are:

- Building blocks
- Labels (e.g. Customer Segments)
- Prompts (e.g. Who are our most important customers?) and keywords (e.g. mass market, niche market)
- Positions (e.g. Customer Segments is connected to Value Propositions through Customer Relationships)
- Icons (e.g. heart icon for Customer Relationships)

How have other scholars and practitioners adapted the Business Model Canvas? The Cooperative & Mutual Enterprise Canvas changes the building blocks to focus on governance structure relevant to cooperatives (Mazzarol et al., 2018). The Ownership Model Canvas preserves the overall look and feel of the Business Model Canvas, but all building blocks focus on ownership issues (Spitzberg, 2021). The Sustainable Business Model Canvas (n.d.) and Triple Layered Business Model Canvas (Joyce & Paquin, 2016) seek to embed 'sustainability' into the Business Model Canvas. The first does so by adding a second bottom row ('Eco-Social Costs' and 'Eco-Social Benefits') below Cost Structure and Revenue Streams. The second does so by creating two additional canvases with the same building block layout but different content to address social and environmental issues.

What did we learn from these adaptations? The Cooperative & Mutual Enterprise Canvas and the Ownership Model Canvas illustrated alternative ways to re-frame organisational ontology to recognise that co-operatives consist of members who are both service providers and customers. This ontology is similar to commons. The two sustainable business adaptations provided more of a cautionary tale. Both of these adaptations complicated the design elegance of the Business Model Canvas to achieve their goals, which conveyed that sustainable business requires more work rather than different work. In creating this first draft of a commons model canvas, we sought to preserve the features that make the Business Model Canvas successful: A single-page layout with a maximum of nine building blocks.



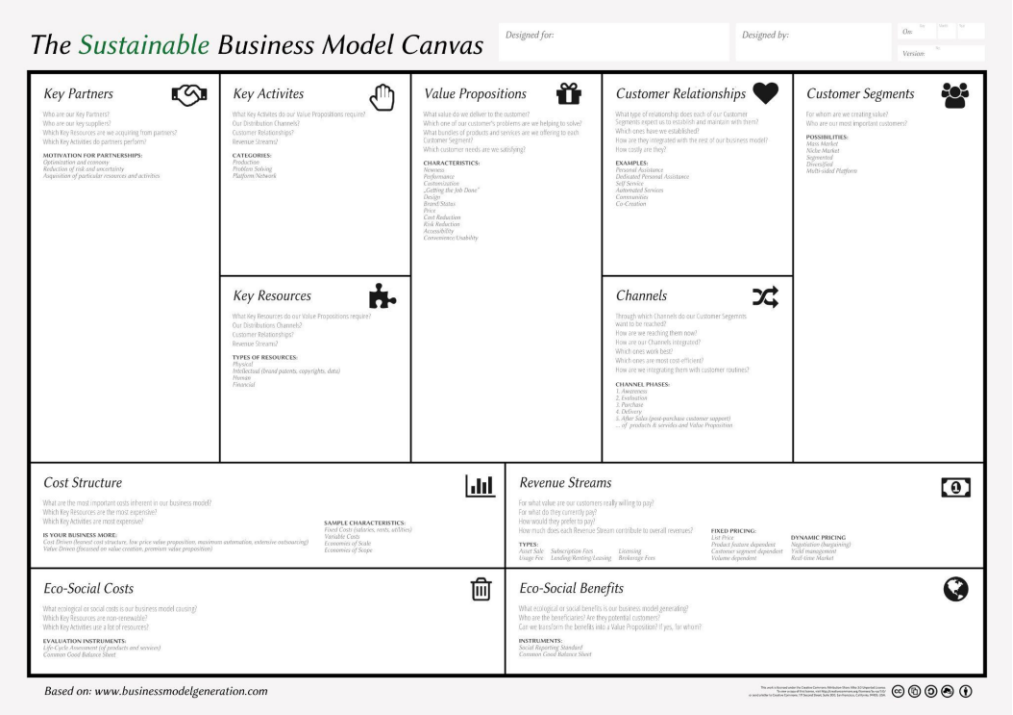


Figure 69. Re-framings of the Business Model Canvas: (top) Ownership Model Canvas for co-operatives (Spitzberg, 2021), (bottom) Sustainable Business Model Canvas (n.d.).

Experiment design

This experiment was originally designed with the intention of using the commons model canvas with the Soil Trust community after conducting internal validation with the commons-maker. The purpose of the commons model canvas changed during the experiment. Instead, the commons model canvas elucidated the commons-maker's need to think differently about Soil Trust as a set of nested commons rather than one large commons. For this reason, we then pivoted from the commons model canvas and developed the action situation canvas described in the next experiment (Chapter 0).

1.80. Act/Make

The act/make phase comprised two steps:

1. Making the commons model canvas, and
2. Making the Soil Trust commons model canvas.

Making the CMC

There are seven building blocks in the commons model canvas:

- Knowledges
- Assemblages
- Members
- Shared Purpose
- Practices
- Challenges
- Customs

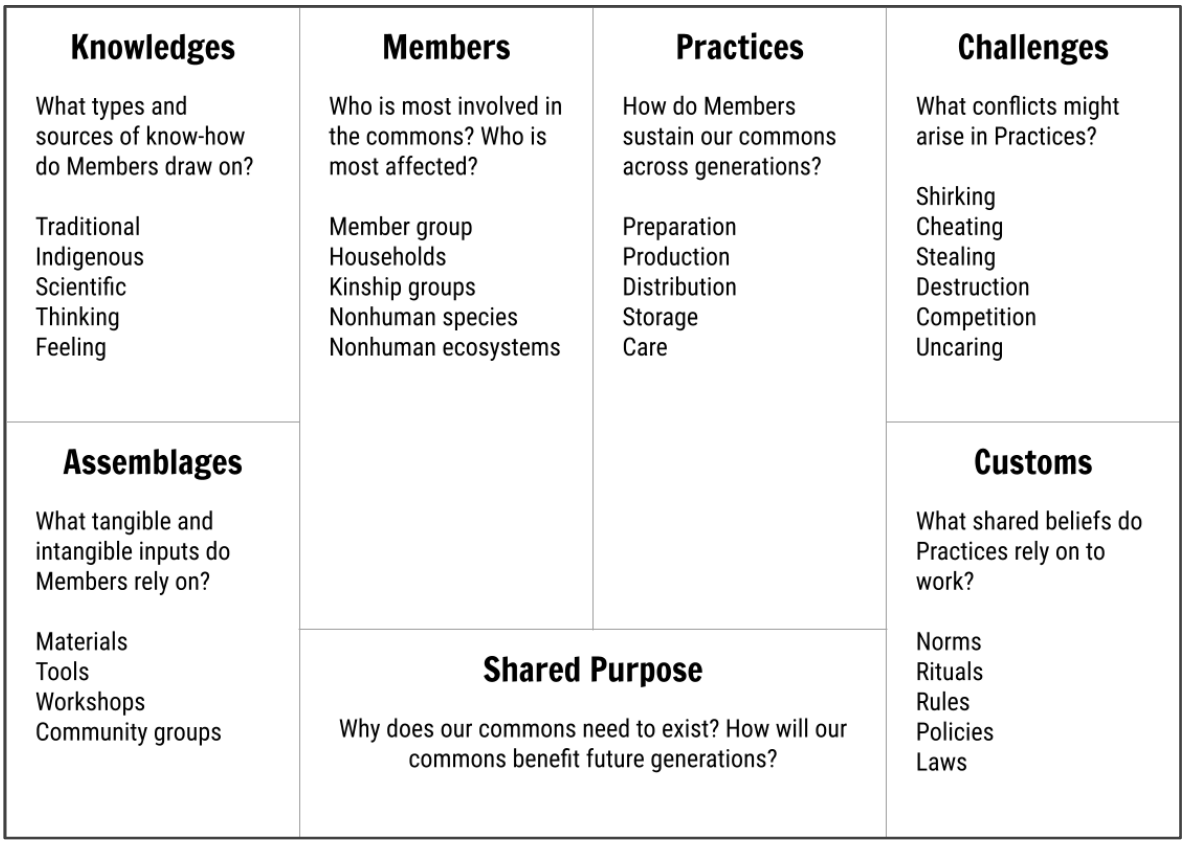


Figure 70. The template commons model canvas with labels and prompts.

There are two notable changes from the Business Model Canvas. The first change is the removal of the bottom row, Cost Structure and Revenue Streams. In order to escape the gravity of capitalocentrism, we felt it was better to use building block and label discourse to encourage people to think outside capitalist terms. For example, where does rice bran, a bedding ingredient, come from? If we see Cost Structure, we might intuitively place rice bran here as a commodity to be purchased. By placing rice bran under Assemblages, we might think about other ways to obtain rice bran, such as excess or 'waste' from other groups.

The second notable change is the reduced size of Shared Purpose, which replaces Value Propositions. We made this change to direct the commoner's focus to other building blocks, because, as Bollier and Helfrich (2019) put it, 'Through commoning, a shared purpose eventually emerges. It is not necessarily self-evident or knowable in advance.'. We observed that building block sizes might change over time. For example, Shared Purpose might increase in size as the commons matures, while Challenges might require more space at the outset but shrink over time as commoners develop practices to resolve challenges.

The labels of the commons model canvas incorporate our observations from other frameworks and wider literature review, much of which was discussed in the plan/design section.

Knowledges. Combines what we observed about Indigenous well-being models and practice architecture. The use of the plural is intended to provoke consideration of knowledge diversity. The keywords encourage the user to consider different types and sources of knowledge. The prompts also incorporate skills or competences from practice theory as a type of knowledge.

Assemblages. Intended to provoke the user to consider both practice materials as well as immaterial inputs. For example, Farm Care Mornings, when commoners visit the farm where the bokashi is used, is an assemblage of skills, people, tools, and places.

Practices. Draws directly from practice literature. Practices are similar to Key Activities from the Business Model Canvas, but we re-labelled this building block to prompt consideration for the repeated, patterned interactions that are core to commoning frameworks. The prompts encourage the user to consider human as well as non-human practices, e.g. what are the practices of soil-penetrating earthworms that Soil Trust commons can support?

*Shared Purpos*e. The prompts seek to shift focus from immediate purpose to multi-generational purpose, a technique we observed in the Commons Yardstick (Gibson-Graham et al., 2013, p. 139).

Members. The capitalist division between customer and service provider is dissolved in a commons, which requires re-jigging many design tools for this different relational system (Sacks & Galabo, 2022). Another problematic boundary this building block seeks to blur is between human and non-human species. Non-human species and ecosystems are named Members of the commons who equally engage in Practices.

Challenges. Represents action situations from the commoning frameworks. The prompts encourage users to consider the interplay of humans as well as human-non-human action situations.

Customs. Incorporates what we observed from the Indigenous well-being frameworks into the commoning frameworks. In principle, rules-in-use (IAD framework) and governance systems (SES framework) include rituals, taboos, and other customary rules, so this change is another example of a discourse change. We re-labelled this building block as Customs to recognise that even seemingly permanent laws are ultimately social constructions that can be contested and changed.

We also experimented with the positions of the building blocks. We moved Members and Practices to the centre, an inversion of the Business Model Canvas ontology. The Business Model Canvas frames a business's activities and its customers as opposite sides of the canvas. For a commons, in contrast, members create the commons and its value through the practice of commoning.

The left side of the canvas roughly mirrors practice architecture, with Knowledges and Assemblages embodying practice architecture's materials and competences. We placed these building blocks to the left side because they are direct features of Members rather than Practices, i.e. Members can draw on Knowledges and Assemblages to perform Practices.

The right side of the canvas roughly re-frames the remaining components of commoning frameworks. Since the commons model canvas re-frames non-human species as Members, the remaining input into practices is rules-in-use (IAD framework) or governance systems (SES framework). Challenges have been positioned to the side since the purpose of the commons model canvas is to help a community visualise and generate a functional commons. Challenges provide a space to constantly identify current or anticipated challenges and consider how these challenges are resolved in Practices.

Making the Soil Trust CMC

The commons-maker's first attempt to complete the commons model canvas is crowded and almost illegible (Figure 71). This first attempt surfaced for #commonize studio that the commons-maker was using the banner of Soil Trust to engage members in at least two distinct activities:

1. Create bokashi for composting, and
2. Tend to the farm where the bokashi was used to grow vegetables.

The commons-maker had repeatedly observed that commoners were diligent about making bokashi but would rarely come to Farm Care Mornings, an event held on Sundays at the farm where the bokashi was used. The farm was two hours away by public transport for most members, and Sundays proved inconvenient for commoners with children.

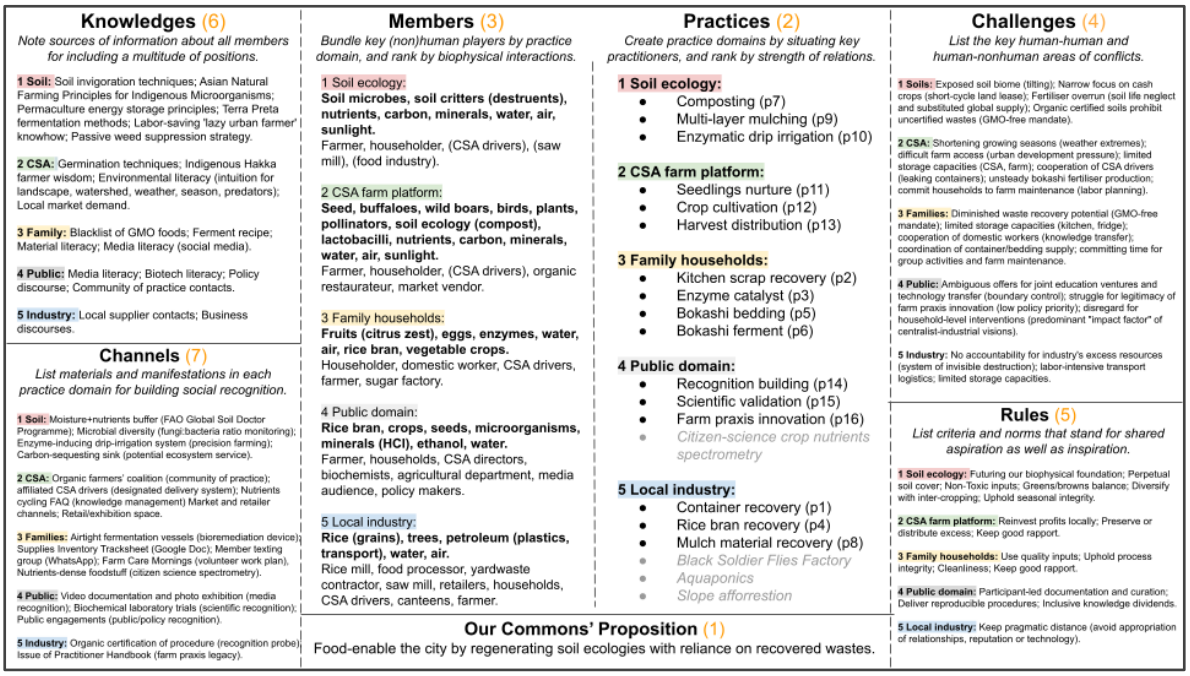


Figure 71. Commons-maker's first commons model canvas iteration, revealing too many core members and practices for a single commons.

The commons model canvas was crowded also because the commons-maker identified five commoner categories and organised responses in each building block using these five categories:

- Soil ecology
- CSA [community supported agriculture] farm platform
- Family households
- Public domain
- Local industry

During the desk critique process, I suggested that the commons-maker remove the last two categories, 'Public domain' and 'Local industry', as these commoner categories were less directly involved in Soil Trust, and there were no individuals who had regularly engaged with any of Soil Trust's practices.

This desk critique process illuminated a very specific commons model challenge: Soil Trust as originally conceived and communicated was doing too much. In hindsight, these insights are parallel to the types of insights a start-up team might gain from using the Business Model Canvas.

The next version of the Soil Trust commons model canvas was less crowded because we narrowed down commoner categories (Figure 72). This is the version that was shared in the PDC22 workshop. We had not yet simplified the Soil Trust commons model canvas to just the bokashi-making commons, so this version still presents both bokashi-making and farming practices.

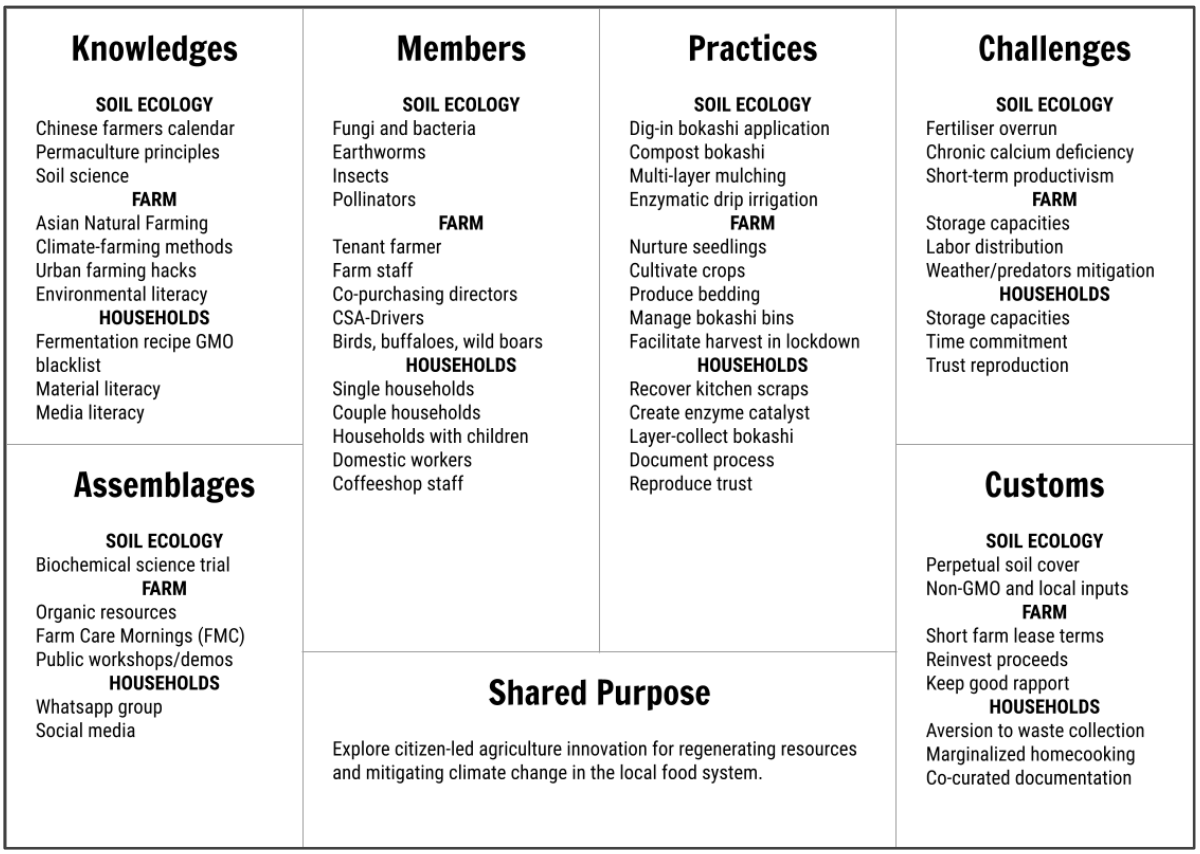


Figure 72. The Soil Trust commons model canvas presented for peer critique at PDC22 (Sacks & Wernli, 2022a).

Overall, we found it easiest to organize ideas around sites or places of practice, e.g. the farm versus the home, which informed the next experiment, action situation canvas. The results of this second attempt and the reflections this second attempt provoked are presented below.

Knowledges. This building block was the most successful building block in terms of feeling that we had represented the diversity of knowledges used by members and that there was space to write them all down.

Assemblages. We had too many ideas to put in this building block. Ideas ranged from farm tools to more complex workshops. Does everything need to be listed here? If not, what is the basis for inclusion in this building block versus in a more detailed plan? In the Business Model Canvas, for example, a start-up might list 'newsletter' in the Channel building block and elaborate the management of that newsletter in a marketing plan.

Members. How do we prioritise who the non-human members are? The focus of Soil Trust is soil ecology, so we focused on soil ecology as the member; however, there are clearly other non-human members affected by this commons.

Shared Purpose. We found that this text included broader cultural concerns, such as how this commons contested food and waste culture. Perhaps future prompts might incorporate counterpower or contestation, using more lay language.

Practices. We had previously used practices as a way to think through the Soil Trust commons. Practices preceded members in our thought process. There is no right starting point. We noted that our soil ecology practices remain related to humans. Do we accept anthropocentricity, or are there prompts to change our mindset?

Challenges. This building block label and/or prompts may need to change, as many initial ideas dealt with farming challenges like weather. Weather is a challenge, but the point of action situations is the management of conflicts. We cannot stop a typhoon, but we can adapt our behaviour to mitigate the damage caused by the typhoon. One option is to prompt users to rephrase ideas in this building block as questions. For example, rather than 'weather', we might state, 'How do we protect crops from typhoons?'.

Customs. Similar to Assemblages, we developed too many ideas to fit in the building block. Our discussion, however, generated important and useful insights, such as the impact of Hong Kong's British colonial history on perceptions about household waste, i.e. keeping a bokashi container in the house is considered uncivilised behaviour.

This act/make phase description blurs with the observe and reflect/critique phases because it represents a summation of numerous, micro-ARtD cycles that typify design research. The next two sections focus on observations and reflections that persisted throughout this experiment.

1.81. Observe

While the commons model canvas form and format requires additional modification, it proved profoundly useful in two ways:

1. It guided the commons-maker to externalise the full complexity of Soil Trust as a commons-in-formation for new audiences like me; and
2. It concretised the realisation that Soil Trust was a nested ecosystem of commons, so the commons-maker needed to treat the bokashi-making community as a discrete commons.

Language/Ideas

This experiment generated numerous provocations about language for commons-making that also feed back to the commons literature. In this experiment, we categorised human and non-human species as equal commoners. This approach contrasts with the approach taken in Chapter 0, the commoner persona and journey map. In that experiment, I delineated humans from non-human species, and I suggested re-naming the SES framework labels to challenge anthropocentricity, e.g. human actors and non-human actors. The potential value of this approach is that it requires minimal change to existing commons frameworks. The potential value of the more flattened approach taken in the commons model canvas is that it may better de-centre human actors in commons-making.

Another persistent language/idea provocation is the relevance of practice theory to commons-making. Thinking about action situations as sites of practice proved helpful to externalising Soil Trust's commoning activities. The current IAD and SES frameworks do not offer particularly intuitive language for commons-makers to articulate their commoning practices. Practice literature offered some more intuitive language that we incorporated into the commons model canvas building blocks.

Discourse for 'rules-in-use' or 'governance systems' is another area we explored through this experiment. How to evoke the breadth of these terms? We used the terms 'knowledges' and 'customs' to do so, though these could change. These terms were drawn from a shallow but informative review of traditional ecological knowledge and Indigenous well-being literatures.

Ultimately, more experimentation is required to see which terms best frame commons-makers' thinking for the common model canvas.

Relationships/Subjectivities

Within the context of how the Soil Trust commons model canvas was actually used (versus envisioned for use), the most noteworthy observation of relationships/subjectivities was the emergence of nested commons within Soil Trust. It was during the act/make phase that the commons-maker was compelled to reflect and communicate these many endeavours. Similar to a start-up, Soil Trust had pursued multiple opportunities, unsure which would be the most fruitful. In the early stages, Soil Trust proactively carved out opportunities, such as creating the relationship with TinYeah and the farm-holder. Later on, Soil Trust responded to opportunities that arose, including successfully pitching for investment from a social investment fund. This experiment took place six months into the project, when the commons-maker could observe how initial commoners chose to interact with Soil Trust. The commons-maker observed how the households disliked coming to the farm while they remained enthusiastic about making bokashi; meanwhile, a group of households who lived near the farm were more often engaged with the farm. These two groups did share in the governance of the soil of the Kangmiao Organic Farm, but Soil Trust held different meanings for each commoner group. The commons literature recognizes nested commons as a design principle, but there is far less literature about how nested commons ecosystems function and could be visualised, an issue explored further through Hack4Blood.

Collective action

There were two types of collective action envisioned for the commons model canvas, though neither of these intentions materialised in this ARtD cycle:

- Collective action within Soil Trust, and
- Collective action with peer scholars engaged in commons-making.

The first type of collective action mirrors the original Business Model Canvas as a living, reflexive business (commons) model. The commons model canvas was intended to support members to navigate and refine shared visions and understandings of Soil Trust, which might strengthen commoning. The commons model canvas was never used by Soil Trust commoners, which ultimately dissolved when the owner of the Kangmiao Organic Farm sold the land to real estate developers.

The second type of collective action was for peer scholars engaged in commons-making, as expressed in the PDC22 workshop abstract: 'Based on our own research through design, participants can expect: to expand their knowledge about the commons and pluriversal

design, to gain insightful peer feedback on their commoning projects, *and to forge a potential peer network for future collaboration*.' (emphasis mine) (Sacks & Wernli, 2022a, p. 227). The PDC22 workshop went differently than planned. No participants brought their own work into the workshop; instead, we spent the full workshop reviewing and critiquing the Soil Trust commons model canvas. This peer critique led to the next experiment, body histories (Chapter 0).

Artefacts

While the commons model canvas is the most observable artefact created by this ARtD cycle, the thought process going into creating it is possibly more valuable. In fact, recording and discussing the thought process was a recurring critique from peer reviewers of the rejected paper. One reviewer suggested we:

> ...provide more details into the very process of co-designing the CMC - some discussions, (dis)agreements between members (human and probably nonhuman?) involved into building the Soil Trust Commons to get more evidence for the viability and usefulness of the proposed CMC.

How might studio experiments document the co-design process? We did not resolve that challenge in this experiment, but further exploration into recording what is often a messy and non-linear process merits further investigation.

1.82. Reflect/Critique

The commons model canvas was subjected to more forms of studio critique than any other experiment, from desk and peer critique to expert or 'public critique' (El-Latif et al., 2020). We received critique from the following sources, chronologically:

- Professor of design at a US university
- Four peer reviewers of the unpublished PDC22 paper
- Participants (10) of the PDC22 workshop

Critique

The professor of design commented primarily on the paper title. Our title was 'Reframing and Rendering Commoning with a Pluriversal Commons Model Canvas' (Sacks & Wernli, 2022b). The professor suggested 'Commons Sense: How Business Might Change its Model to Enable a Pluriverse on Earth', along with four more title ideas that spoke to the idea of the commons model canvas as a tool to reform capitalist business models to support commons. This language sits somewhere between neoliberal and reformist commons ideology, and it

locates the commons model canvas as a type of bridge between capitalism and commonism. For commons scholars aligned with counter-hegemonic commons, this approach might render the commons model canvas problematic or even counter-productive, as at least one PDC22 reviewer felt. Yet, the commons-makers #commonize studio field experiments, Soil Trust and Hack4Blood, had to engage with capitalist institutions to progress their commons. How do commons-makers tap into capitalist institutions, most often for money or for recognition of their rights to exist (design principle #4), while protecting the values of the commons?

The four PDC22 peer reviews almost exclusively addressed the scholarship behind creating the commons model canvas rather than the artefact itself, which pointed to where we might improve the paper but not how to improve the commons model canvas. The reviewer who most harshly critiqued the artefact offered no counterexamples or inspirations that might address our purpose in a different way. Only one peer reviewer engaged with the artefact, with two suggestions:

- 'a participatory workshop where actors arrange their own optimal configurations, from which the researchers can identify the dominant patterns that emerge, could be a novel, and commons-based, approach.'
- 'There are other typologies that may well be more suitable visual arrangements for this setting and that might contest an inherent scientific rationalism that rectangles in this way afford, since they can fall into a trap of knowledge compartmentalised in small boxes, like discrete parts stacked into a house. Scaling circles, area grouping, or some other metaphor may well amplify the objective of the model, to amplify commons.'

These two suggestions are valid, relevant, and speak to future potential iterations on the commons model canvas; however, they are easier to suggest in theory than to execute in practice. The commons-based approach to configuring the commons model canvas seems ideal, but #commonize studio would need to continue to support commons-makers while assembling enough people to perform this co-design process. The second suggestion speaks to the challenges we confronted in the plan/design phase. In future iterations, what formats might better evoke the physicality of commons-making while remaining simple to replicate in a local context?

The PDC22 workshop might be compared to a final review, with the commons-maker and I presenting our work to this group of external peer scholars for their critique. The most durable point made by these peer scholars was the way that the commons model canvas anesthetized the vibrancy of the Soil Trust commons. One participant observed that the

commons model canvas felt like the members were externalising their practices rather than sharing them. Another participant suggested a methodology grounded in learning by doing, such as mirroring a parent making a meal. The commons model canvas did not capture the feelings, smells, tastes, and emotions of Soil Trust; yet, we still had to interface with the world, from university colleagues to funders. How might we convey the physicality of Soil Trust in a manner that external stakeholders would accept and receive? The paper peer reviews highlight this challenge and even the hypocrisy encountered in trying to answer this question. One paper reviewer questioned if the A4 format was viable, e.g. 'But can a worldview fit in an A4?'. The answer is probably not. However, it was PDC22 who required us to submit our paper in A4 format, and not just A4 format but Microsoft Word A4 format using the PDC macro-heavy template.

Reflection

The most critical reflections have been recorded in other phases and are summarised here:

- The commons model canvas was particularly useful at guiding the commons-maker to think through and articulate the commons-in-formation, combining the diversity of enacted practices as well as anticipated or aspirational practices.
- The making process made visible that Soil Trust is actually an ecosystem of nested commons, which led to a shift in approaching the bokashi-making commons.
- The commons model canvas made visible a differentiation between internalising versus externalising processes conducted by #commonize studio.
- Desk critique observations resulted in drilling down further into specific sets of interactions with commoners, leading to the next experiment, action situation canvas (Chapter 0).
- Peer critique encouraged us to continue developing the commons model canvas and to develop a more sensory-based experiment performed later (Chapter 0).

Action situation canvas

The action situation canvas was the first experiment iteration to engage Soil Trust commoners. Similar to the commons model canvas, the action situation canvas posed dual internalising-externalising objectives, aimed at both solidifying commoning practices among commoners (internalising) and recording and sharing practices for new commoners (externalising).

1.83. Purpose

The action situation canvas shared the same internalising purpose as the commons model canvas, to strengthen commoning practices so that Soil Trust commoners could sustain the commons without the commons-maker in the future. After testing the commons model canvas on ourselves, we felt it might be intimidating as a first step. Instead, we looked at starting with a specific, singular commoning practice rather than the whole of the commons. We likened this singular practice to the action situation in commons scholarship.

The action situation canvas was also an experiment in creating an internalising process that could be replicated. We planned to start with the practice of making sawdust bedding, but there were other practices that Soil Trust commoners needed to share and manage, such as making eggshell powder that would be mixed into the bedding. With the gradual lifting of Covid-19 restrictions in 2022, the commons-maker developed a monthly meetup at the TinYeah warehouse, which was much closer to commoners' homes than Kangmiao Organic Farm.

The meetup had two purposes. The first purpose was social, as the meetups were the first opportunity most Soil Trust commoners had to meet each other in-person since joining. The second purpose was to create a forum for shifting commoning know-how from the commons-maker to the commoners. Until this point, the commons-maker had made the bokashi bedding for the commoners. Now, the Soil Trust commoners would participate in making bedding alongside the commons-maker. Making bokashi bedding is a multi-step process, so the commoners would start with one step and, ideally, add steps with each monthly meeting. The meetup lasted 2-3 hours on a Saturday or Sunday daytime, and most of this time was already used for updates, socialising, and making bokashi bedding. How could we incorporate the action situation canvas into this meeting?

1.84. Plan/Design

After so many pilot experiments, the action situation canvas was the first #commonize studio experiment used with commoners. The unique qualities of remotely supporting a commons-maker to use artefacts with commoners generated design methods and experiment design features that would be replicated in future experiments.

Commons literature

This experiment centred the action situation. By this point in #commonize studio, I had started to observe the value in focusing on the action situation as a basis for commons-

making; however, the action situation is complex. There are seven rules at play in the action situation, and the action situation then interacts with every other component of commoning frameworks. Where do we start? What aspects do we include or omit?

At the time, I shared with the commons-maker the action situation as presented in *Understanding Institutional Diversity* (Ostrom, 2005, p. 189). I explained the purpose of the action situation and the seven rules associated with the action situation as follows:

> The action situation diagram is actually pretty relevant to the "induct new member" action situation. Basically, new members must decide on some of the 'rules' about new members. This is probably going to be very simple to start, e.g. any member can introduce a new member. The diagram raises more questions about when new members become regular members, e.g. right away, rites of passage? The main challenge I anticipate is how does this group know if new members' bokashi is good/bad? I imagine people made mistakes in the beginning? Obviously, there is no reason for major sanctions (a design principle), but it does sound like you don't want to put "bad" bokashi in the ground on the farm, correct?

The commons-maker made several comments on the shared document I created with this information. One comment represents what most partners have said when I share original commons literature: 'i think for an non-researcher, this IAD action situation diagram is a lot to take in and digest…'. Another comment, responding to my explanation of the action situation rules was, 'Rules can be frightening to people at the beginning: could be just say "Boundaries" and "Positions" etc to introduce the questions?'. This comment responds to language in commons-making, an issue that #commonize studio consistently grapples with. In the next section on design methods and experiment design, I share how we accommodated the commons-maker's concerns.

Design methods

The action situation canvas moved through two design methods: co-design followed by cultural probe. This sequential combination proved useful and was then used for subsequent studio experiments beyond this thesis, e.g. action situation blocks (Chapter 0).

The action situation canvas differs from previous experiments in that it was not layered onto any previous design infrastructure, e.g. the commons model canvas iterates on the Business Model Canvas and the commoner persona iterates on the user persona. The action situation canvas also differs from these previous experiments because it was used with both the commons-maker and the commoning community. This dual use raised questions about who forms the 'co' in co-design for #commonize studio or commonized design more broadly. As a

panellist for 'Agonism and Equity' at PDC22, a participant asked us how we involve different stakeholders in delicate community-building work. My response was that the commons-maker controls how stakeholders are involved, not me. Through a coaching lens, I can make suggestions, but the commons-maker ultimately decides who to involve and when to involve them. In one unpublished project, the commoners (as reported to me by the commons-maker) debated delegating this type of work to whoever was willing to volunteer their time. Referring back to choice levels, it is sensible that these processes might involve different people at different times. In other words, co-design in commons-making or commonized design does not mean everyone must be involved in everything. The community can decide how members enter or exit from such processes.

The second step in this experiment might be best classified as a cultural probe (B. Gaver et al., 1999). The commons-maker inserted the co-designed action situation canvas in the TinYeah warehouse during a monthly meetup. The commons-maker introduced the action situation canvas and encouraged commoners to interact with it during their time there. Commoners were not required to interact with or use the action situation canvas, so the commons-maker used the action situation canvas probe to gauge commoner sentiment as well.

Experiment design

This experiment was the first experiment where the commons-maker transformed our work into a physical artefact to be used with commoners in-person. The commons-maker, therefore, drove experiment design. The commons-maker chose the opportunity, the location, the timing, the materials used, and the instructions. The commons-maker also autonomously performed knowing-in-action on the day of use, e.g. responding to questions, moving materials around. On reflection, my inability to control experiment conditions is a feature of studio experimentalism. In contrast with lab experimentalism, the exploration of diverse experiment conditions contributes to studio experiment learning. We learn which experiment designs might be more conducive to successful commons-creation with each experiment conducted by commons-makers and commoners.

1.85. Act/Make

The action situation canvas comprised two making steps:

1. Co-designing the action situation canvas with the commons-maker, and
2. Using the action situation canvas with Soil Trust commoners.

Making the action situation canvas

The persistence of the word 'canvas' connects this experiment with the previous experiment. We continued to explore the idea of creating a visualisation that commoners could complete on a wall, and ideally a visualisation that could stay on the wall over time as commoners interacted with the artefact. We retained the rectilinear form for the action situation canvas for the same pragmatic considerations as the commons model canvas.

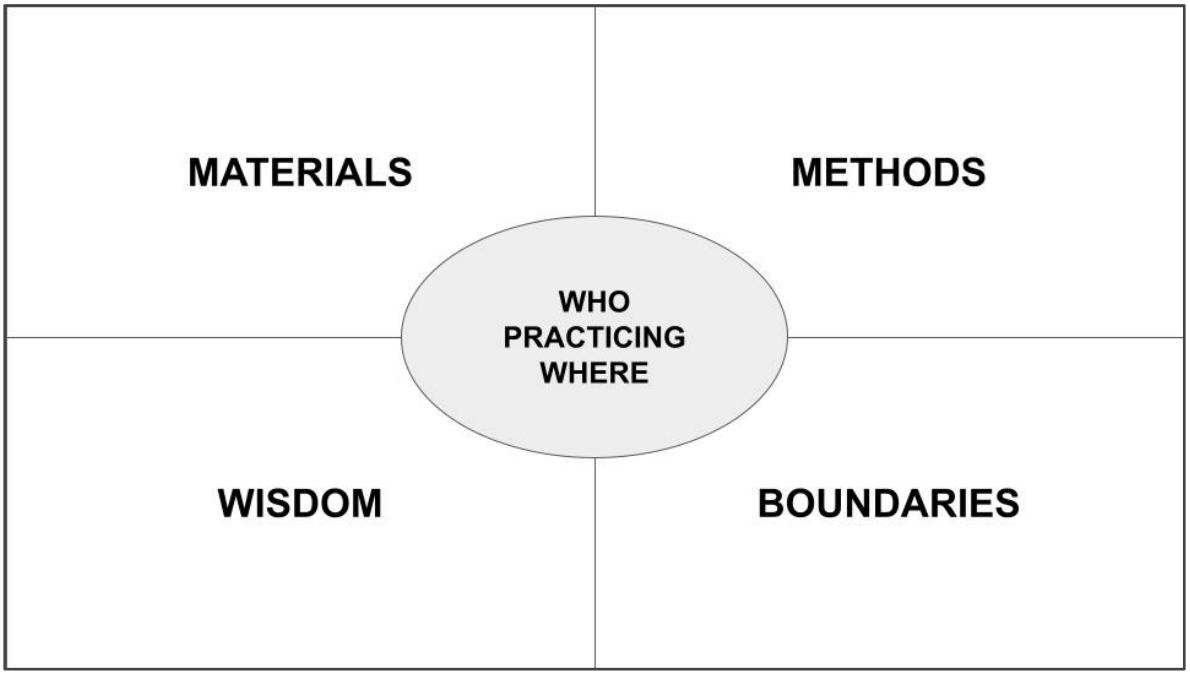


Figure 73. The first full iteration of the action situation canvas.

The first full iteration (Figure 73) comprised five building blocks, four quadrants with a central circle. This overall design persisted over successive iterations but with different labels:

- Materials
- Methods
- Wisdom
- Boundaries
- Centre: Who - practicing - where

'Materials' aligns with assemblages from the commons model canvas and biophysical conditions from the IAD framework. 'Methods' aligns with practices from the commons model canvas and interactions from the IAD framework. Both 'Wisdom' and 'Boundaries' align with knowledges from the commons model canvas and rules-in-use from the IAD framework. The way I explained these two labels at the time was:

> Boundaries are like “rules” since you thought that word would be problematic. To clarify wisdom v boundary: “I like to mix the bokashi with my hands” is wisdom while “Only add raw fruit and veg” is a Boundary/Rule.

In the quotation above, mixing bokashi with one’s hands is one of many methods to make bokashi; however, all of these methods must include only raw fruit and veg (and, conversely, must not contain meat).

I described the central circle at the time as: ‘The middle circle contains three elements for exploring the “action situation”’. This later became what I termed the ‘action situation statement’. The purpose of the action situation statement is to frame the action situation canvas:

- Which members (*who*)
- Are performing what practices/interactions (*what*)
- In what location (*where*).

The action situation statement emerged from pilot experiments and the commons model canvas experiment. Bokashi-making occurs in two location types: commoners’ homes and the TinYeah warehouse. For the experiment at the monthly meeting at TinYeah, the action situation statement specified bokashi bedding making at TinYeah to focus discussion, though commoners ended up discussing how to use the bedding at home. In principle, each commoner’s home is a separate action situation unless all conditions are the same. Among commoners, some had paid household help, some had children, some had more or less kitchen space. One commoner housed the bokashi bin at her office so others could participate, which creates an entirely different action situation. The action situation canvas illustrated the ongoing balancing act between honouring complexity and creating a useful artefact that supports commoners.

Critique from the Soil Trust co-investigator and further iteration based on this critique yielded a second version of the action situation canvas (Figure 74). The content remained roughly the same, but the labels changed. The four quadrants changed to:

- Materials > What we need
- Methods > Ways we do it
- Wisdom > Words of wisdom
- Boundaries > Do’s and Dont’s

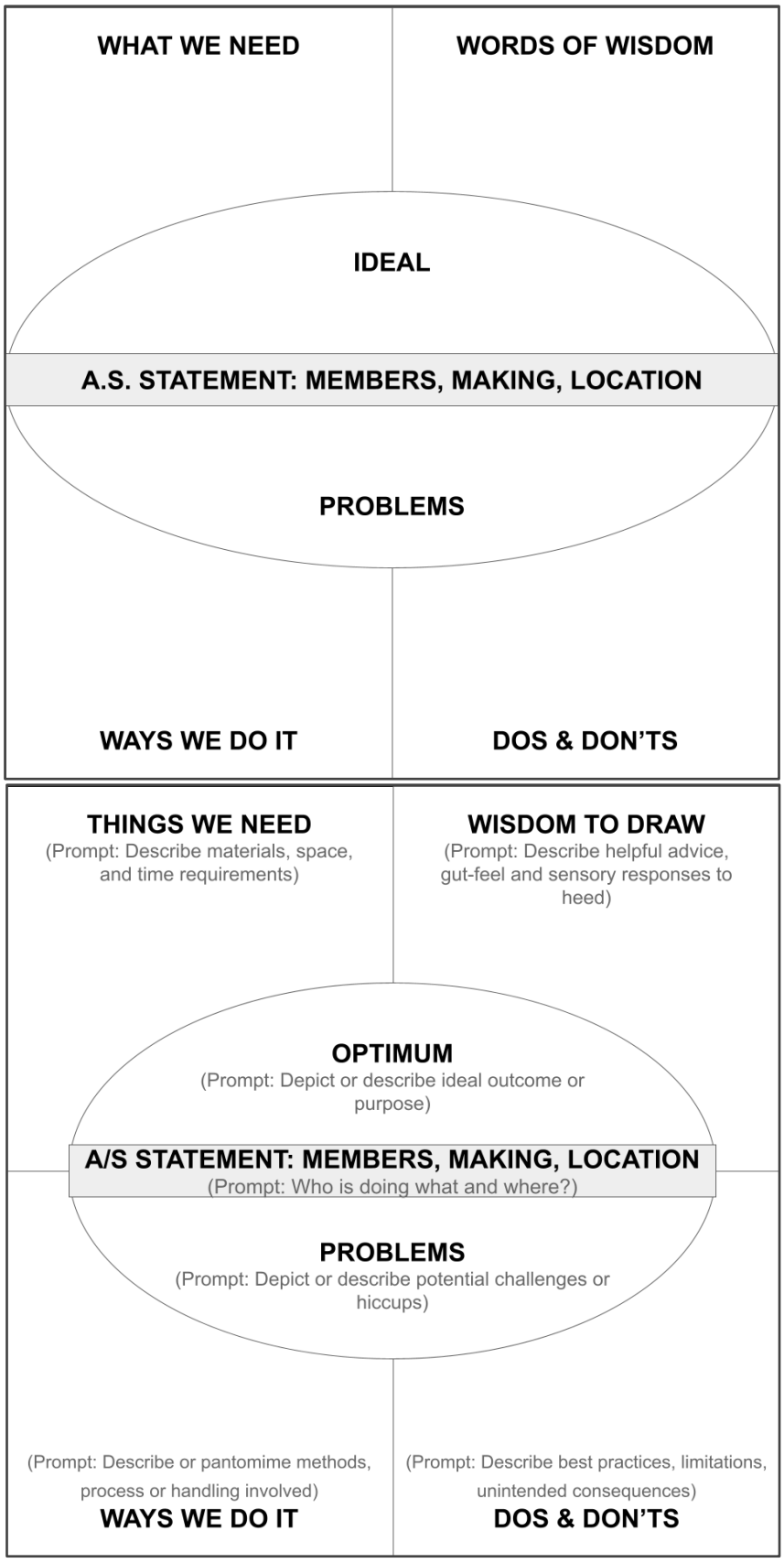


Figure 74. Next iteration of the action situation canvas after critique from the Soil Trust co-investigator: (top) blank version, (bottom) version with prompts.

The central circle changed more substantially. The three sections of the central circle became:

- Action situation statement ('A.S. Statement')
- Ideal
- Problems

The action situation statement put a name on the 'who-what-where' description in the previous iteration along with more clarity about how to write this statement. In design terms, the action situation statement acts as a commoning frame. The elements above and below the action situation statement, 'Ideal' and 'Problems', are new. Ideal was intended to give commoners a space to articulate how their commons might look. Problems was intended to give commoners a space to identify challenges to successful interactions.

The commons-maker completed a version of this action situation canvas on his own to identify opportunities for improvement (Figure 75) and made several alterations ahead of the monthly meeting (Figure 76). The major alteration was swapping out the quadrant 'Words of wisdom', which had proven difficult to differentiate from 'Do's and dont's', for 'Verifying our progress', which the commons-maker explained as: 'How do we co-monitor advancement toward a common goal?' The 'Verifying our progress' label intended to elicit ideas for how commoners would know that the commons was functioning and that members were doing what they said they would do. This quadrant in effect became a way to explore how commoners would monitor and enforce the rules described in the 'Ways we do it' quadrant. The other alterations were shifting quadrant positions and changing the label 'Ideal' to 'Optimum' in the central circle. Quadrant positioning may matter, but with only this one experiment with commoners, further experimentation would be required to determine its impact.

A useful lesson from performing this test-run was that this process can become a litmus test for commons-makers. They can compare their version to whatever their peer commoners create. How do these two versions of the action situation canvas, one by the commons-maker and one by the commoners compare and contrast?

The commons-maker also developed one suggestion, which he explained as: 'such a Verifying Our Progress element in the canvas could become the pivot to expand the tool from constitutional into the governance realm of the group.' (Figure 77). The commons-maker interpreted constitutional-choice as broad, high-level ideas that lead to discussions about more detailed rules at the collective/operational-choice levels, which the commons-maker refers to as 'governance realm of the group'. This suggestion embodies the opportunity ahead for the generative turn in commons research. The commons-maker constructed knowledge using commons language and in turn proposed back a potential solution for moving between choice levels that has not yet been successfully resolved by commons scholars.

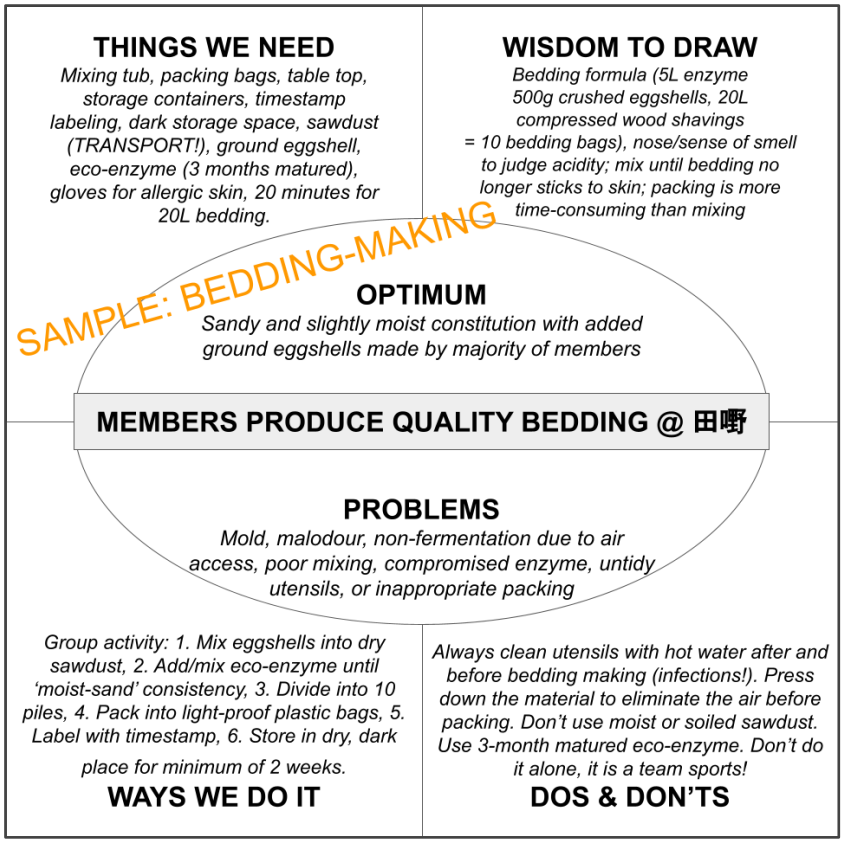


Figure 75. Action situation canvas completed by the commons-maker prior to making another version for use with Soil Trust commoners.

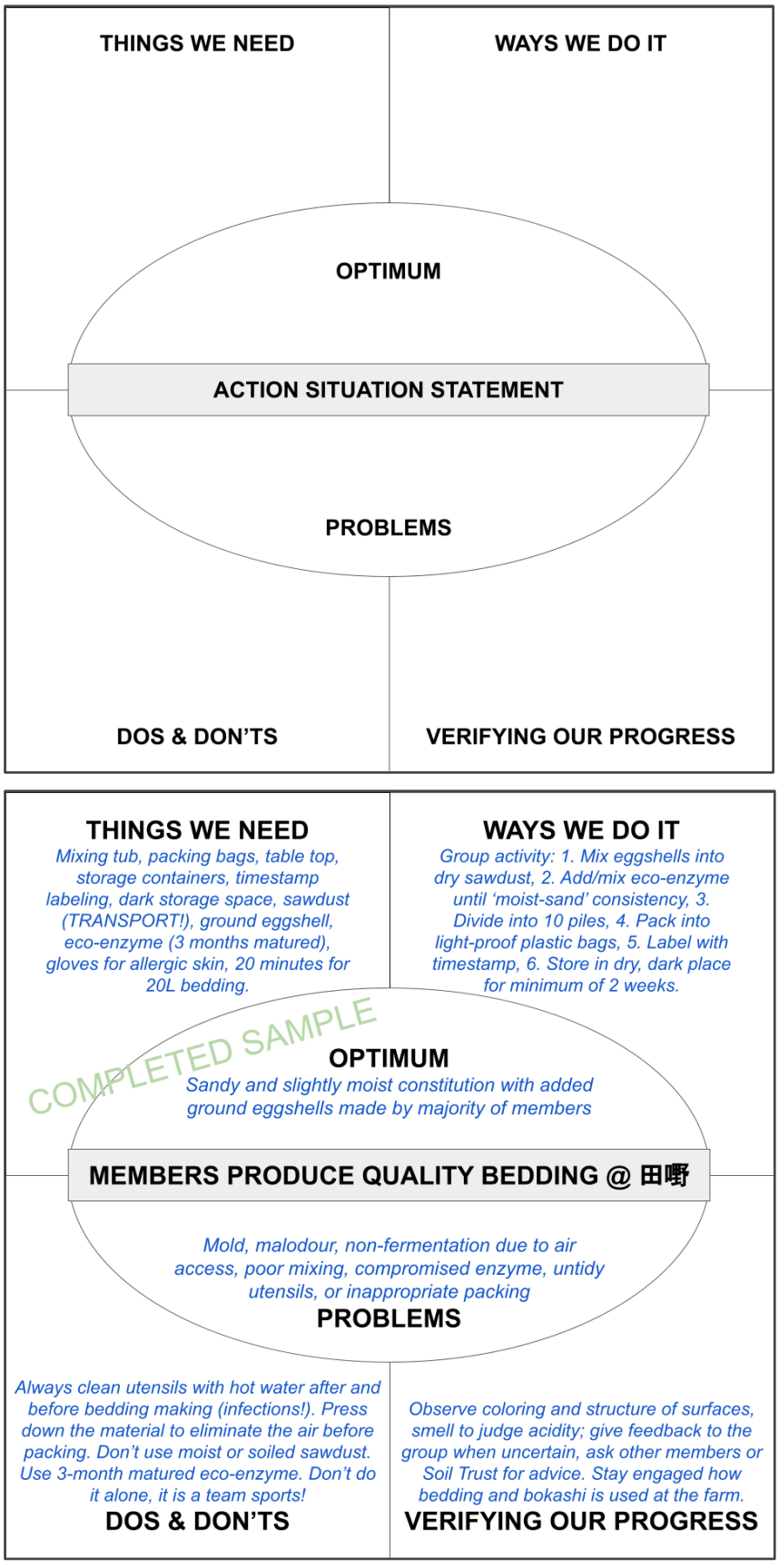


Figure 76. The final revision of the action situation canvas as a blank template (top) and again completed by the commons-maker (bottom). While unplanned for this experiment, this step demonstrated value for future experiments as a way to compare how the commons-maker and the commoners understand their commons.

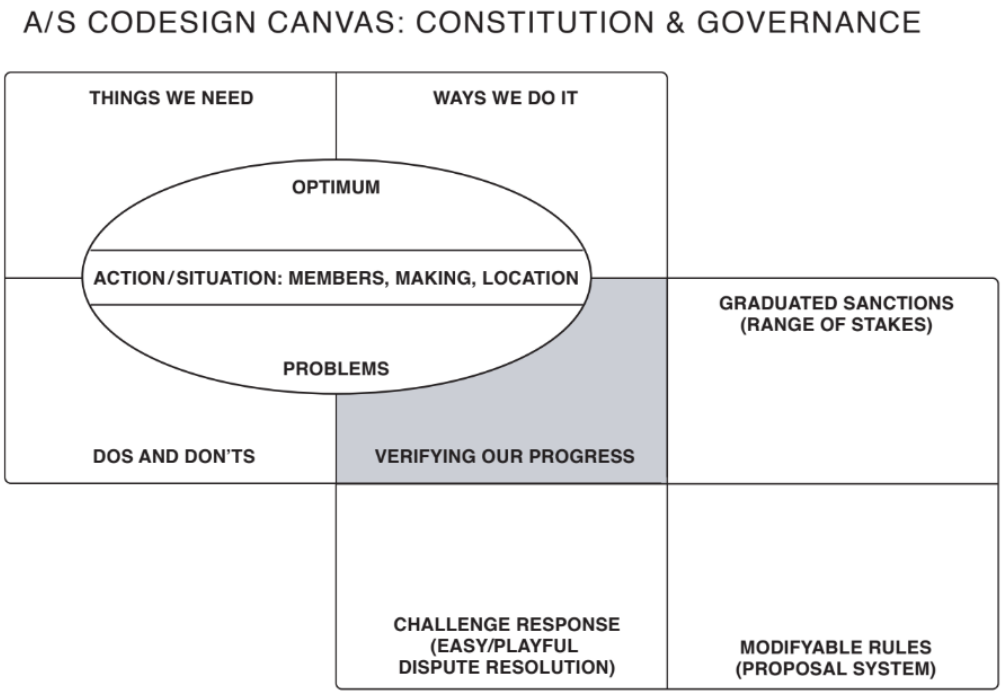


Figure 77. Action situation canvas expansion design proposal by commons-maker. The 'Verifying our progress' quadrant becomes a pivot point for moving between constitutional- and collective/operational-choice levels.

Using the action situation canvas

The commons-maker translated the digital template we had created into a three-dimensional cardboard artefact using discarded cardboard box sides (Figure 78). While other commons-makers may be more or less artistically inclined, these variations simply demonstrate how commons-makers can personalise and alter the digital template for their own context.

The commons-maker placed the action situation canvas on a wall in the same room where Soil Trust commoners were making bokashi bedding that day. The commons-maker also placed markers and sticky notes near the action situation canvas so that commoners could write and affix their ideas. Importantly, the commons-maker left the process open to the commoners. There were pros and cons to this approach. Below is edited and abridged email text from the commons-maker about the making process:

Figure 78. Action situation canvas in use with commoners at TinYeah, August 2022. Source: Markus Wernli.

> We just finished the session at TinYeah. It went fairly well, and some participants engaged with the canvas more than others. We have to keep in mind that among the 10 families present, half of them come with kids, it is a Sunday morning, and people want to have fun and reconnect with each other primarily. … Because participants want to have fun, we ran the canvas exercise and bedding production in parallel after I explained the canvas, hoping that the bedding-making would directly inform the contents of the canvas. But there was not much interaction, so I facilitated that transfer by asking bystanders of the action to observe, reflect, and comment on the canvas. … While the group inspected several bokashi samples with their noses, skin, and eyes, the comments were all made respectfully on post-its. Post-its have the advantage that they can be moved around the canvas, and in discussion with the group, the statements can be reallocated.

The intention was to leave the action situation canvas on the wall at TinYeah so that commoners could revisit the action situation canvas and modify it in subsequent months. Instead, the TinYeah owners needed to remove the action situation canvas after this meeting, so it was not revisited after this experiment.

Figure 79. Action situation canvas in context at TinYeah monthly meetup. Source: Markus Wernli.

1.86. Observe

The detailed observations by the commons-maker provided tremendous insights into how to improve the action situation canvas and shaped future experiments.

Language/Ideas

The action situation canvas directly confronted how to organise commons literature into usable infrastructure. The commons-maker made the following observations about how commoners interacted with the action situation canvas:

- "Participants zoomed in on the PROBLEMS aspect of the canvas since they had a lot of concerns related to the new wood-based bedding that we introduced two months ago, which required different handling than the initial rice-bran-based bedding. The PROBLEMS label initiated an intense discussion on excess liquid, sappy smell of wood, the attraction of occasional insects, and the high air-content of wood-based bedding.
- There was uncertainty if practical wisdom/insights would be allocated to DOS AND DON'TS or into WAYS WE DO IT. Personal workarounds (like using dried tea leaves to absorb excess liquid in bokashi) can fall into both categories.
- Also, in VERIFYING OUR PROGRESS, participants focused on the effects rather than the process when they placed statements in there like 'optimal team growth' or 'happy members' or 'crop, yield + quality', which fits more into the OPTIMUM field above the Action/Situation statement (probably my explanation wasn't clear enough)."

Relationships/Subjectivities

An important aspect of this experiment that is invisible to the observer is the movement away from the word 'workshop' towards the word 'meeting' or 'meetup' to describe the context for using the action situation canvas. The commons-maker initially described these meetups as workshops, and the photos above could easily connote a workshop to the observer, yet I felt the term workshop implied an asymmetric power dynamic. This definition of workshop from the popular design research book *Design. Think. Make. Break. Repeat.* manifests this subtly problematic perspective: 'Co-design workshops bring users, customers, stakeholders and designers together to rapidly critique and iterate on design concepts, ensuring that the needs of the people *we* are designing for remain at the centre of the design process.' (emphasis mine) (Tomitsch et al., 2018, p. 44). While meeting or meetup might still be the wrong words, 'workshop' tends to connote those 'designerly spaces' (Teli et al., 2022, p. 23) that reinforce asymmetric roles rather than 'institutioning the common' (Teli et al., 2018).

Collective action

This experiment was very much an aspirational experiment in building collective action. Could this action situation canvas support the commoners to externalise practices for new members? Would commoners feel greater confidence in leading Soil Trust through this externalising activity? Would any commoners surface to take forward issues that arose? The commons-maker observed: 'I think participants appreciated the canvas as a tool to be listened to and have their insights heard.'. Indeed, the commons-maker made changes based on the insight from the commoners through the action situation canvas, which is reviewed in more detail in the reflect/critique phase.

Artefacts

The action situation canvas retained the rectilinear form of the commons model canvas, for better and worse. The advantage of this rectilinear form was that it was fast and easy to ideate, adapt, reproduce, and record. In popular design thinking parlance, this 'lean design' approach allowed us to iterate and learn quickly rather than investing enormous amounts of time to learn possibly similar lessons. This simplified form was also advantageous in that the commons-maker could interpret, alter, and reproduce it locally using readily available free materials. A clear disadvantage is that ideation and communication are not rectilinear, and there are likely formats that might better support commoners to externalise their practices. In terms of studio experimentalism, #commonize studio would ideally record and share this format for others to further appropriate. Collectively, over time, echoing the suggestion of one commons model canvas paper reviewer, we might arrive at a suite of formats that commons-makers find work well.

1.87. Reflect/Critique

This experiment received a form of desk critique from the Soil Trust co-investigator. Our reflections, many of which are already captured in the previous ARtD phases, resulted in the final Soil Trust experiment, body histories.

Critique

We shared the draft action situation canvas with the Soil Trust co-investigator, who tested it with his students. The following bullets are edited from an email from the commons-maker paraphrasing the critique shared by the Soil Trust co-investigator:

- Participants can be unsure (almost suspicious) why such reflecting together is necessary or beneficial and why the organizers do not simply supply a ready-made manual.

- Participants also may question how to use this communication tool unfamiliar to them when introducing newcomers and how to continue the conversation thereafter.
- Also, often, participants (even design students) tend to mix up the different categories on the canvas, for example, by mistaking 'methods' for 'knowledge'. It raises the issue of clarification and moderation.
- All this means that the usefulness or the enjoyability of shared reflection needs to be evident from the get-go.
- He liked the current labels as is with their simple wording so we will stick with them (no translation into Chinese needed).

This critique resulted in several changes, more to do with how the commons-maker introduced the action situation canvas than the artefact itself. The critique about 'methods' versus 'knowledge' is one reason the commons-maker revised this language, i.e. 'Ways we do it' and 'Do's and don't's', respectively.

Reflection

This desk critique and the commons-makers observations generated two reflections that led to the final Soil Trust experiment, body histories.

First, language complexity characterises generative research far more than it does analytical research. Commons scholars performing analytical research generally do not have to communicate their research to commoners beyond speaking the local language. The researcher must understand the IAD framework, but the commoners do not. For generative research like the action situation canvas, discourse is critical, possibly more so than visual design. How do I communicate with commons-makers and how do commons-maker communicate with commoners (and eventually, how to commoners communicate with each other). Despite being a visualisation artefact, the desk critique of the action situation canvas addressed discourse at multiple levels: how do we introduce the artefact, what words or phrases might work best in the artefact, and what language (Chinese versus English) do we use?

Second, shifting from capitalist to commonist subjectivities requires more divergent thinking. The commons-maker observed that Soil Trust commoners preferred to 'show not tell' others how to make bokashi bedding, and the co-investigator had instructed us to ensure that 'the usefulness or the enjoyability of shared reflection needs to be evident from the get-go'. The commons-maker had attempted to make the action situation canvas fun and useful by contextualising it as a first step in creating a manual. The commoners had vocalised the need for this artefact, but it appeared that perhaps they wished the commons-maker to make

it for them. So how might we support subjectivities through a 'show not tell' design method, which would also resolve some of the language complexity challenges we faced too?

Body histories

Body histories is a riff on oral histories. In essence, body histories explores how embodied practices can be used to sustain a commons. Learning by doing, shadowing, and even the medical phrase 'see one, do one, teach one' all reflect this core human approach to learning. The lacklustre engagement in the more conventional action situation canvas caused us to reflect on what commoners enjoyed doing and to lean into that joy.

Body histories might be considered an archetype of Schön's reflection-in-action, especially when we understand design as a 'reflective conversation with the materials of a design situation' (1992). Body histories also illustrates design's role in converting messes into well-formed problems (Schön, 1985). Lab experimentalism demands that knowledge and materials conform to the lab experiment format. Labs like J-PAL seek to transpose in-house lab techniques to living contexts, aspiring to perform the experiment as closely as possible to conditions of perfect control. Body histories represents a mess that requires studio experimentation before it can be subjected to lab experimentation. Body histories started with the hypothesis that Soil Trust commoners might prefer to create a manual through recording embodied practices, to 'show not tell'. There are too many variables in this hypothesis to adequately perform lab experiments. Do commoners prefer to share embodied practices through photographs, videos, audio recordings, some combination of these, or only in-person? Who should do this recording, when should this recording be done, and how do commoners prefer to share these records? After more substantial studio experimentation, we may have converted this mess into a well-formed problem that lab experimentalism is placed to answer.

1.88. Purpose

This experiment continued the same purpose as the previous experiment, which is to find ways to shift subjectivities of this bokashi-making commons from the commons-maker to interested commoners. Responding to the suggestion by several commoners to create a manual, the previous experiment tested infrastructure for co-designing the manual. The observations from that experiment resulted in trying a different tactic, the more hands-on approach of this experiment. The intention was to engage the many children who had consistently participated in monthly meetings to record their parents' performance.

1.89. Plan/Design

The commons-maker instructed commoners to bring their bokashi container into TinYeah for this meeting so they could demonstrate how they make bokashi to new commoners. The commons-maker and I also discussed introducing additional bokashi commons-making practices at each monthly meeting as a method for shifting responsibilities. For this meeting, the commons-maker decided to introduce eggshell-grinding. Previously, the commons-maker ground eggshells and distributed them to commoners. In this meeting, commoners would grind eggshells to be added to their bokashi bedding.

Commons literature

This experiment focused on informing commons literature and commons-making research through design methods. Body histories captures the interactions that take place in an action situation. During the plan/design phase, we discussed capturing different practices to respond to different aspects of the action situation, e.g. how to resolve odour issues with your bokashi jar.

Design methods

This experiment ventured into territory that is more often associated with (performance) art than design, yet the use of performance here is entirely in service to commons-making. The commons-maker cited *The Hand: How Its Use Shapes the Brain, Language, and Human Culture* (Wilson, 1999) and *The Craftsman* (Sennett, 2008) as inspirational sources for this approach. We might say that we were undertaking 'social practice design'. Though this term was coined in a 2012 paper (Jacucci & Campagnolo, 2012), there has been little uptake since, so I believe this term could be reclaimed. Social practice design is an appropriate term because the purpose of body histories is to support commoners to design the social practice of bokashi-making and their bokashi-making commons.

The originators of the term 'social practice design' explained its role as, 'emphasizing the need to support the organizational change implied by not only the introduction of new technologies but also by the introduction of new participative methods.' (Jacucci & Campagnolo, 2012, p. 274). The authors go on, problematically, to make social practices subservient to technology:

> It can be considered an extension of the Participatory Design to the implementation phase of information systems. Its object is the design and introduction of new participatory activities, or new ways to accomplish tasks by humans, in order to "make

room" for technology, addressing various issues related to the social deployment and use of technology in organizations.

This relationship-framing, introducing participatory activities to make room for technology, has been inherited from participatory design's roots, but it remains at odds with social practice theory. Social practice design could equally be about changing technology to 'make room' for desired social configurations. This experiment, therefore, explores social practice design as a way of introducing a different participative method, body histories, for commons-making.

Experiment design

There were two components to this experiment design: performance and recording.

The context was logical for the commoners. There were several new commoners, other TinYeah customers who had recently joined this bokashi-making commons, who needed to learn how to make bokashi. This October 2022 meeting was a good opportunity for veteran commoners to demonstrate their practices to new commoners. The veteran commoners were asked to bring in their bokashi containers so they could demonstrate their techniques. The commons-maker set up two tables, or we might say two 'stages', a term adopted from performance by service design. The rest of this performance process was unscripted, other than the commons-maker preparing prompts as back-up.

The second component was recording performances, a way to document practices in this embodied rather than textual version. Building on critique from the PDC22 workshop, we decided that recording would be an ideal responsibility for the children in the group, using their parents' phones.

1.90. Act/Make

In the immortal words of Burns (1786), 'The best-laid plans of mice and men go oft awry.'. Despite children's presence at every previous meetup, no parents brought their children to this meetup, for reasons unknown. The commons-maker decided to abandon the plan to record practices at this meetup and instead let all participants engage in sharing and observing each other's bokashi-making practices. At the time, the commons-maker believed we could reproduce this process at the next meetup instead.

1.91. Observe

The primary observations for this experiment are the photos and annotations from the commons-maker, which are combined below.

Language/Ideas

Observations from commons-maker:

- 'My team got the impression that for about 10 families, the food waste bokashi collection has become second nature, another routine like flossing teeth'
- 'We also introduced a new practice of grinding dried egg shells to substitute the bedding culture with calcium powder (essential for healthy soils, plant anatomy and human bones)'

Body histories approached commons-making through the lens of embodied practices, accompanied sometimes by verbalisation or oral history, rather than the textual discourse of previous experiments. The embodied practices or 'routines', such as mixing bokashi container ingredients and grinding eggshells, became the language of the commons. The role of oral history and embodied practice is ancient, but its use for commons-making is far less understood or developed. Certainly, modern digital technologies transform oral/body histories from a technique that is limited to the direct exchange between people in-person to a mechanism for scaling out practice beyond the immediate interaction. The closest approximation for recording and sharing body movement might be dance notation, which ranges from generalised systems like Labanotation to specific systems like Beauchamp–Feuillet Notation for Baroque dance. Such detailed, technical systems are likely overkill at this point, but they raise the question: What forms might 'commoning notation' take?

Relationships/Subjectivities

Observations from commons-maker:

- 'the meeting went really well: the old member really taught the new members the bokashi, bedding, and eco-enzyme practices in hands-on demo.'
- 'Basically my team stepped back and opened the stage for mutual experience exchange'
- 'We have 3 protagonists who became the main mentors'

A shift in relationships or subjectivities was far more observable in this experiment than in others, with commoners 'taking the stage'. Much like the LARP step in the commoning blueprint with the university students, this approach created an approachable and enjoyable

pedagogical context. The concept of veteran commoners showing new commoners how to do something is clearly not novel. What this experiment highlighted, then, was the necessity of incorporating body histories into the commons literature. The SES framework, for example, identifies a number of interaction types, such as harvesting and investment activities. This experiment highlights a type of activity that is not overtly stated in commoning frameworks: Teaching other commoners to sustain the commons.

Collective action

Observations from commons-maker:

- 'Waste as socio-ecological bonding material (we have to remember that conventional households in HK toss out waste as quickly as possible: who would play with spent tea leaves, ground coffee, food scraps and sawdust drenched in catalyst?)'
- 'In HK everything seems so fast-lived and things come and go very quickly, so for this social waste community still to exist is a little miracle'

This bokashi-making commons endured against many odds. Strict Covid-19 restrictions dominated the entirety of commons-making, and mass emigration during this period resulted in several households leaving Hong Kong. The dissolution of this commons was not due to commoners abandoning the commons, or a change in community attributes in commons scholarship discourse. Rather, the sale and closure of the farm the community gave their bokashi to, a key biophysical condition, meant their bokashi compost had no home. In other contexts, the loss of a farm to receive free compost could easily be resolved by finding another farm, but this proved challenging in the Hong Kong context. These observations also point to the role of non-human species in collective action. Excess food waste became a 'bonding material' for commoning in the commons-maker's observation. Commons scholarship has historically treated non-human nature as a desensitised, countable input. In Soil Trust, the commons-maker encouraged commoners to explore and share their sensory experiences and to relate to soil as more than an input.

Artefact

The observable artefact/s of this experiment are limited to the photos taken during the meeting. It is possible that still photographs are sufficient for sharing practices, as photos or illustrations are used as instructions elsewhere. The photos do present a question: Which media types are helpful when? For example, when do we need photos versus videos, audio recordings, animations? Body histories is ephemeral without a recording, yet maybe there are certain embodied knowledges that simply cannot be shared except in this form.

Figure 80. Soil Trust commoners showing each other how they make bokashi (top) and getting to know the new bedding ingredients (bottom).

1.92. Reflect/Critique

Critique

This experiment was the product of extensive desk and peer critique from previous experiments but did not receive any direct desk or peer critique itself. Nevertheless, commoner engagement with this experiment strongly underscored another form of critique that might need a name for future #commonize studio experiments. The mundane term that comes to mind is 'commoner feedback', instead of 'user' feedback. User or customer feedback does not feature in the studio pedagogy literature, perhaps because few university studio projects are useable. Even the papers that conducted experiments through studio, where students produced artefacts for potential real-world use, offered no discussion of user/customer critique or feedback. There is clearly scope for the Soil Trust commoners to perform peer critique in the future, e.g. they collaborate in some form to design these future body histories experiments. In this specific experiment, though, critique was unsolicited and informal, leaving the commons-maker to perform designerly reflection-in/on-action.

The conception of infrastructuring as relational (Chapter 1.5) becomes more helpful now. Body histories took place in a liminal space where subjectivities and relationships had not yet shifted. The commons-maker aspired for this community to view themselves as commoners responsible for their commons, but the community members had not yet made this shift. The practice, the infrastructure, might be the same, but the way people relate to it may change over time. At the time of this experiment, we would probably call this feedback. In a future where the smiling faces in these photographs have made the 'OntoShift' to the commons, we might call it peer critique.

Reflection

The written and visual artefacts suggest that both the commons-maker and the commoners enjoyed and valued this experiment more than any others. While this specific experiment was not recorded for detailed analysis, it is easy to imagine how future experiments could bridge the ephemeral nature of performance with the data recording modes that support scaling out. In a proposed set of experiments by the commons-maker for another project, commoners will be outfitted with GoPro cameras so they can record their social practices alongside think-aloud protocol (Kinsley et al., 2016) to improve their collective practices. This approach is a type of social practice design in which technology is being used to make room for social practices and commons formation.

#commonize studio design brief

The design brief is a classic tool for designers as well as in professions like web development, a living interface between the designer and the 'client'. For most of the experiments captured in this thesis, problem-scoping and problem-setting was *ad hoc*. We had conversations online, I took notes, I wrote up ideas often via email, and we carried on. This experiment was a deliberate exploration into creating process for #commonize studio. I developed a prototype and tested it with the commons-maker at a conference workshop titled '#commonize Studio: Creating Design Briefs for Disruptive Economics' (Sacks, 2022b). Opening the process to workshop participants added a level of peer critique that is typically not part of design brief development. As a first iteration, the design brief presented successes and failures. Importantly, though, the commons-maker articulated exactly how it impacted his thinking about the next steps of commons-making.

1.93. Purpose

I will start with the full workshop abstract, which serves as both an introduction to the experiment and also an artefact that records my thought evolution since commencing doctoral research:

> What if we treat economics as design rather than social science? #commonize studio explores what a design studio that supports communities to build commons looks like. The projects supported so far range from a 'soil trust' to upcycle food waste in Hong Kong to a 'public-commons partnership' for blood donation in Botswana. The approach in all of this work, which has evolved into a combination of designer and coach, is to develop the 'things' that commons 'instigators' need to build commons. The majority of what has been produced so far might be considered boundary objects -- translations of the commons literature that enable emerging communities to create their own commoning worlds. Examples range from broad frameworks (e.g. Commons Creation Framework) to activity-based tools (e.g. more-than-human member persona), and 'commons planning' documents (e.g. pluriversal Commons Model Canvas). In this workshop, we will focus on the design brief. A design brief outlines the 'client's' challenge and how they think the designer/s can solve it. 'Creating design briefs for disruptive economics' is a workshop where willing participants can share their challenges, and we'll create design briefs through collective Q&A that address how we, as a momentary #commonize studio, might support the participant's progress. (Sacks, 2022b)

This was the original purpose of the workshop. As is often the case, the context changed between submitting this abstract and performing the workshop, reviewed next.

1.94. Plan/Design

The #commonize studio design brief overall tried to preserve the qualities of a design brief, keeping to one page, while reframing the information categories to prompt 'commons thinking'.

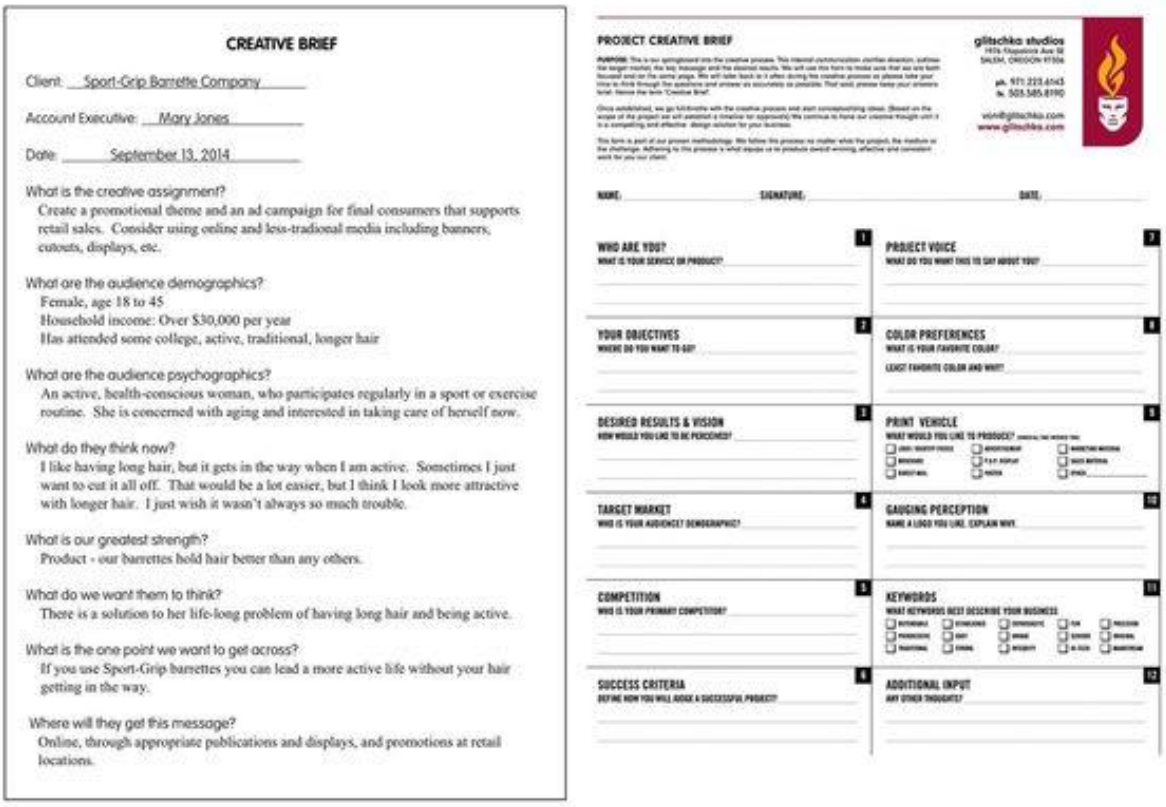
Commons literature

Iterations of the design brief drew on various combinations of commons literature that have all been reviewed in previous chapters. The novel aspect of this experiment was the incorporation of ideas and terms created in previous experiments, particularly the ideas, terms, and learning generated by Soil Trust in previous chapters.

Design methods

The principal design method employed in this experiment was the design brief. There are near-infinite permutations of a design brief, and they typically include some combination of: project deliverables, budget and timeline, target audience, design goals and objectives, project scope and overview, brand overview, and competitor analysis (Team Asana, 2022).

In Canva's blog post, 'How to write a design brief that gets you results', what becomes clear is that most design briefs are only one page long, and only one side of one page (DeFelice, n.d.). Similar to executive summaries, these one-page documents capture summative information. The design brief might capture, for example, the target audience, while a more detailed marketing plan will be developed separately. Another reason design briefs are one page is that they are living documents, periodically modified as the project unfolds.



CREATIVE BRIEF

Client: Sport-Grip Barrette Company

Account Executive: Mary Jones

Date: September 13, 2014

What is the creative assignment?
Create a promotional theme and an ad campaign for final consumers that supports retail sales. Consider using online and less-tradional media including banners, cutouts, displays, etc.

What are the audience demographics?
Female, age 18 to 45
Household income: Over $30,000 per year
Has attended some college, active, traditional, longer hair

What are the audience psychographics?
An active, health-conscious woman, who participates regularly in a sport or exercise routine. She is concerned with aging and interested in taking care of herself now.

What do they think now?
I like having long hair, but it gets in the way when I am active. Sometimes I just want to cut it all off. That would be a lot easier, but I think I look more attractive with longer hair. I just wish it wasn't always so much trouble.

What is our greatest strength?
Product - our barrettes hold hair better than any others.

What do we want them to think?
There is a solution to her life-long problem of having long hair and being active.

What is the one point we want to get across?
If you use Sport-Grip barrettes you can lead a more active life without your hair getting in the way.

Where will they get this message?
Online, through appropriate publications and displays, and promotions at retail locations.

PROJECT CREATIVE BRIEF

glitschka studios

NAME: SIGNATURE: DATE:

1 WHO ARE YOU?
WHAT IS YOUR SERVICE OR PRODUCT?

2 YOUR OBJECTIVES
WHERE DO YOU WANT TO GO?

3 DESIRED RESULTS & VISION
HOW WOULD YOU LIKE TO BE PERCEIVED?

4 TARGET MARKET
WHO IS YOUR AUDIENCE? DEMOGRAPHIC?

5 COMPETITION
WHO IS YOUR PRIMARY COMPETITOR?

6 SUCCESS CRITERIA
DEFINE HOW YOU WILL JUDGE A SUCCESSFUL PROJECT?

7 PROJECT VOICE
WHAT DO YOU WANT THIS TO SAY ABOUT YOU?

8 COLOR PREFERENCES
WHAT IS YOUR FAVORITE COLOR?
LEAST FAVORITE COLOR AND WHY?

9 PRINT VEHICLE
WHAT WOULD YOU LIKE TO PRODUCE?

10 GAUGING PERCEPTION
NAME A LOGO YOU LIKE. EXPLAIN WHY.

11 KEYWORDS
WHAT KEYWORDS BEST DESCRIBE YOUR BUSINESS

12 ADDITIONAL INPUT
ANY OTHER THOUGHTS?

Figure 81. Design brief examples from popular web platform Canva (DeFelice, n.d.).

Experiment design

The original plan detailed in the workshop abstract was to test a version of the #commonize studio design brief with workshop participants. The workshop time was later limited to 1.5 hours, and my previous online workshop experiences caused me to decide to bring one of the studio partners to this workshop in case participants were more interested in observing than participating. The experiment design became instead a type of peer crit. I spent the entire workshop period working through the design brief with the commons-maker while participants observed and interacted. Some of these interactions were made on the shared Google Jamboard document, while others were posed as questions/comments during the workshop.

We used this experiment as an opportunity to explore the anticipated next steps for Hack4Blood. At this point in time, the workshop with NBTS was being planned (Chapter 0). We knew that the next steps would need to engage the kgotla, following the ecosystem mapping process we had outlined earlier. The NBTS workshop was more straightforward: the workshop would be conducted in English, held at NBTS office space that came equipped with internet, we would join remotely via laptops, and the participants were all literate and comfortable writing ideas on sticky notes and putting them on flipchart paper. The

workshops with kgotla would look different in all of these respects. What would ecosystem mapping with kgotla look like? This became the focus of the design brief experiment.

1.95. Act/Make

Similar to previous experiments, there were two phases of act/make:

1. Making the design brief, and
2. Completing the design brief with the commons-maker and workshop participants.

I developed several iterations that looked like a questionnaire, similar in form to the design brief in Figure 81. I decided that the visual form offered value. Just as we used positioning for the commons model canvas, I considered how to use the positioning of text boxes to prompt commons thinking (Figure 82).

CONTEXT *What is the next step?*	**MEMBERS** *Who will be involved in this work?*	**INTERACTIONS** *How will members interact?*	**RECORDS** *How will knowledges be recorded?*
Work so far	Member Types	Methods	Written, audiovisual, experiential
Challenge ahead	Knowledges & Customs	Materials	Commonized design Increasing political agency? = Members control decisions. [direct, delegated] Increasing economic agency? = Members control resources. [physical, digital, cultural]

Figure 82. #commonize studio design brief blank template.

The design brief was intended to focus the commons-maker on the action situation of concern. Much of the discourse visibly draws from the earlier work on the commons model canvas and action situation canvas. The design brief is organised as columns so will be reviewed from left to right.

Context. In contrast with most design briefs, the #commonize studio design brief knows that it captures a moment in time that is part of a continuous cycle of commoning or co-design. Studio partners have ranged in their context. In the case of Hack4Blood, there had been action situations that preceded the current state of play, such as the previous research the

commons-maker had conducted with Spectrum Analytics, as well as planned action situations, such the anticipated workshop with NBTS. These prior and anticipated action situations become the problem-framing for the design brief, but like all problem-framing in design, we might have it wrong. In a sense, the context records some of the assumptions that a commons-maker makes about the action situation under consideration. Context is divided between 'Work so far' and 'Challenge ahead', which can otherwise be thought of as the past and future context. The sole prompt provided here is: 'What is the next step?'.

Members. By this point, the use of members may seem familiar, but this commons thinking prompt remains important. This column aims to prompt the commons-maker to consider which actors need to be part of the action situation. The top row, 'Member types', could have prompts in the future but was left open for this experiment. The bottom row, 'Knowledges and customs', essentially seeks to tease out the rules-in-use from the IAD framework that are present in this action situation. The sole prompt provided here is: 'Who will be involved in this work?'.

Interactions. This is the first experiment where I more directly pull in interactions as a way to prompt commons thinking. While previous experiments have focused on the contextual factors, this experiment and the next experiment change the emphasis to interactions. The two rows in this column borrow from the commons model canvas. 'Methods' could be likened to practices and 'Materials' could be likened to assemblages. The sole prompt provided here is: 'How will members interact?'.

Records. The final column owes its existence to the action situation canvas experiment with Soil Trust (Chapter 0). We learned from this experiment that commoners prefer to record their knowledges in diverse ways, and often not as a neat written report. The prompt offered is: 'How will knowledges and customs be recorded?'.

Commonized design. The bottom-right box in this brief is static. This text is intended to remind those using the design brief template about the purpose of commonising resources. This text is adapted from an early presentation that received positive interest in the two years since it was recorded (Sacks, 2021a). I considered developing commonized design as a type of design for my doctoral research but decided against it. On one hand, the design research world is replete with fill-in-the-blank design, yet maybe commonized design is necessary to guide commons-makers?

In terms of completing the design brief, we moved from left to right through the design brief template. To accommodate group work, I created a separate Google Jamboard slide for each column. In principle, sticky notes could be color-coded based on whether they were created

by the commons-maker, workshop participants, or me. In practice, sticky note colours followed no logic and could belong to anyone.

The first section, Context, was primarily for the benefit of the workshop participants, as the commons-maker and I had already discussed context prior to the workshop (Figure 83).

Figure 83. Context slide of design brief completed during workshop.

The Members discussion (Figure 84, top) began new territory for #commonize studio and the workshop members. The commons-member elaborated on how the kgotla system works. This process was not one-way, though. According to the commons-maker, this discussion caused him to realize that the district commissioner and minister of local government would need to give approval to this process, and so they should probably be involved in the upcoming workshop with NBTS.

The Interactions discussion (Figure 84, middle) was probably the most divergent from Global North understanding. The commons-maker suggested, for example, ways that villagers could ideate using sticks on the ground or draw on a large banner pinned up on a kgotla wall and left unattended so as not to intimidate people. During this discussion, the commons-maker expressed some unease that his ideas were tied to his positionality and the kgotla with which he was familiar, while people from other villages might have other ideas. The discussion about interactions was the most complex and information dense. I took separate notes from the shared Google Jamboard for this element of the design brief (Figure 85). The final compiled design brief (Figure 86) drew on both the Google Jamboard and these notes.

For Records (Figure 84, bottom), most ideas identified photographic records and possibly interviews. The interactions described earlier, such as drawing on the ground, generated questions about how to record such ephemeral data.

I then reviewed and assembled the individual slides into a single design brief that the commons-maker reviewed and approved (Figure 86). This form would likely need to be revised again to become a living, shared document across commoners. Nevertheless, the process, which took one hour, did rapidly paint a picture of how ecosystem mapping might look with kgotla and, particularly, the different capacities, techniques, and materials we would need to perform this step in Hack4Blood.

1.96. Observe

The design brief was reasonably successful for a first-run experiment for two disparate reasons:

1. The commons-maker evaluated it positively after completion, and
2. I understand the design brief a year after it was created because it is both legible and well-organised.

Languages/Ideas

As a design brief for commons-making, there is tremendous depth to the languages and ideas embodied in this artefact. Almost every aspect of this brief responds to learning emerging from previous experiments. The design brief has chosen to simplify commons-making to three features:

- Members: Who will be involved?
- Interactions: How will members interact?
- Records: How will knowledges be recorded?

The most notable feature is Records. Members and Interactions can be traced to most commoning frameworks, e.g. community attributes (IAD) or actors (SES). Records does not appear in these frameworks, yet Records has become the critical feature of commons-making as well as studio experimentalism. Notably, it is the Soil Trust commons-maker who identified this missing piece, which illustrates the role of commons-makers in transforming commons scholarship for generative purposes.

As a minor point, on reflection, this artefact does not communicate that it is a design brief. An observer would only know to read it as a design brief if informed so. This could perhaps be inserted into the static bottom-right corner.

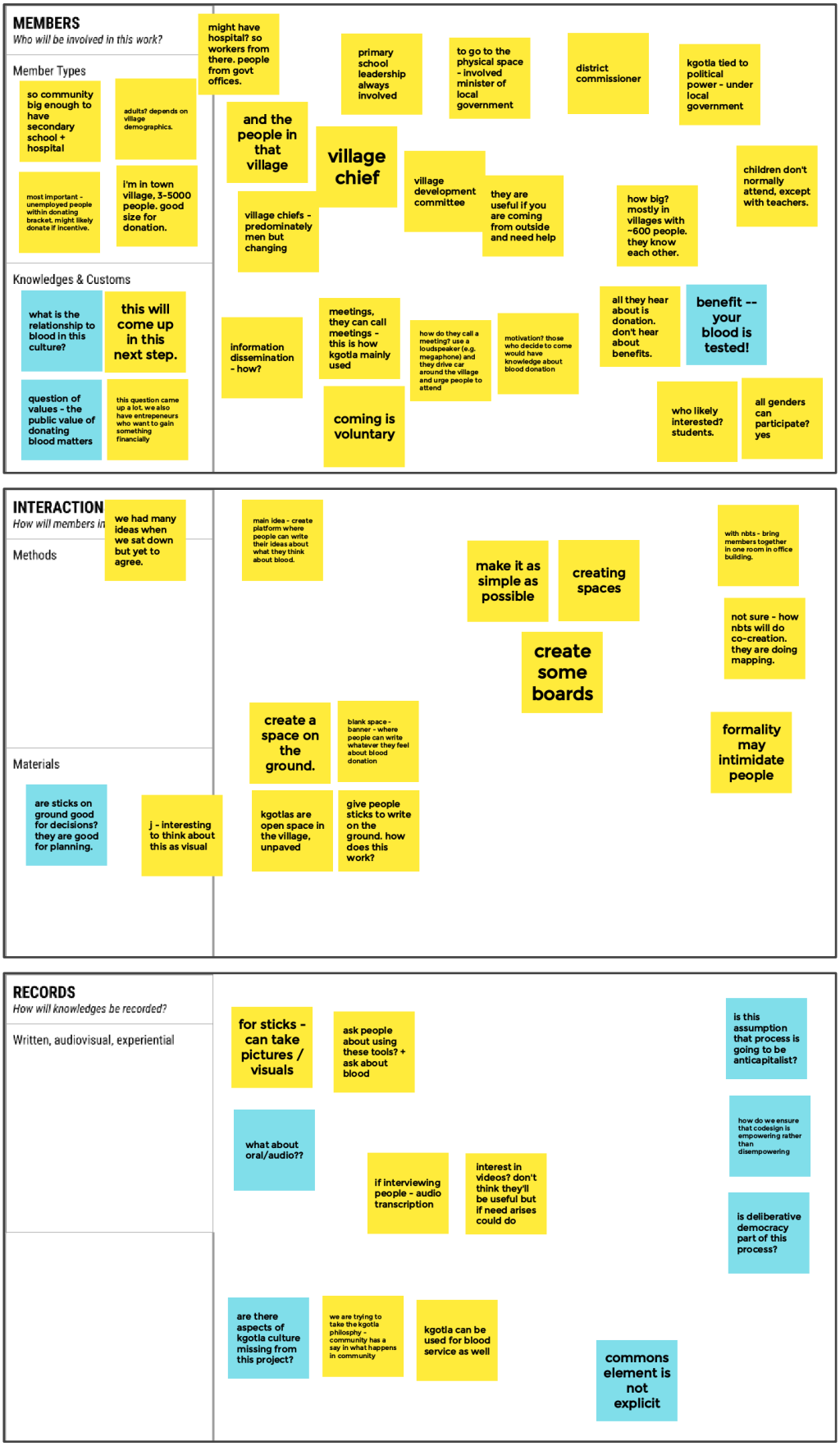


Figure 84. Design brief slides from workshop: (top) Members, (middle) Interactions, (bottom) Records.

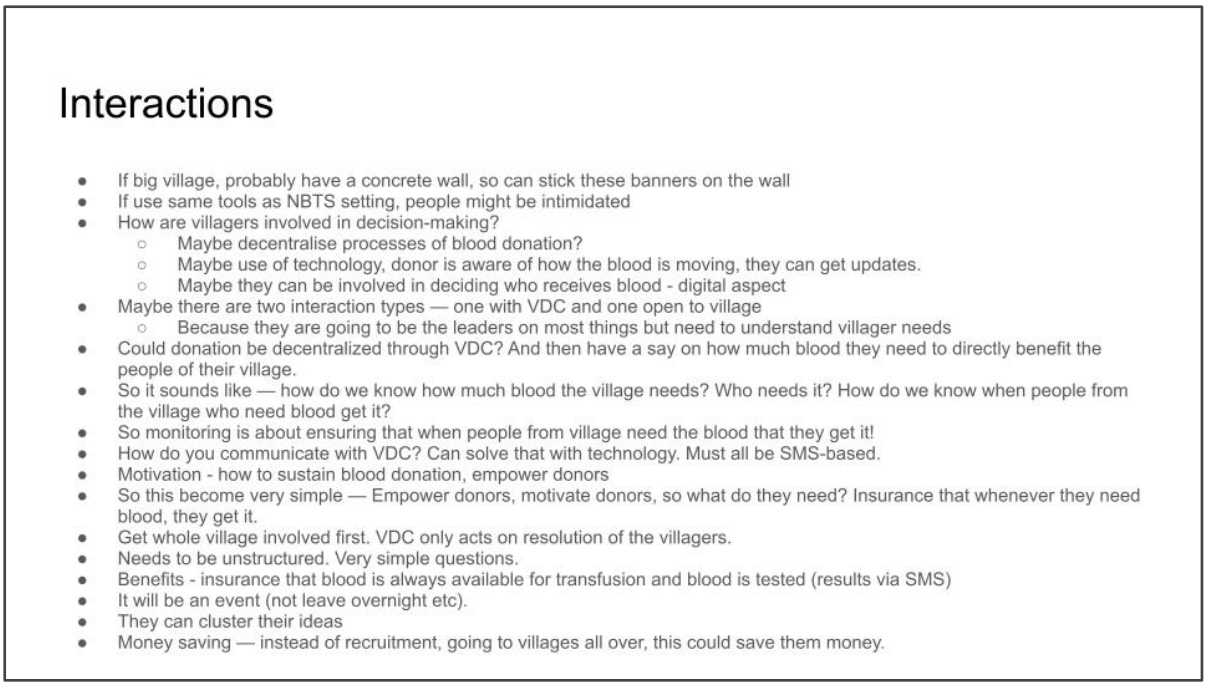


Figure 85. My notes while performing the Interactions slide of design brief.

CONTEXT *What is the next step?*	**MEMBERS** *Who will be involved in this work?*	**INTERACTIONS** *How will members interact?*	**RECORDS** *How will knowledges be recorded?*
Work so far • Organizing Workshop with NBTS • Realized from this process need to invite OP and others • How might we show participants at the NBTS workshop what the next step looks like?	Member Types • Community large enough to have hospital and secondary school • Also government workers • Town of 3-5,000 people is good • Maybe also one with 600 people • Village chief • Village development committee • District commissioner • Minister of local government • Students - must come with teachers	Methods • Hang banner paper or boards in kgotla for people to write/draw on • People can draw on ground with sticks • Make it as simple as possible • Create spaces • Formality may intimidate people	Written, audiovisual, experiential • Photos of banner paper • Photos of ground • Interviews? • Other approaches?
Challenge ahead • People can say whatever they want in kgotla • Use that space to find solutions • Commons adds layer of power • Understand how village members understand ecosystem • Understand how they find benefits • JS: Making ecosystem visible from both kgotla/villager perspective • JS: Creating initial commoners from first groups	Knowledges & Customs • Anyone can say anything • Meetings called by driving around with loudspeaker - this is how we announce it • Village of 600 people know each other • Motivation: people who already have knowledge about blood donation • Students interested in learning • Benefit: your blood is tested!	Materials • Banner paper • Writing objects eg marker • Sticks	Commonized design Increasing political agency? = Members control decisions. [direct, delegated] Increasing economic agency? = Members control resources. [physical, digital, cultural]

Figure 86. Final design brief

Relationships/Subjectivities

Changes to relationships/subjectivities was not an objective of this experiment.

Collective action

By this point in #commonize studio, two types of collective action began emerging, which I will term 'collective building' and 'momentary studio'. The initial collective action aspiration, which was also described in the PDC22 workshop abstract, was that these workshops would catalyse collective formation. That is, the workshop would coalesce other commons-makers or scholars interested in commons-making into a nascent network or community. This is what I term collective building. However, with the exception of the PDC22 workshop, I had no idea who planned to attend these workshops or who ultimately attended. Participant anonymity across all of these workshops met research ethics standards but stymied collective building. At the same time, I had no obvious collective for people to join. #commonize studio did not really present a solid collective to join.

The other type of collective action that did emerge from this and other experiments was 'momentary studio'. By this I mean the vibe of successful peer critique. Did participants feel comfortable enough to engage in peer critique? Did the commons-maker receive this peer critique constructively? Did we all emerge changed from this experience? Momentary studio may be quite similar to how others, outside design, experience successful workshops. In the case of #commonize studio, we have peer critique from studio pedagogy, as a benchmark.

Artefact

The completed design brief is the principal observable artefact of this experiment. Reviewing it nearly one year after it was completed is a form of evaluation (laughable on one hand, but deadly serious on the other!). Do I understand what we wrote? Does it capture what we then went on to do after creating this design brief? In comparison to some other #commonize studio artefacts, I find the design brief more successful as a record of a moment in time of an experiment. For this reason, further iteration on the design brief is useful, at minimum as a form of record-keeping. There are clearly many options, from changing content, terms, and positions. At the time of writing this thesis, we had not found funding to pursue ecosystem mapping with kgotla, so there is no next step that would offer more informative evaluation of this artefact. Both the commons-maker and I expressed that this hour we spent on the design brief was productive and worthwhile, which is a minimum and important evaluative point.

1.97. Reflect/Critique

Critique

This workshop combined both desk critique and peer critique.

I was performing desk critique with the commons-maker for the majority of the workshop. This desk critique differed from traditional desk critique, such as the intimate desk critique performed with the commons model canvas, because it was performed in front of workshop participants. For this reason, we might reasonably expect the commons-maker to be more guarded, though I felt the commons-maker was extraordinarily honest throughout the workshop.

The workshop participants understandably took some time to become familiarised with the project and then comfortable posing questions. The conference organiser noted by email that, 'I popped in a few times and it looked really engaged', so I do think it is fair to say that workshop participants became sufficiently comfortable to perform peer critique during the workshop.

The majority of visible peer critique appears in the 'Records' slide (Figure 84, bottom), where all of the sticky notes along the right side of the slide are attributable to workshop participants:

- 'Is this assumption that process is going to be anticapitalist?'
- 'how do we ensure that codesign is empowering rather than disempowering'
- 'is deliberative democracy part of this process'
- 'commons element not explicit'

This workshop took place at a political ecology conference titled *Deep Commons 2022: Cultivating Ecologies of Solidarity and Care Beyond Capitalism, Patriarchy, Racism and the State*, so workshop participants were naturally more interested in counter-hegemonic commons than in most other experiments. I cannot say if these comments directly impacted the next experiment, action situation blocks. I can say, though, that I interpret these comments differently now than when I started my research. Earlier on, I might have felt responsible for making commons more 'explicit' or addressing deliberate democracy. Now, I would react differently. Instead, I would ask us how we can better understand kgotla to inform how we think commons and democracy might be practiced.

Reflection

My principal reflection from this experiment is the importance of 'Records' in the design brief. In the Soil Trust experiments, particularly body histories, I observed how important

diverse methods of recording and sharing practice may be to commons-making. Here, the commons-maker began identifying suitable methods and materials for recording data that might bridge the different cosmologies of the state (NBTS) and the commons (kgotla). While the #commonize studio experiments recorded in this thesis do not resolve this challenge, future projects seek to address this recording question head on.

Action situation blocks

This is the last experiment completed within the timeframe of the thesis. Action situation blocks was the next step after I published the paper, 'Botswana Blood Commons', co-authored with the commons-maker for Hack4Blood. The commons-maker shared this paper with Spectrum Analytics, the instigator of Hack4Blood, and Spectrum Analytics in turn shared the paper with NBTS. While we hoped to hold this first workshop earlier, the workshop was pushed back from autumn 2022 to February 2023 as NBTS was occupied with a national blood donation campaign. This experiment is also an experiment in mostly hands-off experimentalism. I had limited information about the context, objectives, and meeting parameters. I was not present at the workshop and relied on Spectrum Analytics to record and share data.

1.98. Purpose

The purpose of this experiment was both functional and strategic. The functional purpose was to complete the first step of ecosystem mapping with NBTS as outlined in the PDC22 paper. The strategic, or perhaps pragmatic purpose, was to enthuse NBTS participants to want to continue this process. I state this second, strategic purpose because, ultimately, the interest of NBTS to continue the work mattered more than what the workshop produced.

1.99. Plan/Design

For this final experiment, I am going to change how I review commons literature and design methods. By this point in #commonize studio, I had begun to reference previous experiments for both commons literature and design methods. In essence, #commonize studio had begun to generate its own discourse and methods.

Commons literature

The action situation blocks built on similar commons literature concepts as several previous experiments, namely the action situation. I wish to focus on how I explained commons to

NBTS. I shared one slide with a short definition, a breakdown of 'dimensions', with examples for each dimension (Figure 87).

This discourse contrasts greatly with how I explained commons in early experiments. Rather than speak of physical commons and digital commons as separate examples, I explained commons as a singular commons having multiple dimensions: physical, digital, cultural. I also described the community as a 'community of actors', rather than people, as I had in prior definitions. This language creates space for more-than-human commoning. Finally, I inserted a parenthetical '(not the state or private market)' to call out commonised resources as outside these two familiar sectors. I inserted this parenthetical for this experiment in particular because of the direct collaboration with the state, which was not a feature of other studio projects.

The only other commons literature I introduced in the workshop was the diagram of the public-commons partnership model for a blood service from the paper (Figure 53).

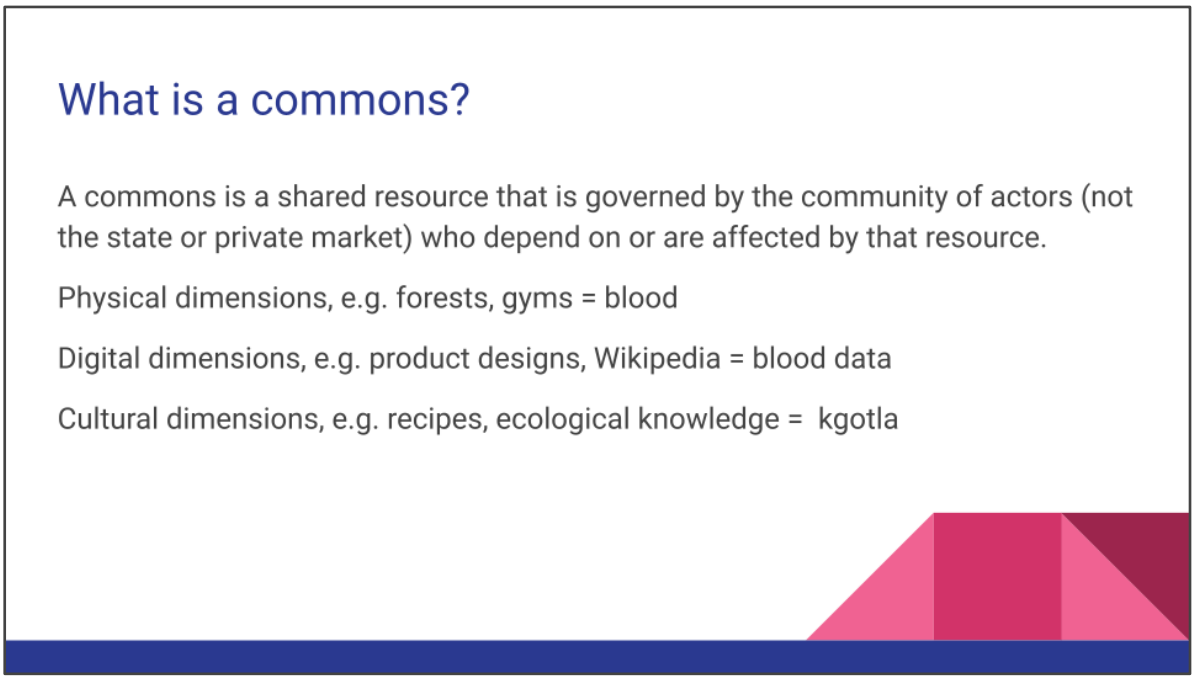


Figure 87. Commons explanation slide from NBTS workshop.

Design methods

This experiment benefited from the learning of previous experiments, so the action situation blocks share a recognizable lineage with the commons model canvas (Chapter 0), action situation canvas (Chapter 0), and design brief (Chapter 0).

The primary design method used in this experiment was the 'action situation block' (Figure 88), itself a reference to previous #commonize studio experiments. I had also iterated on

methods that engaged participants in physical role play, drawing on the experiments with the commoning blueprint (Chapter 0) and body histories (Chapter 0); however, these methods were removed due to time constraints.

The visual design is a familiar rectilinear form, for better or worse, but intentional because it is easy to replicate in a variety of materials and contexts. The four categories relate most clearly to the 'network of focal action situation' more prevalent in the CIS framework.

The action situation blocks effectively disassemble the action situation statement from previous experiments. As explained earlier, 'The purpose of the action situation statement is to frame the action situation canvas: which members (who) are performing what practices/interactions (what) in what location (where).' (Chapter 1.85). The action situation blocks turn these three components of the action situation statement into separate boxes for ideation. The fourth box, Verification, is directly attributable to the studio experimentation of the Soil Trust commons-maker in designing the action situation canvas (Chapter 1.85). One can imagine how the Verification quadrant could become that pivot point the commons-maker suggested. For example, if the 'Kgotla Association' makes decisions about how many residents will donate each period, how will NBTS or other kgotla know that each kgotla has complied with or violated this rule?

Experiment design

There was an original experiment design, which the commons-maker and I developed, and Spectrum Analytics transformed into a branded image for participants (Figure 89). The experiment ultimately made it to the sixth row of this agenda, 'Donation' under 'Part A'. We cut the rest of the experiment because the group was highly engaged and posed many questions to Spectrum Analytics, the commons-maker, and me, which we encouraged.

I will still review the experiment design, especially as it has informed future experiments. The concept of a current state (Figure 90) versus a preferred commonised state (Figure 91) has since been useful in future experiments. This framing enacts Simon's definition of design. Recognising that naming current and preferred states is political, we had planned to conduct a similar process with kgotla. This process mirrored how the commons-maker had developed ecosystem maps between actors, to compare and contrast how these two stakeholder groups understood the current state.

ACTORS	INTERACTIONS
Who is involved in this specific action situation? Individuals Groups Non-human species	How do actors collaborate to solve the action situation? Which actors What actions How often How long
PLACE	**VERIFICATION**
Where do interactions between actors take place? Physical spaces Natural features Tools Technology	How do actors know interactions took place? Monitoring Compliance See Hear Write down Text Photograph

Figure 88. The final 'action situation blocks', given to studio partners as digital file.

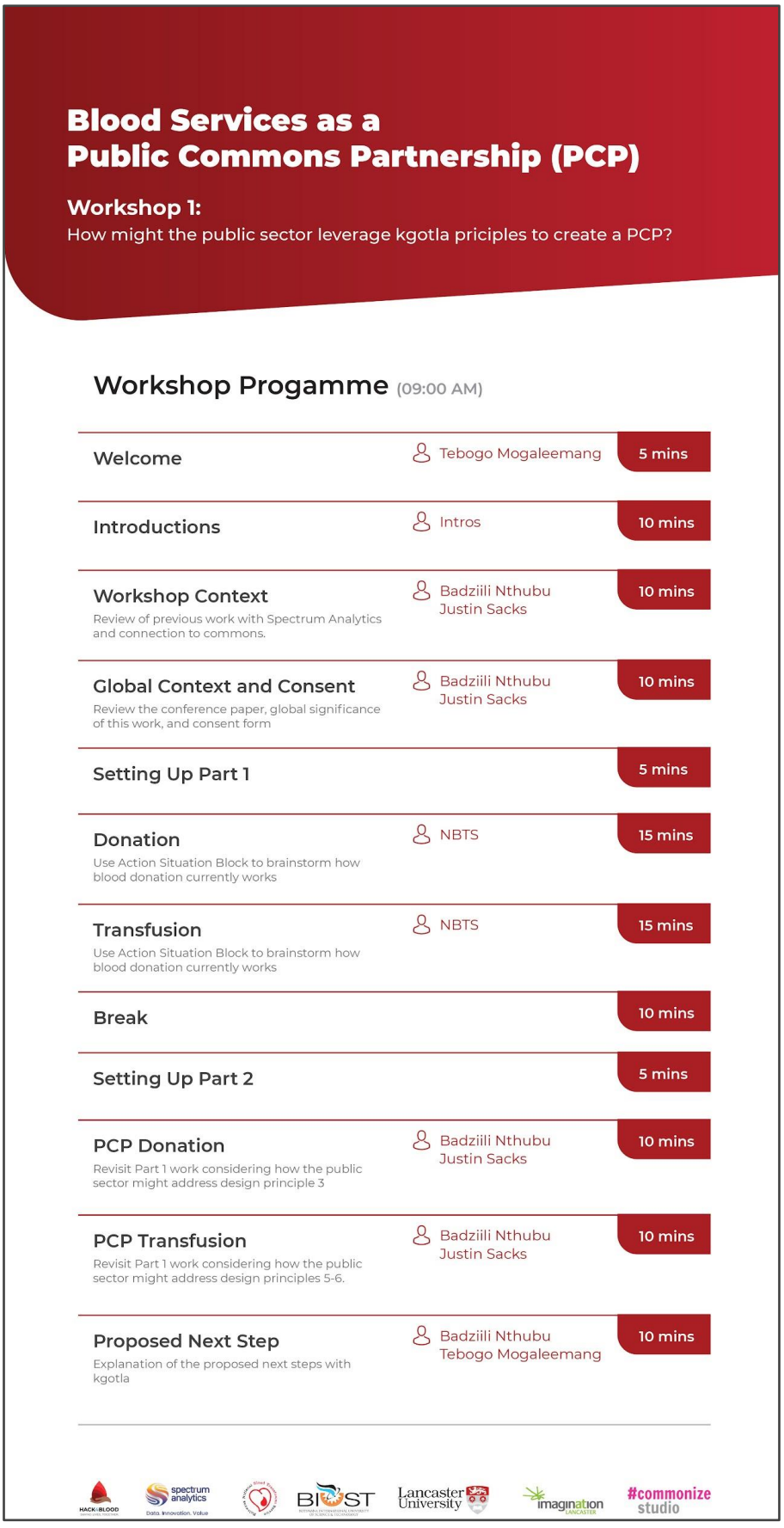


Figure 89. The agenda shared by Spectrum Analytics with workshop participants.

Part 1 of the experiment sought to provoke NBTS to identify the actors, interactions, and place qualities involved in a specific action situation, which I described as donation in a village. I spent about one hour reviewing the entire workshop design with Spectrum Analytics, who would be the in-person facilitator for this workshop.

Part 2, which was not pursued in the workshop, sought to provoke NBTS to speculate about what a fictional public-commons partnership might look like (Figure 91). The instructions were to focus on one of the eight design principles for managing a commons to generate ideas. For donation, I suggested that participants consider design principle #3, 'Those affected by the rules can participate in modifying the rules'. The intention was to provoke NBTS to consider how kgotla might be part of designing blood donation parameters. I hoped this might lead to ideas about how kgotla could engage the community to decide who would donate, e.g. maybe two percent of residents would donate for the year and change up every month.

For transfusion, I suggested that participants focus on design principles #5 and #6, 'Rules are enforced by effective and accountable monitoring' and 'Use graduated sanctions for rule violations', respectively. These two rules address verification. For example, what would happen if a person waited days for a blood transfusion at the hospital? How might this problem be recorded, shared, and acted upon? How would the person's kgotla know that the violation had been monitored and enforced?

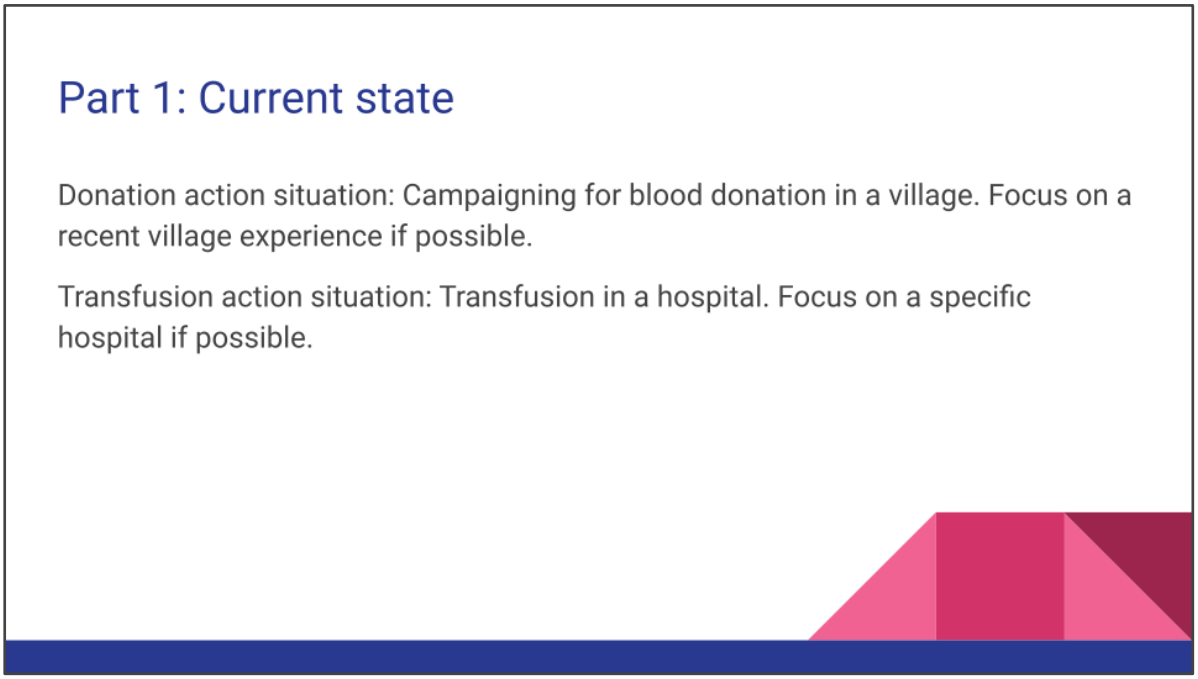


Figure 90. The 'Current state' slide tries to narrow the scope for ideation to an action situation, e.g. asking participants to focus on a specific village or specific hospital.

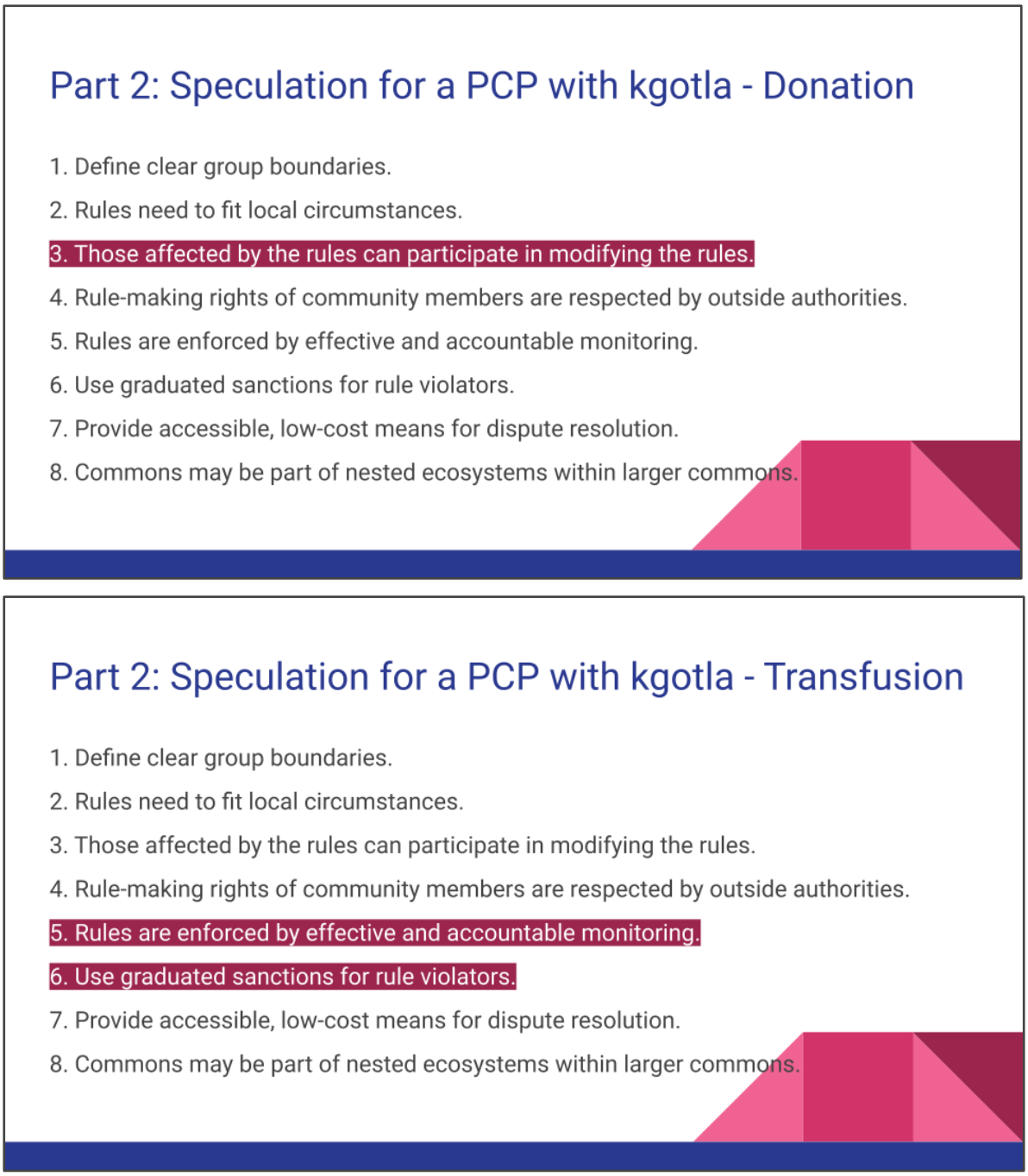


Figure 91. The intended second part of the experiment was to ask participants to speculate about blood donation and blood transfusion if it involved kgotla as equal members of a public-commons partnership.

1.100.Act/Make

Spectrum Analytics conducted the rest of the experiment autonomously. NBTS was concerned about data sharing at this early stage, so all conversations were treated as confidential and not shared in this thesis. Spectrum Analytics was able to share the results of the workshop in the form of the action situation blocks, both in original form (Figure 92). and a digitalised versions that made the sticky notes easier to read (Figure 93, Figure 94).

The first set of outputs are the original action situation blocks (Figure 92), as enacted by Spectrum Analytics. Spectrum Analytics selected A1 sheet paper and made each block a different colour. These blocks were lined up in a row on one wall. I asked about sticky note colours and was told there is no logic to these.

The second output is the electronic version of these action situation blocks, making all sticky note text legible (Figure 93, Figure 94). In addition to digitalising the sticky notes, Spectrum Analytics also performed some data organisation or sense-making.

The first block is Actors (Figure 93, top). The prompts in the template are:

- Individuals
- Groups
- Non-human species

Spectrum Analytics organised answers into two groups: non-human actors and individuals and groups. The sticky notes indicate that NBTS identified a broad network of action situations rather than a singular situation. The groupings also indicate where the prompting terms might be improved. Spectrum Analytics has re-named non-human species as non-human actors. This re-naming is helpful in that it opens ideation to sticky notes like ‘SMS services’ and ‘social media’; however, it is unclear why sticky notes like ‘NGOs’ and ‘Schools’ are in this cluster rather than the individuals and groups cluster. Since non-human technology actors were identified, unprompted, perhaps the prompting terms might include technologies.

Taken on face value, this Actor block is useful in showing which actors in the commons NBTS believes might be important to blood donation. There are two sticky notes that are specific kgotla-related actors: ‘Kgosi’ (village chief) and ‘VDC chair’ (VDC = Village Development Committee, a collective within the kgotla). This block suggests that the kgosi and VDC chair are the two kgotla actors that might become a bridge for this public-commons partnership.

Figure 92. The original action situation blocks created by workshop participants. These blocks were placed in a horizontal line along a wall. Source: Spectrum Analytics

The second block is Interactions (Figure 93, bottom). The prompts in the template are:

- Which actors
- What actions
- How often
- How long

These prompts have become three columns for ideation, in both the original and digitalised versions. The sticky notes in this block affirm the methodology of constraining ideation to specific action situations. It is unclear if these notes relate to blood donor campaigns or actual blood donation or both. The first prompt, 'Which actors', has also been omitted, so we do not know who is involved. In particular, we do not know which of these interactions currently involve the kgosi or VDC chair.

The third block is Place (Figure 94, top). The prompts in the template are:

- Physical spaces
- Natural features
- Tools
- Technology

These prompts have again been organised into columns in both the original and digitalised versions. Tools and technology have been grouped together. These two prompts were separated to ensure consideration of non-technical tools; however, NBTS seems to have adequately thought beyond technology so perhaps combining is possible in the future. As with the other blocks, NBTS is clearly identifying a range of action situations rather than a thick description of a single action situation.

The fourth and final block is Verification (Figure 94, bottom). The prompts in the template are:

- Monitoring
- Compliance
- See
- Hear
- Write down
- Text
- Photograph

These prompts have been reduced to three columns: monitoring, compliance, photography. Since participants were looking at the entire ecosystem, we have a mixture of specific points

and broad categories. Similar to the Actors block, though, we might approach this block as a gauge of NBTS's mindset for the most obvious sources of verification. There are two sticky notes that identify specific, donor-facing points of verification: appreciation messages and donor information slip. These verification sources indicate a starting point for how NBTS might develop a public-commons partnership. NBTS has also identified two internal verification sources: reports and schedule campaigns (annual). These are the types of verification sources that would likely need to be shared with kgotla in order to develop shared governance in a public-commons partnership.

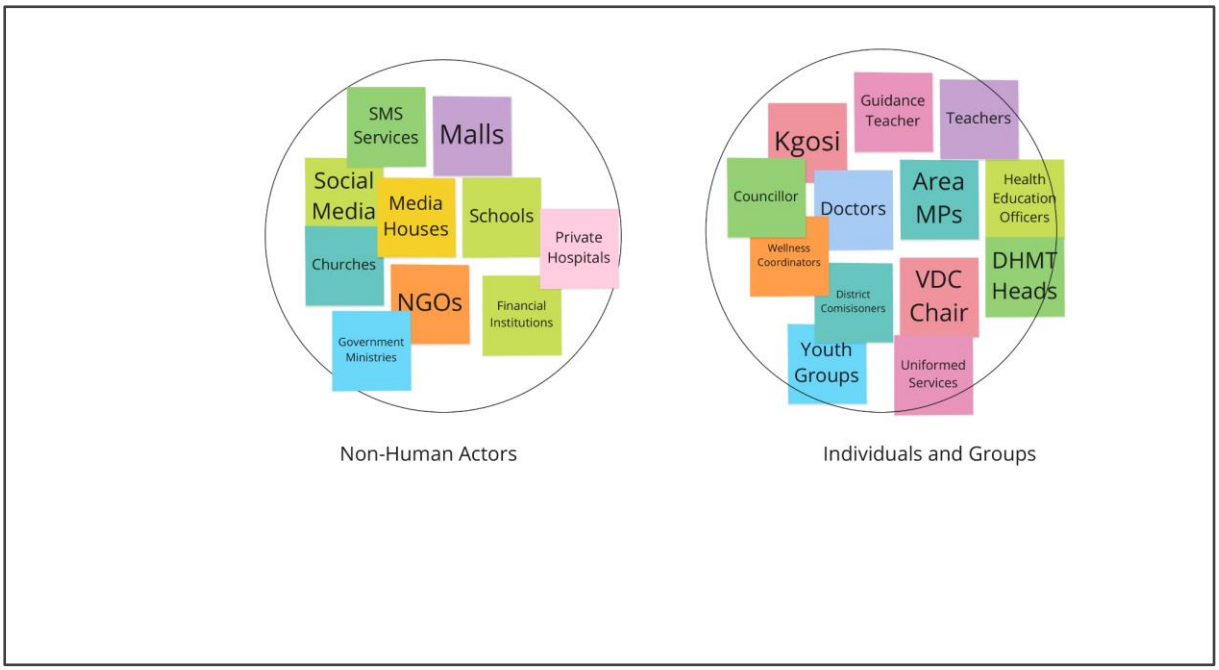
The act/make phase of this experiment unintentionally highlighted the ongoing challenges of documentation for studio experimentalism. In this experiment, the sole record and source of data are the action situation blocks. These artefacts, therefore, must stand on their own as a record and data source, not only for #commonize studio but for future experimenters.

1.101.Observe

While I often explained the discussions and contexts for experimentation in previous experiments, the observe phase here will draw exclusively from the action situation blocks artefacts.

Languages/Ideas

The original expectation was to observe the languages/ideas of thick description of a specific action situation. And, if we had completed the second part of the experiment, to observe shifts in thinking about a public-commons partnership. Since participants thought about the wider blood donation ecosystem rather than a specific action situation and did not progress to the second part of the experiment, the overall observation is more of an affirmation of the trajectory of #commonize studio experiments. Over time, studio experiments have consistently become more granular in their focus, zooming in on action situations that are bounded by a specific place, actors, and set of interactions. The results of this experiment illustrate how hard it can be to keep people so focused and the need to better embed such instructions in future experiments. There remains a big leap between commons scholars breaking down analysis of extant commons into action situations and commons-makers trying to tease out this granularity from their community in the thick of commoning.



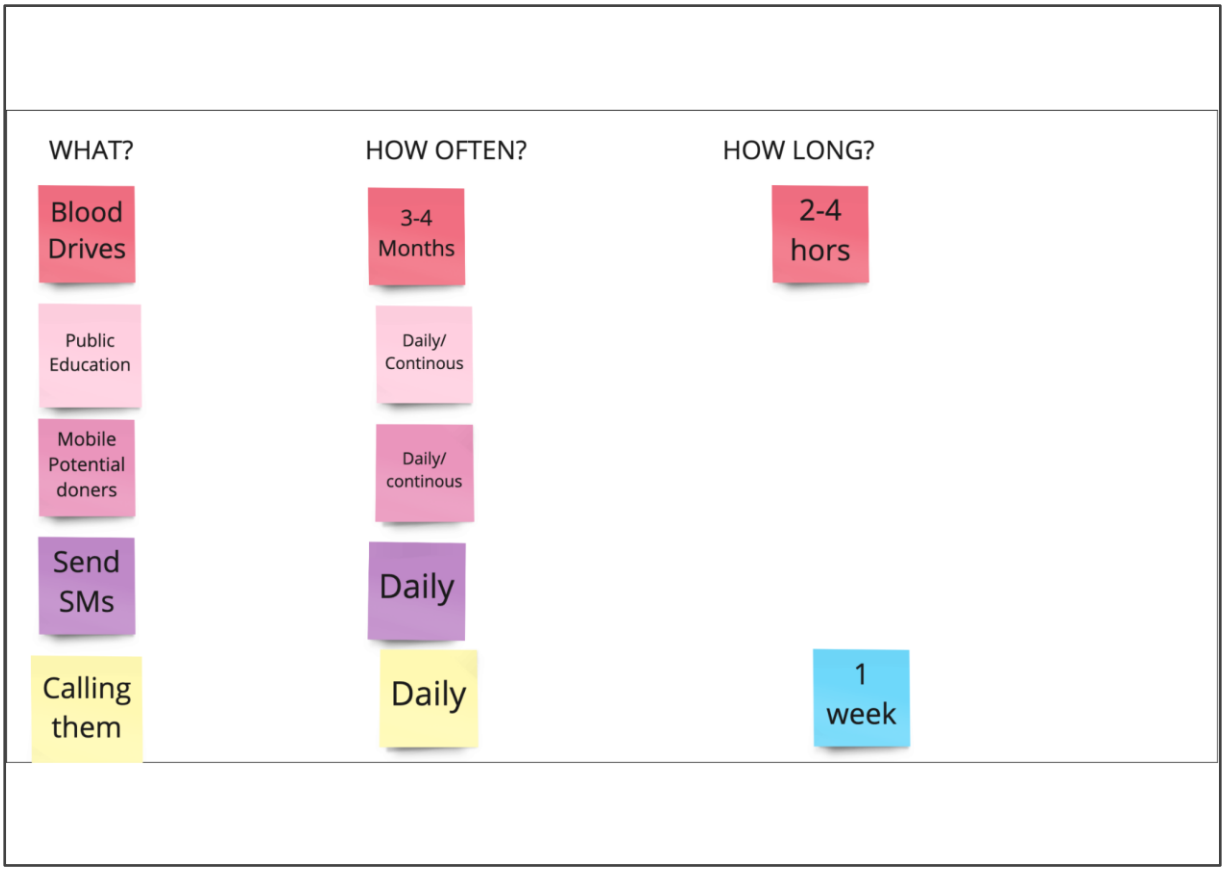
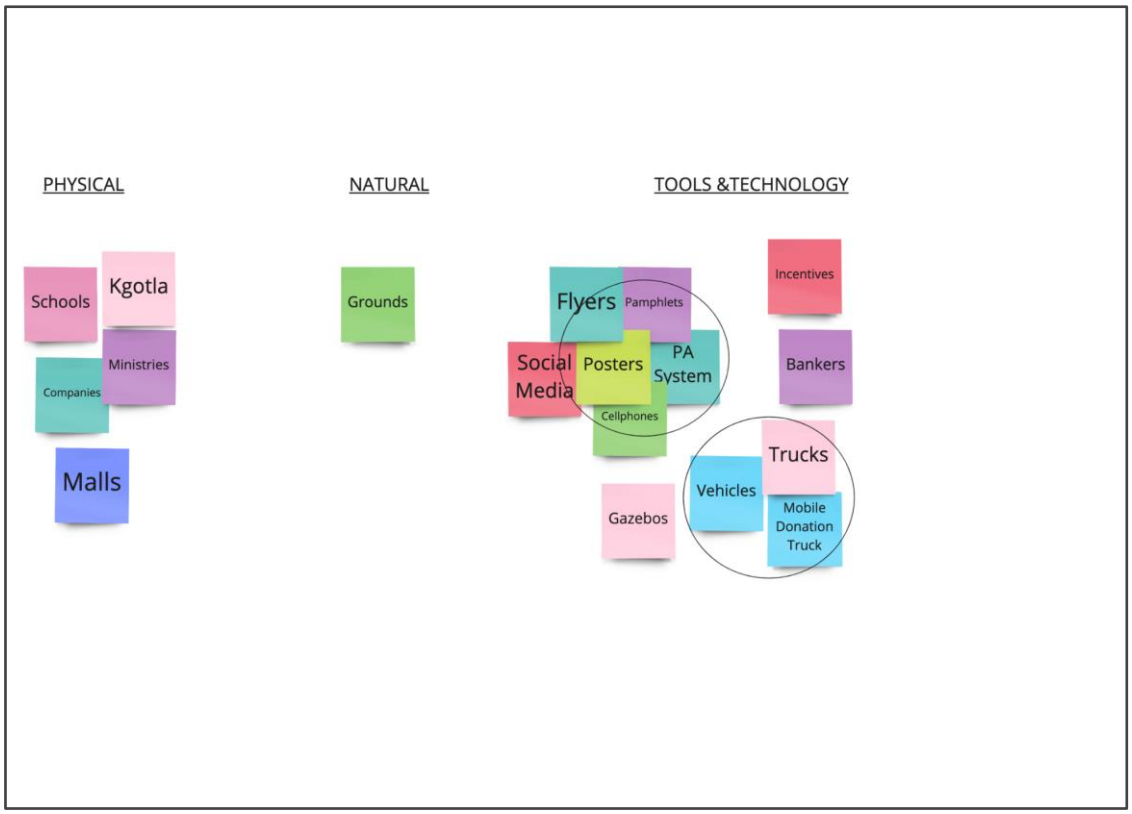


Figure 93. Actors and Interactions blocks. Source: Spectrum Analytics



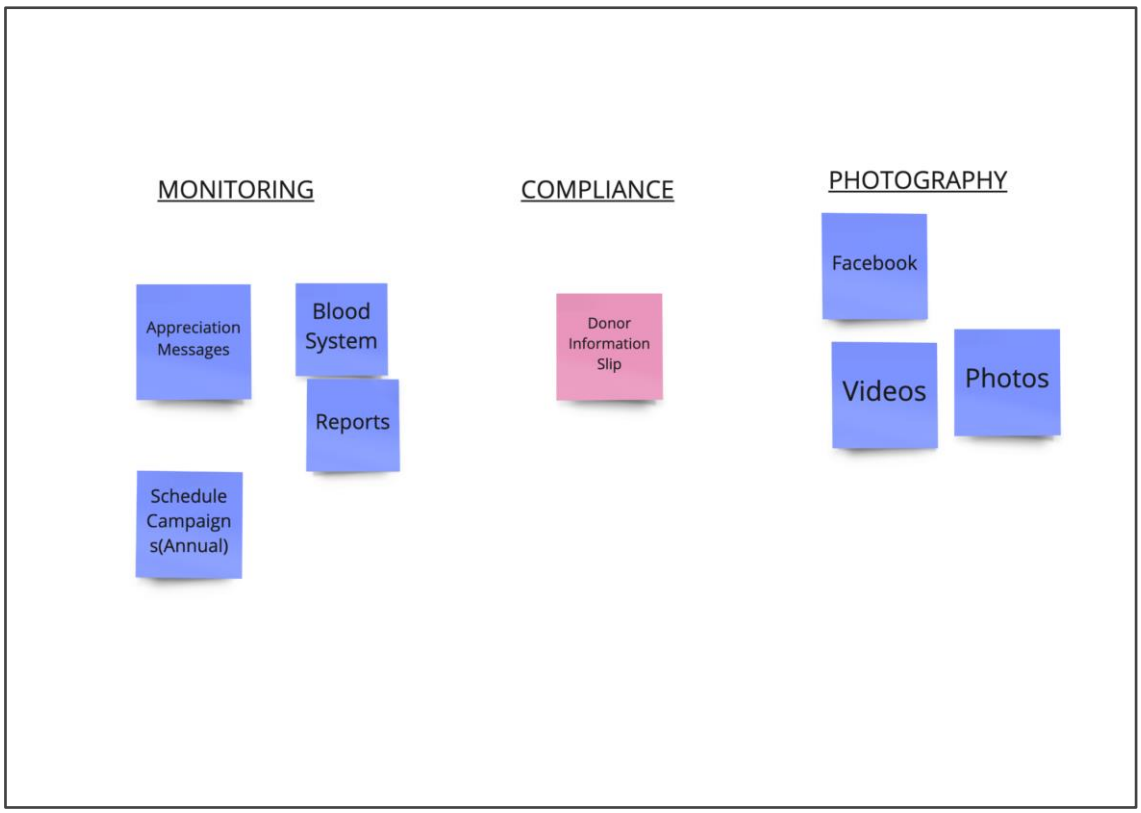


Figure 94. Place and Verification blocks. Source: Spectrum Analytics

Relationships/Subjectivities

The second part of the experiment, speculative design of a public-commons partnership, did not take place, which would have been the source for shifting relationships/subjectivities.

Collective action

Collective action probably cannot be observed from the artefacts. In this case, the desired collective action goal was to enthuse NBTS to continue the process, which remains unknown.

Artefact

The artefacts are the record of this experiment. The most pressing observation is that NBTS generated ideas for a range of action situations rather than a single action situation, or a network of action situations. This renders the knowledge created more difficult to understand and act on, especially as a standalone artefact. The intention of the action situation blocks was to unpack a single action situation statement, e.g. residents donate blood at a mobile van in the village, into four categories of thinking. One earlier version stayed closer to the action situation canvas and contained action situation statements (Fig. 3.4.3.k). Another earlier version kept the ideation space looser but still asked participants to articulate their ideas as action situation statements (Fig. 3.4.3.l). These two earlier versions both encouraged users to transform sticky note ideas into complete sentences. The version used relied more on verbal instructions, which suggests that verbal instructions may be insufficient.

1.102.Reflect/Critique

As the last ARtD cycle, and the most hands-off experiment, I focus on three recursive reflections.

Critique

This experiment received some minor desk critique from the commons-maker; however, neither of us were at the workshop to observe or act on commoner feedback.

Figure 95. Earlier version of the action situation blocks that features the action situation statement across.

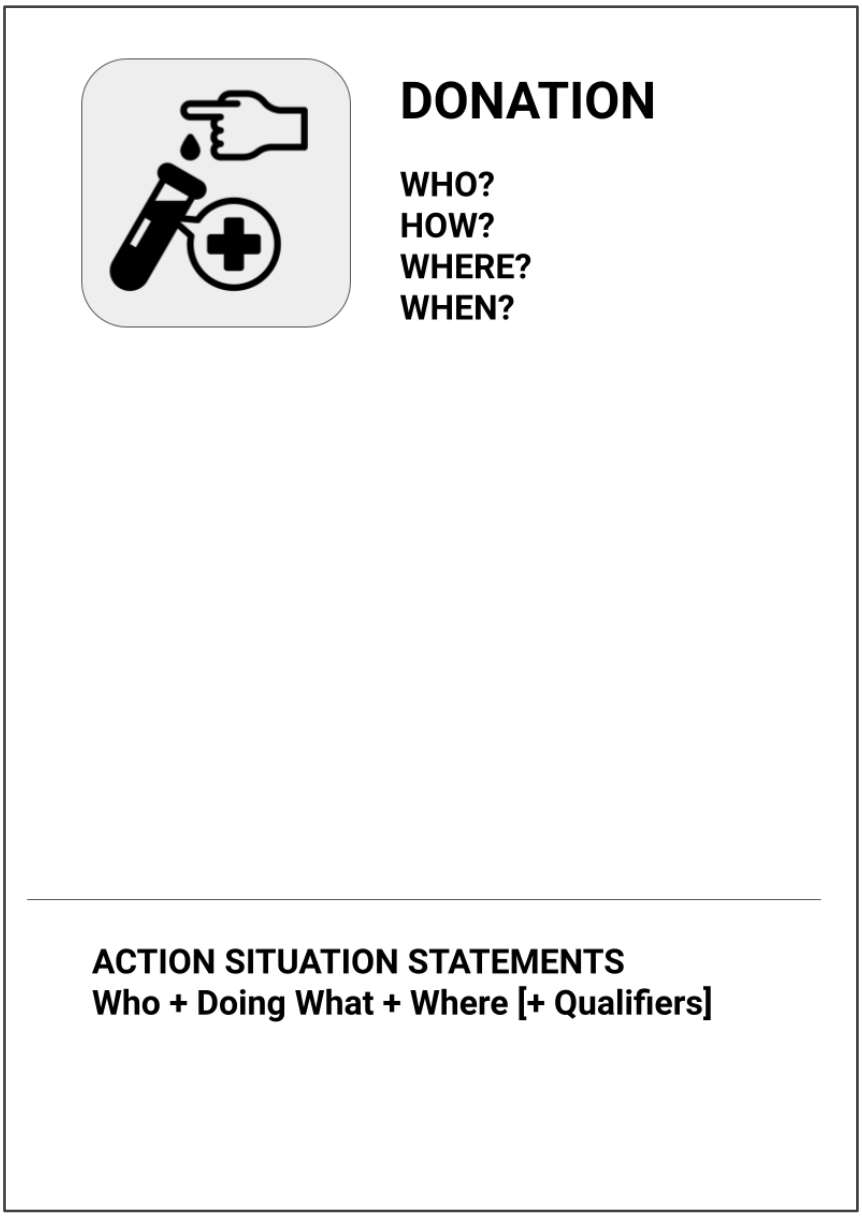


Figure 96. A version of the action situation blocks developed closer to the final workshop date. This version features the action situation statement but broke down blocks by interaction type, e.g. donation.

Reflection

The three reflections I wish to focus on are:

1. This experiment revealed the importance of embedding instructions in artefacts;
2. This observation about instructions gave new life to the commons creation framework; and
3. #commonize studio needs to consider how experimenters share their results back to others.

First, this experiment revealed the importance of embedding instructions in artefacts. This was the most hands-off ARtD cycle of all #commonize studio experiments. I spent a total of three hours convening with Spectrum Analytics over the entirety of all Hack4Blood experiments. In preparation for this experiment, we met once for one hour. While I think more time together might have benefitted experiment outcomes, this ARtD cycle posed an important question: How little time can we spend together to generate successful studio experiments? What surfaced from this question was the importance of standalone artefacts. I had relied heavily on conversations with commons-makers in the past. How well do the artefacts act as infrastructure for commons-making without me? In an aspirational future of widespread commons-making studio experimentalism, commons-makers will only have these artefacts to work with. The artefacts clearly required more instructions than I had provided, which led to the second reflection.

Second, the commons creation framework now looked very useful to me. In the Improvement matrix, there are three 'layers' (planning, facilitating, doing) and three 'dimensions' (instruction, functionality, flexibility). The 'Instruction' column is the aspect of interest to me. I had over-relied on my personal input to support this process rather than creating the action situation blocks with these layers of instruction. I had also over-relied on my personal input to support scaffolding with Spectrum Analytics, when they did not have time for online sessions. #commonize studio was probably not yet in a position to produce the appropriate scaffolding materials, but this remains a goal for future activities.

Third, the observe phase illuminated the challenge of recording and sharing the results of studio experiments effectively. Previous experiments highlighted the challenge of recording and sharing data, such as how to make bokashi. In this case, how could the commoners share the results about the effectiveness of this experiment so that peer commons-makers could build on it? The commoning framework focuses on how communities can identify and adapt tools to support commons-making, but it does not consider how these communities would in turn share back this data about how they adapted and used the tools for other communities to use. Again, #commonize studio was not yet positioned to support this type of infrastructuring, but it remains a question for the future.

Contributions and conclusion

I share observations and findings throughout this thesis, particularly in the thick descriptions of #commonize studio experiments in Part C, any of which might one day prove to be important to commons-making. In this section, 'Contributions and conclusion', I narrow the focus to observations and findings that emerged consistently from performing #commonize studio. These consistent observations represent what I believe are novel contributions to the research disciplines of commons, design, and diverse economies. These findings might be woven together into the methodology I earlier named studio experiments for commons-making, or, commons-making through studio experimentalism.

Contributions

This research started with a high-level research question: What do communities need to make commons? From this high-level research question emerged two more specific research questions:

- What does the commons literature offer commons-making researchers?
- What does the design research literature offer commons-making researchers?

I named my research practice #commonize studio as a container in which to perform this bridging or weaving between two worlds. In one direction, #commonize studio experimented with ways to make commons literature accessible to commons-makers with whom I worked, from discourse interventions like 'commonize' to infrastructuring methods like the action situation canvas. In the other direction, #commonize studio began exploring studio experimentalism as a way to make studio pedagogy more explicit and accessible to commons-makers.

I have organized observations around four contributions:

- Studio experimentalism
- #commonize discourse and infrastructure
- Commoner sustainment activities
- Activating existing language

These findings tend to bridge both research questions.

1.103.Studio experimentalism

As a methodology contribution, studio experimentalism is the broadest contribution. Studio experimentalism responds primarily to the second research question, a way to make studio pedagogy and practice accessible to commons researchers, but, in the short-term, it is more likely to be useful to design researchers exploring commons-making. It also maybe useful to commons-making activists, such as DEAL and P2P Lab, who might use it as a way to structure and communicate their research.

When I started this research, I knew that I would be exploring design methods. The potential value of studio experimentalism emerged later during this research. This thesis cracks the door open for what studio experimentalism might be, more so than answering what studio experimentalism is and how it can be performed. As described in Part B, studio experimentalism is thinly documented, and almost all of the papers reviewed were in unknown or low-ranked journals. That is to say, even the thin veneer of scholarship is likely to go unnoticed and dismissed by other design researchers. From this review, the paper that throws the gauntlet down most clearly for studio experimentalism is Binder and Brandt's (2008) proposal for the 'design:lab'. Binder and Brandt are also respected design researchers, and their paper appears in *CoDesign*. They describe the design:lab as a studio with 'emphasis on a transparency of process and results contained in open recipes' that records 'exemplary processes of inquiry rather than as finalised results'. The authors emphasize 'portability and scalability' of these records so others can 'maintain, accumulate and continuously reiterate what is learned'. While the authors name this position the design:lab, this thesis argues that there is merit in building out studio experimentalism instead. To do so, I attempted to frame my research as studio experiments. In doing so, I discovered some of the strengths and weaknesses of this approach, at least with reference to commons-making research.

In Chapter 0, I considered what a comparison group might mean for studio experimentalism. A comparison group requires maintaining the status quo and making no interventions, yet design is explicitly about making interventions. How can a designer design without designing? In 'Designing New Socio-Economic Imaginaries' (Speed et al., 2019), the design researchers show how even unattended cultural probes embody and transmit politicized frames. Binder and Brandt do not address control or comparison groups, but they do respond to this concern with a definition of 'controlled environments' for a design:lab as 'the setting where we let this "as-if world" live and be explored under the explicit condition that we have not yet decided if this world should be translated into a more permanent reality.' (2008, p. 119). The comparison group in Chapter 0 took place entirely in an 'as-if

world' so it would fulfil this requirement. The decision of concern was not whether this world should be translated into a more permanent reality but rather what commons discourse and worldviews should be introduced into this controlled environment. A studio experiment comparison group for #commonize studio became a controlled environment where no commons discourse and no worldviews were introduced by the designer.

While the other design researcher and I did make a number of interventions, such as developing a list of potential design fictions for the group to choose from, we avoided introducing any overtly contesting worldviews to the group. I cannot say that we introduced no contesting worldviews to the group because the design fiction list, for example, may have embodied diverse worldviews; however, no economics field experiment can make this claim either. J-PAL framed their intervention as a singular variable, the installation of residential water cisterns, but they cannot claim that ancillary variables played no role in observed outcomes. On reflection, the practical purpose of a comparison group for #commonize studio is about finding the minimum intervention required to perform experiments. The comparison group of Chapter 0 showed that making no intervention resulted in members making a neoliberal commons. In this case, the comparison group contained no known member with a reformist or counter-hegemonic politics, which might have resulted in different outcomes. Future experiments tested various intervention scales. In 'Chapter 0. Action situation blocks', I observed that #commonize studio possibly intervened too much, introducing too much discourse into this controlled environment.

In Chapters 0-0, I considered what pilot experiments might mean for studio experimentalism. This set of experiments is the most verbatim translation from lab experimentalism and also the easiest for others to build upon. Design researchers perform pilot experimentation prodigiously and often document these pilot experiments in papers. The challenge here is how such pilot experiments are recorded, particularly with regards to process over final results. Binder and Brandt rather ironically embody the very challenge they critique. They present only their final experimental process with the clients, yet one imagines they would have deliberated and tested these processes, even if just with each other, before putting them before clients. To this end, I tried to document #commonize studio pilot experiments as 'open recipes', detailing the experimental process. These attempts, including the deliberation processes behind other experiments like commons model canvas (Chapter 0), revealed a double-edged opportunity/challenge. Riffing on Schön, this double-edged opportunity/challenge might be termed 'documenting critique-in-action'. Studio critique, from desk critique to peer critique to final review, encourages the student to share their thinking and making processes. These thinking and making processes, including interim artefacts, are interrogated as much as the final artefact. Anyone who has experienced

this process knows why it is so valuable. Others can see where we may have gone off-track or become stuck, or they may see interim artefacts that are more successful but got lost along the way. Or we may love our final artefacts only to discover that others prefer an interim artefact or line of inquiry more so. The principal challenge, however, is rendering these thinking and making processes interrogable when we are not present. I called this process documenting critique-in-action, as we try to imagine how we might explain our thoughts and actions in studio experiments. #commonize studio did not solve this challenge, and even in this thesis, I did not share the full set of slides or drawings.

The experiments with Soil Trust confronted the challenge of creating 'open recipes', figuratively and quite literally in this case, that might support others to 'maintain, accumulate and continuously reiterate what is learned'. We observed the complexity of truly conveying embodied, situated know-how in a recipe. This challenge is humorously depicted in *Schitt's Creek* (Read et al. & Ciccoritti, 2016), where two characters are shown trying to make enchilada cheese sauce using a recipe. The recipe calls for them to 'fold in the cheese', which mystifies and ultimately defeats both characters. How would any of us describe 'fold in' in a recipe and ensure that it is interpreted correctly, and interpreted correctly each time by different people in different contexts? The Soil Trust experiments each sought to create these open recipes in different ways. Or, using Binder and Brandt's language, we tried 'to reify a workable process that can produce the results displayed and to rehearse the translations that are necessary to carry results along to new contexts.' (2008, p. 121). The commons model canvas sought to reify various commoning practices into a visualized format that both commoners and external audiences could understand and engage with. The action situation canvas sought to reify the specific 'recipe' for making bokashi bedding. In particular, the action situation canvas grappled with balancing hard boundaries that leave room for interpretation, e.g. needing to remove all air from the bedding bag but accomplishing this in many ways. Body histories experimented with what we might call 'embodification' rather than reification; that is, how to treat the living body as the carrier of wisdom. In the earlier review of studio pedagogy, I noted the opportunity to combine depictions of critique through dialogue (Dannels et al., 2008; Schön, 1985; Shaffer, 2007, p. 200) with attempts to reify this dynamic process into a framework (Oh et al., 2013). The Soil Trust experiments largely failed, yet they succeeded in a way that is often attributed to lab experiments: They eliminated avenues of research so we could further refine future experiments. We cannot say what experimental process would have helped commoners 'consistently generate successful creative works' (Sawyer, 2018, p. 170), but we eliminated more typical methods involving posters and sticky notes and learned to steer attention to body histories.

The experiments with Hack4Blood considered how we can use artefacts divorced of context as 'exemplary processes of inquiry'. Binder and Brandt lament studio's reliance on end results and look to lab experiments as a better way to record design processes, not just the end result. #commonize studio engaged with this aspiration while finding serious barriers to such an approach. In previous experiments, #commonize studio recorded designing and making processes and tried, in various ways, to transmit these processes as a record. For action situation blocks (Chapter 0), #commonize studio omitted the making process for several reasons. The result was a record of the design process and the end result, but not the making process. The finding from this experiment was the failure of the artefact to fully communicate the 'recipe' in both directions: instructing the commoner how to use and instructing the observer what the results mean. Yet, I have come to embrace this failure. Binder and Brandt's desire to record the design process is a desire for controllability. As much as we may desire control, the reality of commons-making research is that we have little control. Often, the artefact is all we have left at the end. Or, as Soil Trust illustrates, the commons, understood as that entanglement between commons and commoners is the 'end result' that conveys knowledge, the analogue of the scientist's logbook.

While Binder and Brandt's exhortation for recording processes is laudable, many studio experiments cannot be recorded like lab experiments. Binder and Brandt believe 'the Design:Lab must prototype a sustainable practice that can continue to make sense of what is collaboratively envisioned.' (2008, p. 121). But *who* is making sense of this collaborative vision? In the comparison group, design researchers asked all participants to share short descriptions of a data trust. Each description was different. It became our task to make sense of a collaborative vision, but this vision might have looked different if another group member led this process. Binder and Brandt's design:lab aspires to be positivist, which is anathema to trends in design research for commons-making, such as pluriversal design and relational commoning. On one hand, in fairness to the authors, this paper was published in 2008, before such themes took hold. On the other hand, this very anachronism underscores the point: How they might describe their process or collective vision in 2008 is probably different than how they would do so now. Moreover, the data they thought was important in 2008, what the included and omitted, may also change. To this end, studio experiments for commons-making present a different approach to studio experimentalism, which we summarize in an early paper as 'a commons is a product of constant co-design by commons members' (Sacks & Galabo, 2022). A commons is also, using Binder and Brandt's language, a sustainable practice that is continuously making sense of what is collaboratively envisioned. The commons becomes the sustainable practice and the record, and future studio experimentation must figure out how to engage with it.

1.104. Discourse and method

#commonize studio discourse and infrastructure primarily addresses the first research question, observing how #commonize studio's research so far has been used by design researchers. This contribution has taken shape in the development of the term 'commonize', lay adaptation of commons theory and frameworks in papers, and adaptations of design research methods like the commons model canvas. In their current form in this thesis, these contributions are primarily useful to academic researchers, while a future aim is to adapt #commonize studio discourse and method to be useful to commons-makers more broadly.

The uptake of my nascent publication history has offered some insight into what #commonize studio discourse and methods are valuable to design researchers so far. This is an admittedly short window for observing uptake, but there has been some early data worth reviewing.

What discourse or methods have design researchers found useful? This can be observed from publications created by peer design researchers. On this front, the terms 'commonism' and 'commonized design' have been included by other design researchers. In 'Designing for a Pandemic: Towards Recovery and Resilience' (Mullagh et al., 2021, p. 171), written before I created the term 'commonize', I contributed the following paragraph:

> The sharing of designs for ventilators, associated spare parts, and face shields has demonstrated an economic imaginary that can be termed commonism. In short, commonism is a mode of production in which open generative systems create common products (also called commons) for decentralized peer governance (Dyer-Witheford, 2007). While we saw individuals sharing designs online, we also saw different examples of operation that included large organisations sharing their proprietary operations.

This text appeared as one of six paragraphs under the heading of 'Designing sustainably'. The lead authors independently created a paragraph heading and a single bullet point for each paragraph. The heading they gave to this paragraph is 'Designing collaboratively', and the bullet point is 'Mobilization of design and implementation through commons will be important in ensuring resilience.'. I consider inclusion of commonism and commons in any journal paper to be an accomplishment, especially when not the lead author. The language the lead authors created communicates, to a point, how they interpreted the value of commonism and commons.

Written at a similar time is a book chapter by Dr Galabo (2023), one of the commons-makers featured in Chapter 0, titled 'Challenging capitalism through Design for Commonism'. Dr

Galabo cites one of our papers (Sacks & Galabo, 2022) at the end of this sentence: 'Literature on the commons offers robust analytical frameworks to understand the infrastructure of existing functional commons but is lacking in approaches to support communities in creating or improving commons infrastructures' (Galabo, 2023, p. 44). Also, this sentence reproduces the language of political and economic agency from my previous work (Sacks, 2021a; Sacks & Coulton, 2020) that we had discussed but is uncited: 'Design research can … enable communities to have political and economic agency over the wealth that shapes processes that can affect their lives.' (Galabo, 2023, p. 44). The dual necessity of political and economic agency has proven, as discussed earlier, a critical aspect of communicating commonized design.

Cooper's (2022) paper, 'Design Value versus Design Values: From Mission Oriented Innovation to Ecosystem Enabling' more explicitly explores commonized design. The full paragraph from this paper follows:

> For instance, the notion of communised [sic] design, where to commonise is to place a resource under the governance of a community of people, versus privatize or nationalize. Commonised design is based on eight principles for the governance of a commons, developed by the Nobel prize winner in Economics Elinor Ostrom (Walljasper, 2011). It addresses how people jointly make and enforce rules over the resources they depend on. These principles were used for instance in Co-Bologna (https://labgov.city/about-people/) aimed at applying the same design principles to the governance of the urban commons, seeing the city as a commons. This has been taken further by Sacks (2020) in considering how to use these principles to design a commonised mobile network. (Cooper, 2022, p. 52)

These references illustrate what definitions of commons and commonized design prove accessible to other scholars. While my work has progressed since this publication, the ideas that others pick up, even if quite rare at this stage, acts as feedback for where I might invest more time articulating #commonize discourse.

Finally, the Griffith Centre for Systems Innovation cited my work to communicate the concept of choice levels in their blog post descriptively titled, 'Governance in and for complexity. Part 1: collective governance within intermediary organisations' (2024):

> Designing in different 'choice levels' is one way this has been approached — whereby different groups of people are involved in different types of decision-making" (see Sacks, 2024; p.34, and Sacks & Galabo, 2022, for examples from work around Commons governance) both for accountability purposes, but also to enable effective power-sharing.

1.105.Commoner sustainment activities

Commoner sustainment activities primarily address the second research question, showing how this action research through design (and through commons-making) has generated an important insight for commons researchers using analytical frameworks like the IAD and SES frameworks, even if they are performing analytical work.

A frequent consideration across studio partners, including partners with whom I worked but were not published in this thesis, was the need to attract, introduce, skill up, and retain commoners. I term these activities collectively as 'commoner sustainment activities', though other people will no doubt coin better terms. The need to sustain commoners is not unique to commons and is shared with most community organizations.

Within this thesis, the experiments with Soil Trust best demonstrate the critical role of commoner sustainment activities to commons-making. The goal of all three experiments was a form of commoner sustainment, with each experiment seeking to catalyse commoner solidarity in some form so the commoners could successfully govern the commons into the future. Tellingly, each experiment moved successively closer to being a purer form of commoner sustainment.

The first experiment, commons model canvas (Chapter 0), was conducted with only the commons-maker and lacked commoner sustainment from the many practices articulated by the commons-maker. The closest articulation is 'Care' within the Practices box of the commons model canvas, for which we had, rather appropriately in hindsight, included the prompt, 'How do Members sustain our commons across generations?' (Figure 70). Caring for each other could be considered a commoner sustainment activity but also could be misinterpreted for caring for soil. This experiment was deemed inappropriate for use with commoners at this stage of commons formation.

The second experiment, action situation canvas (Chapter 0), focused again on the mechanics of making the bedding used for bokashi-making. One particular comment by the commons-maker, repeated here, shows how the commoners were telling us what to care about:

> Also, in VERIFYING OUR PROGRESS, participants focused on the effects rather than the process when they placed statements in there like 'optimal team growth' or 'happy members' or 'crop, yield + quality', which fits more into the OPTIMUM field above the Action/Situation statement (probably my explanation wasn't clear enough).

We had dismissed these contributions as misplaced. Instead, if we view bedding-making as embodied practice, how people feel while producing bokashi bedding might be considered an

equally important 'quality assurance' measure. In the US, the Food & Drug Administration gained national attention for requiring a bakery to remove 'love' from its ingredient list (B. Y. Lee, 2017), yet famous chefs (Gotbaum, 2017) and parents the world over claim otherwise, and there are multiple university research studies that find we perceive food that is made with love to taste better (Brouker, 2012; Taylors, 2016).

The third experiment, body histories (Chapter 0), more or less enacted exactly what the commoners asked for in the previous experiment. We had previously focused on ensuring that technical knowledge was transmitted to commoners without great regard to how joyful these methods might be. In this third experiment, our focus was joy. Since Soil Trust closed in the months after this experiment, we do not know if approach successfully sustained commoners, in the dual sense of bringing joy and also transmitting critical making skills. I can say, though, that future #commonize studio experiments would consider body histories as part of commons-making. In the same way that the three Soil Trust experiments evolved as we tried to involve commoners, the role of commoner sustainment activities became more visible as #commonize studio moved from pilot experiments to field experiments with Soil Trust and Hack4Blood.

The implication for commons research is the need to consider inclusion of commoner sustainment as a variable in commons frameworks, particularly the SES and CIS frameworks. The SES framework presents no variables that explicitly focus on commoner sustainment activities. The closest SES framework variables can be found in the Interactions category, including 'information sharing' (I2), 'self-organizing activities' (I7), and 'networking activities' (I8) (McGinnis & Ostrom, 2014). The absence of commoner sustainment activities from commons frameworks matters because commoner sustainment activities may be the variable that affects commons performance, and commons scholars may be missing it. Cole et al. (2019) exemplify the CIS framework, which integrates the SES and IAD framework variables, by diagnosing why a lobster fishery experienced performance changes over time. What if the cause of such changes is due to commoner sustainment activities, e.g. trouble recruiting new members or wisdom degradation over generations?

Commoner sustainment activities are often 'hidden in plain sight' because they are integrated into other commoning activities. For example, the Soil Trust bokashi bedding-making meetup was both a type of Interaction activity and a commoner sustainment activity. Other times, commoner sustainment activities may be separate purposeful activities. The body histories experiment with Soil Trust exemplifies such a commoner sustainment activity that serves no other function within the SES/CIS frameworks. If we reflect on our personal experiences with commons or community organizations more broadly, we have very likely

participated in such standalone commoner sustainment activities, such as tours, demos, and shadowing.

How precisely sustainment activities should be incorporated into commons frameworks is beyond the scope of this thesis. What this research has found is that commoner sustainment activities are a critical part of commons-making. This research only explored the formative stage of several commons, and further research might explicitly explore commoner sustainment activities to understand their relationship to commons performance over time. This contribution is also an exemplification of the value of action research through design as a research methodology for future commons research. Only by participating in commons-making did this important activity become evident as an absent feature of commons frameworks.

1.106. Activating existing language

Activating existing language is primarily a contribution to the diverse economies field, particularly diverse economies researchers performing action research, but this insight is useful to researchers engaged in commons-making more broadly.

One finding specific to diverse economies methodology is the importance of activating *existing* language, rather than activating new language. Cameron and Gibson (2020) describe the strategy of activating new language as 'developing new languages of economy' and exemplify this strategy with three cases. For two cases, the result is 'a new visual mapping language' and 'a powerful phrase'. For the third case, the result is not new language but rather a documentation of 'the rich patchwork of market and non-market exchanges, paid and unpaid labour and capitalist and non-capitalist surplus generating enterprises that work together to sustain livelihoods' (McKay et al., 2007, p. 62). This third case is deemed new language insofar as the project expanded the language of the economy to recognize the language of existing practices. Pragmatically-speaking, though, 'activating new languages' connotes the results of the first two cases rather than the third case. #commonize studio experienced a contrary experience, where we fared far better activating existing language than creating new language.

The studio experiments in scaffolding commons-makership (Chapter 0) sought to relate commons language to the commons-maker's existing knowledge and language. None of these experiments created new language. Instead, they activated the existing language of commons scholarship in other contexts, co-design and ecosystem visualization.

The experiments with the commoning blueprint (Chapter 0) were differentiated in part by the removal of commons language from the experiment. In the first experiment iteration, I spent time explaining commons. In the second experiment iteration, due to time constraints, I dedicated no time to explaining commons and instead introduced LARP to introduce the experimental process. This second experiment produced better results. These results are due to a number of variables besides the omission of commons language, but the better results do mean that omitting commons language does not automatically equate to worse experiment outcomes.

For Soil Trust, the closest the commons-maker came to introducing commons language to commoners was the action situation canvas (Chapter 0). However, as this experiment details, we took great pains to translate commons language into existing, accessible language. So, again, we sought to activate existing language rather than introduce new language.

For Hack4Blood, we did include some explanation of commons for the action situation blocks (Chapter 0). The inclusion of this language in some ways negatively impacted the experiment. We spent a lot of time exploring what commons means. On reflection, were I to repeat this experiment, I would have started with the existing language of the kgotla. This might mean translating the exploratory paper we created one more time before sharing it, removing references to public-commons partnerships and starting instead with the concept of a public-community partnership or even an NBTS-Kgotla partnership. Trying to explain commons also reinforced problematic Global North and South relationships. Rather than explore commons and show how kgotla embody commons, we might instead frame the discussion with kgotla as a commons archetype that informs how we understand commons today.

Overall, #commonize studio fared far better when we activated existing language, either building on the words commoners already used or trying to expand the meaning of these existing words. Activating existing language in this way does appear to be part of Cameron and Gibson's definition; however, in practice, the phrase 'activating new language' connotes creating new language. This strategy might be better simplified to 'activating language'.

Conclusion

After all this, we return to the research questions driving this research. The high-level research question that has driven my research and continues to drive my research is:

- What do communities need to make commons?

In this thesis, I answer this broad, field-expanding question by exploring three more specific research questions, which correlate to the three thesis Parts:

- Part A: What does the commons literature offer commons-making researchers?
- Part B: What does the design research literature offer commons-making researchers?
- Part C: How can these two literatures support commons-makers?

In Part A, I reviewed a number of analytical concepts from the commons literature that I argued might be useful to commons-making researchers. In Part B, I explored studio pedagogy and argued that studio experimentalism might be a useful methodology to commons-making researchers. In Part C, I collaborated with commons-makers (who were also commons-making researchers) to perform studio experiments that drew on commons concepts. In experimental language, my hypothesis was that combining commons concepts with design methods would help communities make commons.

1.107. What do commons-makers need?

What do communities need to make commons? First and foremost, I have learned from this research that I might revise this question to become:

- What do *commons-makers* need to make commons?

While a commons is ultimately dependent on a community of actors, #commonize studio has found above all else that supporting individual commons-makers is a more effective framing for such research. This observation may be due to the unique requirements of the Covid-19 pandemic, but it is a lesson I take forward today. The #commonize studio experiments have also found that such studio experimentalism may be best performed with a single commons-maker rather than multiple. So, what do commons-makers need to make commons, specifically in terms of what I explored through #commonize studio? Each Part of this thesis revealed at least one overarching feature:

- Part A: Scaffolding
- Part B: Coaching
- Part C: Infrastructuring

Scaffolding. If there is one lesson from #commonize studio, it is the need for scaffolding. As reviewed in Chapter 1.6, most commons-making research entails scaffolding. Design researchers have developed the concepts of infrastructuring and institutioning, but they have not mentioned scaffolding by name, even though many papers reference the importance of such work. Most of the scaffolding I performed in #commonize studio was making the

commons literature more available to commons-makers. There is likely scaffolding needed to support non-designers to use design research methods, but #commonize studio did not explore this type of scaffolding since all commons-makers were design researchers. Based on the systematised reviews I performed, I am the first researcher to explain and publish these commons concepts for a design research audience. As design research, there is also an opportunity to think of scaffolding through other media than written documents. In the papers I co-authored with Dr Galabo (Sacks & Galabo, 2022), for example, we suggest changes to discourse embedded in design tools to perform this function. I have merely cracked the door open, and there is so much more to do.

Coaching. Coaching is initially invoked by Schön (1985, p. 7) to describe the role of the studio instructor in studio pedagogy. Decades later, the Eberly Center's (n.d.) instructional strategy for studio includes a stage named 'Coaching', situated between 'Scaffolding' and 'Fading'. Over time, I explicitly recognised coaching as one dimension of my role in #commonize studio (Sacks, 2022b). In addition to the uphill battles that any student faces, commons-makers often feel alone and dismissed. The fundamental importance of coaching in commons-making is captured in a single line I wrote in conversation with a commons-maker, whose work was ultimately omitted from this thesis: '"Someone finally took me seriously!" [she says with triumphant hands raised]'. I generally made myself available to speak with commons-makers whenever they needed to speak, which included my evenings and weekends. Coaching also meant being a 'critical friend' (Costa & Kallick, 1993). The way that I might differentiate critical friendship from, say, desk critique, is power. My relationships with commons-makers were characterised by symmetric power, which contrasts with the instructor-student relationship in a university studio. This symmetric power relationship meant that my scope for criticality was greater with commons-makers. Equally, my scope for positive feedback was greater with commons-makers, as there was no need to self-regulate my behaviour for fear of appearing biased towards one student over another. Overall, coaching commons-makers allows for more liberated coaching, where the coach is allowed to be more honest and emotive.

Infrastructuring. The movement from theory to practice in Part C shone a light on the complexities and subtleties of infrastructuring commons-making. As I observed in the last experiment in this thesis, action situation blocks (Chapter 0), the artefact may be all commons-makers leave behind or carry forward. The infrastructure might ideally, with time, perform scaffolding. We can extend this infrastructuring thinking to more ephemeral experiments like body histories too (Chapter 0), even if we need to be more creative about what infrastructuring means. Infrastructuring is a novel contribution from the design research field to commons-making, but it is also shallowly developed at this point.

#commonize studio experiments revealed some nuances about infrastructuring that are not covered by the existing commons-making literature. What I observed most readily across experiments is the need to consider the stage of the commons with respect to infrastructuring. This is not a particularly ground-breaking observation, yet it may give some guidance for future researchers. The needs of an idea-stage commons like Hack4Blood will differ from an operational early-stage commons like Soil Trust. While cultural contexts vary greatly, I cannot say at this point if that cultural context is the most important variable. What mattered most for #commonize studio experiments so far was the maturity of the commons. Going forward, I suggest thinking about infrastructure in relationship to commons stage. This also necessitates greater study of what such stages might be as well.

1.108. Epilogue

The simple, blunt question, referring back to my overall research question, is:

- Did any of this research help communities, or commons-makers, to make commons?

The short answer is that this research has proven helpful enough that several commons-making researchers have shown interest in taking it further, which is the best evidence I can hope for in response to this question. There are three evidence points to reflect on from this present/future research that indicate how any of this research helps communities to make commons.

First, I have since become a visiting scholar at the Ostrom Workshop, the leading research centre for commons research. The title of my proposed research is '#commonize studio: Making the generative turn in commons scholarship with Ostrom Workshop'. Being accepted and funded as a visiting scholar at the Ostrom Workshop demonstrates that there is interest in this topic by commons researchers. My three stated aims are:

- To develop commons-making capacities in the Ostrom Workshop network
- To create knowledge commons based on this collaboration
- To envision how to scale out #commonize studio

I am in the throes of this process as I write this thesis, and, admittedly, bridging the chasm between scientific and artistic research has proven harder than I expected. The most concrete output of my position will be the development of a reading group and reading list to explore, as the commons-maker calls it, 'variations on commons'. The objective of this reading group and reading list is to create starting points for researchers at all stages to engage with commons-making. The reading group outputs will become open access infrastructure that others can adapt. While I had originally thought I would be collaborating with Ostrom Workshop members to perform field experiments like those in Part C, the starting point is instead around scaffolding commons-makership. My time as visiting scholar has demonstrated that the most durable and critical output of #commonize studio is scaffolding commons-makership.

Second, Dr Galabo, one of the three commons-makers included in this thesis, went on to become a principal investigator for a UKRI-funded project called 'Cooperativa Digital' (n.d.), which I briefly mention in Chapter 1.73 (p. 161). The creation of Cooperativa Digital builds directly on our scaffolding commons-makership experiments. While Cooperativa Digital does not directly draw on the commons concepts we explored (though it draws on others ones), the exploration of commons concepts still proved useful. In the same way that design

fiction artefacts in the IoFT project helped participants interrogate ethical considerations in a way that a roundtable discussion does not, I believe that engaging with concepts like the IAD framework and choice levels helped the commons-maker think more concretely and methodically about commons-making. The full text of our blog post for this research project evidences how the languages and ideas of #commonize studio have been picked up by commons-makers and, importantly, research funders:

> While most digital platforms are controlled by private for-profit companies, some digital platforms like Wikipedia are controlled by their contributing members. These types of digital platforms are part of a longstanding organisational approach called commons, specifically platform commons.
>
> 'Cooperativa digital' builds on a digital platform created by a Brazilian social enterprise that takes advantage of a local law that allows people to donate a portion of sales tax (i.e. VAT) to non-governmental organizations (NGOs). As a platform, the mobile app matches donors with NGOs. Now that the app is operational, the social enterprise wants to transfer control to the NGOs. To support this process, the partners are translating and transforming relevant concepts from commons scholarship into methods and tools that can be used in studio experiments with the community to create the rules for this platform commons.
>
> The project asks: How can we transform commons scholarship into usable tools that support this community to create a digital platform commons? How does the community's approach to discussing and creating greater equity inform understanding of the digital good? ('Cooperativa Digital: Creating a Community-Run Mobile App in Brazil', n.d.)

I am tremendously proud of this research and believe it indicates a future path for other commons-making research. The funder for this research was the UK ESRC (Economic and Social Research Council), which covers social sciences. We therefore framed this research as answering social science questions through design methods. While this approach does subjugate designerly epistemology to social science, I felt we were able to adequately retain studio pedagogy in this process. We did so by making the case that an important way to learn about equity in digital platforms is through making such platforms, i.e. research through commoning.

Third, I have been recruited as an Adjunct Industry Fellow at the Centre for Systems Innovation at Griffith University in Australia, whose mission is 'Innovating towards regenerative and distributive futures' (n.d.). This opportunity arose through the Community Economies Research Network (Chapter 1.40), an important network to the diverse

economies methodology that underpins this thesis. Our partnership is in the early stages, and there are multiple points of intersection. The starting point of our collaboration has been the commons model canvas (Chapter 0). The Centre Director, Prof Ingrid Burkett, has previously led action research on the use of the Business Model Canvas for social enterprises and published two editions of the book, 'Using the Business Model Canvas for Social Enterprise Design' (2020a, 2020b). The Centre for Systems Innovation has historically been connected to the Griffith University Business School and has developed undergraduate and MBA courses for the school. The interest in the commons model canvas marks, for me, the tremendous opportunity for commons-making within the field of management studies, even if that may be an uphill battle within the more dominant business school paradigm.

1.109.#commonize!

This research has opened the door to two fields of research:

- Commons-making, which might be contained within a larger field called economy design
- Studio experimentalism

I have called this thesis an exploration of, more specifically, commons making through studio experimentalism or studio experimentalism for commons-making.

Commonize may or may not take off. Above all, I hope I have conveyed to you that economies are design subjects, a series of choices. We can design or choose differently, and we can design or choose to commonize the resources we depend on. We can choose to commonize a resource, market, or commodity; we can choose to commonize sea beds, mobile apps, housing policy. Commonize makes visible a social practice that we all perform but maybe never named, from our neighbourhood mutual aid groups to our recreational associations.

I opened this thesis with one piece of art, a 17th century poem commonly referred to as, *The Goose and the Common*. I close this thesis with another piece of art, a woodblock print based on a quotation from American activist Grace Lee Boggs (Figure 97).

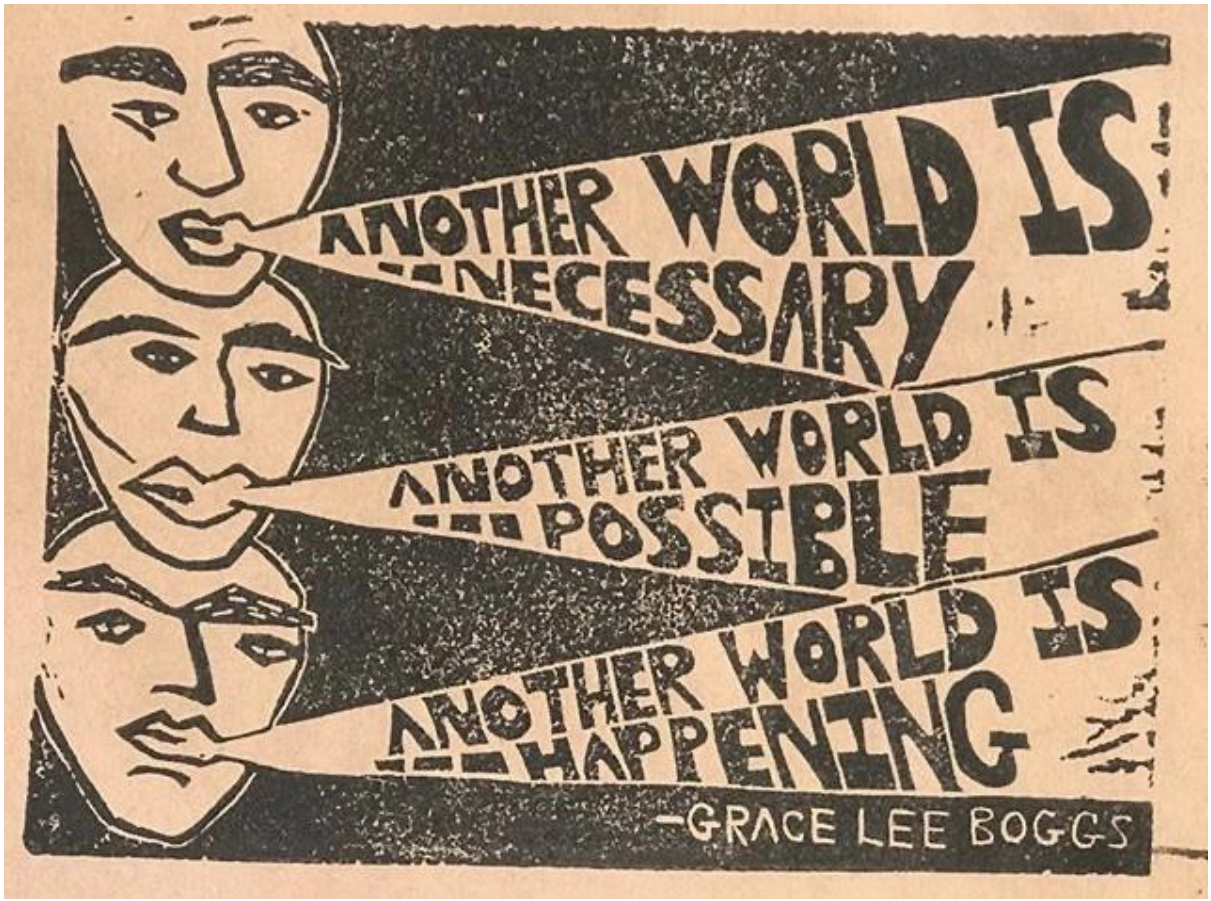


Figure 97. 'Another World is Possible' by Hannah Lewis (n.d.).

I wish to revise this quotation in the spirit of #commonize studio:

Another world has always been possible

Another world has always been happening

Another world is there if you choose to join us

#commonize!

References

Abdelhameed, W. (2011). Architectural form creation in the design studio: Physical modeling as an effective design tool. *Archnet-IJAR: International Journal of Architectural Research*, *5*(3), 81–92.

About. (n.d.). *Phygital: Design Global Manufacture Local*. Retrieved 26 March 2023, from https://phygitalproject.eu/about/

About DEAL. (n.d.). *Doughnut Economics Action Lab*. Retrieved 14 March 2023, from https://doughnuteconomics.org/about

Abt, C. C. (1975). *Serious games*. Viking Press.

Ada Lovelace Institute. (n.d.). *Ada Lovelace Institute*. Retrieved 30 July 2023, from https://www.adalovelaceinstitute.org/

Ada Lovelace Institute. (2021a). *Exploring legal mechanisms for data stewardship*. Ada Lovelace Institute. https://www.adalovelaceinstitute.org/report/legal-mechanisms-data-stewardship/

Ada Lovelace Institute. (2021b). *Participatory data stewardship*. Ada Lovelace Institute. https://www.adalovelaceinstitute.org/report/participatory-data-stewardship/

Althusser, L. (1969). *For Marx* (B. Brewster, Trans.). Allen Lane.

Anderies, J. M., & Janssen, M. A. (2013). *Sustaining the commons*. Arizona State University. https://sustainingthecommons.org/

Antonelli, A., Fry, C., Smith, R. J., Simmonds, M. S. J., Kersey, P. J., Pritchard, H. W., Abbo, M. S., Acedo, C., Adams, J., Ainsworth, A. M., Allkin, B., Annecke, W., Bachman, S. P., Bacon, K., Bárrios, S., Barstow, C., Battison, A., Bell, E., Bensusan, K., … Zhang, B. G. (2020). *State of the world's plants and fungi 2020*. Royal Botanic Gardens, Kew. https://doi.org/10.34885/172

Antoniadis, P., & Pantazis, A. (2020). P2P learning. In M. O'Neil, C. Pentzold, & S. Toupin (Eds.), *The handbook of peer production* (pp. 197–210). Wiley. https://doi.org/10.1002/9781119537151.ch15

Armouch, S., Crivellaro, C., Peacock, S., & Vlachokyriakos, V. (2022). Tensions and trade-offs in community organisations' use of ICTs for 'commoning' during the Covid-19 pandemic. *Proceedings of the Participatory Design Conference 2022 - Volume 2*, 70–75. https://doi.org/10.1145/3537797.3537813

Asikin-Garmager, E. (2020). New translator journey map. *Wikimedia Commons*. https://commons.wikimedia.org/wiki/File:New_Translator_Journey_Map.png

Aydemir, A. Z. (2017). *Experiments, practices and positions in architectural design studio* [Doctoral dissertation]. Istanbul Technical University.

Baibarac, C., & Petrescu, D. (2017). Open-source resilience: A connected commons-based proposition for urban transformation. *Procedia Engineering*, *198*, 227–239. https://doi.org/10.1016/j.proeng.2017.07.157

Baibarac, C., & Petrescu, D. (2019). Co-design and urban resilience: Visioning tools for commoning resilience practices. *CoDesign*, *15*(2), 91–109. https://doi.org/10.1080/15710882.2017.1399145

Baibarac, C., Petrescu, D., & Langley, P. (2021). Prototyping open digital tools for urban commoning. *CoDesign*, *17*(1), 83–100. https://doi.org/10.1080/15710882.2019.1580297

Barab, S. A., & Duffy, T. M. (2000). From practice fields to communities of practice. In D. H. Jonassen & S. Land (Eds.), *Theoretical foundations of learning environments* (pp. 25–55). Lawrence Erlbaum Associates.

Barbosa, J. T., Hellström Reimer, M., & Mota, J. A. (2016, June 25). *Designing participation for commoning in temporary spaces: A case study in Aveiro, Portugal*. Design Research Society Conference 2016. https://doi.org/10.21606/drs.2016.393

Baron, G. N. (n.d.). *Toolkit*. Design for Conservation. Retrieved 9 November 2021, from https://www.design4conservation.com/d4c-toolkit

Bauwens, M., & Kostakis, V. (2014). From the communism of capital to capital for the commons: Towards an open co-operativism. *tripleC: Communication, Capitalism & Critique*, *12*(1), 356–361. https://doi.org/10.31269/triplec.v12i1.561

Bauwens, M., Kostakis, V., & Pazaitis, A. (2019). *Peer to peer: The commons manifesto*. University of Westminster Press. https://doi.org/10.16997/book33

Bayat, A. (1997). Un-civil society: The politics of the 'informal people'. *Third World Quarterly*, *18*(1), 53–72.

Bell, E., & Scott, D. (2016). Reimagining citizenship: Justice, responsibility and non-penal real utopias. *Justice, Power and Resistance*, 53–72.

Bell, J., Cheney, G., Hoots, C., Kohrman, E., Schubert, J., Stidham, L., & Traynor, S. (2004). *Comparative similarities and differences between action research, participative research, and participatory action research*. Antioch University Seattle. https://www.arlecchino.org/ildottore/mwsd/group2final-comparison.pdf

Benford, R. D., & Snow, D. A. (2000). Framing processes and social movements: An overview and assessment. *Annual Review of Sociology*, *26*, 611–639.

Benkler, Y. (2006). *The wealth of networks: How social production transforms markets and freedom*. Yale University Press.

Benkler, Y., Fuster Morell, M., & Hassan, S. (n.d.). *Commons-based peer production*. Real Colegio Complutense at Harvard University; The President and Fellows of Harvard College. Retrieved 4 May 2023, from https://rcc.harvard.edu/commons-based-peer-production

Benson, B. K. (1997). Coming to terms: Scaffolding. *The English Journal*, *86*(7), 126. https://doi.org/10.2307/819879

Bettega, M., Masu, R., Hansen, N. B., & Teli, M. (2022). Off-the-shelf digital tools as a resource to nurture the commons. *Participatory Design Conference 2022: Volume 1*, 133–146. https://doi.org/10.1145/3536169.3537787

Bettega, M., Masu, R., & Teli, M. (2021). "It's like a GPS community tool": Tactics to foster digital commons through artifact ecology. *Designing Interactive Systems Conference 2021*, 1710–1725. https://doi.org/10.1145/3461778.3462034

Bidwell, N. J. (2020). Wireless in the weather-world and community networks made to last. *Proceedings of the 16th Participatory Design Conference 2020 - Participation(s) Otherwise - Volume 1*, 126–136. https://doi.org/10.1145/3385010.3385014

Binder, T., & Brandt, E. (2008). The Design:Lab as platform in participatory design research. *CoDesign*, *4*(2), 115–129. https://doi.org/10.1080/15710880802117113

Binder, T., De Michelis, G., Ehn, P., Jacucci, G., & Linde, P. (2011). *Design things*. The MIT Press.

Bjögvinsson, E., Ehn, P., & Hillgren, P.-A. (2012). Design things and design thinking: Contemporary participatory design challenges. *Design Issues*, *28*(3), 101–116. https://doi.org/10.1162/DESI_a_00165

Björgvinsson, E., Ehn, P., & Hillgren, P.-A. (2010). Participatory design and 'democratizing innovation'. *Proceedings of the 11th Biennial Participatory Design Conference*, 41–50. https://doi.org/10.1145/1900441.1900448

Björgvinsson, E., Ehn, P., & Hillgren, P.-A. (2012). Agonistic participatory design: Working with marginalised social movements. *CoDesign*, *8*(2–3), 127–144. https://doi.org/10.1080/15710882.2012.672577

Blaser, M., & de la Cadena, M. (2017). The uncommons: An introduction. *Anthropologica*, *59*(2), 185–193. https://doi.org/10.3138/anth.59.2.t01

Bloom, G., Raymond, A., Tavernier, W., Siddarth, D., Motz, G., Dulong de Rosnay, M., & Ruhaak, A. (2021, December 6). *A practical framework for applying Ostrom's principles to data commons governance*. Mozilla. https://foundation.mozilla.org/en/blog/a-practical-framework-for-applying-ostroms-principles-to-data-commons-governance/

Bobonis, G. J., Gertler, P. J., Gonzalez-Navarro, M., & Nichter, S. (n.d.). *Harvesting rainfall: Experimental evidence from cistern deployment in northeast Brazil*. The Abdul Latif

Jameel Poverty Action Lab (J-PAL). Retrieved 24 March 2023, from https://www.povertyactionlab.org/evaluation/harvesting-rainfall-experimental-evidence-cistern-deployment-northeast-brazil

Bobonis, G. J., Gertler, P. J., Gonzalez-Navarro, M., & Nichter, S. (2022). Vulnerability and clientelism. *American Economic Review*, *112*(11), 3627–3659. https://doi.org/10.1257/aer.20190565

Bødker, S., Dindler, C., & Iversen, O. S. (2017). Tying knots: Participatory infrastructuring at work. *Computer Supported Cooperative Work (CSCW)*, *26*(1–2), 245–273. https://doi.org/10.1007/s10606-017-9268-y

Bødker, S., Korsgaard, H., Lyle, P., & Saad-Sulonen, J. (2016). Happenstance, strategies and tactics: Intrinsic design in a volunteer-based community. *Proceedings of the 9th Nordic Conference on Human-Computer Interaction*, 1–10. https://doi.org/10.1145/2971485.2971564

Bogost, I. (2010). *Persuasive games: The expressive power of videogames* (1. MIT Press paperback ed). MIT Press.

Boling, E., & Schwier, R. A. (2016). Curators' notes. In E. Boling, R. A. Schwier, C. M. Gray, K. M. Smith, & K. Campbell (Eds.), *Studio teaching in higher education: Selected design cases* (pp. 4–20). Routledge. https://doi.org/10.4324/9781315697420

Boling, E., Schwier, R. A., Gray, C. M., Smith, K. M., & Campbell, K. (Eds.). (2016). *Studio teaching in higher education: Selected design cases*. Routledge. https://doi.org/10.4324/9781315697420

Bollier, D. (2011). The commons, short and sweet. *David Bollier: News and Perspectives on the Commons*. http://www.bollier.org/commons-short-and-sweet

Bollier, D. (2014). *Think like a commoner: A short introduction to the life of the commons*. New Society Publishers.

Bollier, D. (2021, October 21). Reinventing commons governance in modern times. *Resilience*. https://www.resilience.org/stories/2021-10-21/reinventing-commons-governance-in-modern-times/

Bollier, D., & Helfrich, S. (Eds.). (2012). *The wealth of the commons: A world beyond market and state*. Levellers Press.

Bollier, D., & Helfrich, S. (Eds.). (2015). *Patterns of commoning*. Commons Strategies Group.

Bollier, D., & Helfrich, S. (2019). *Free, fair, and alive: The insurgent power of the commons*. New Society Publishers.

Born, G., & Wilkie, A. (2018). Temporalities, aesthetics and the studio: An interview with Georgina Born. In I. Farías & A. Wilkie (Eds.), *Studio studies: Operations, topologies and displacements* (pp. 139–155). Routledge.

Botero, A., Marttila, S., Poderi, G., Saad-Sulonen, J., Seravalli, A., Teli, M., & M.C Van Amstel, F. (2020). Commoning design and designing commons. *Proceedings of the 16th Participatory Design Conference 2020 - Participation(s) Otherwise - Volume 2*, 178–180. https://doi.org/10.1145/3384772.3385162

Bourdieu, P. (1977). *Outline of a theory of practice*. Cambridge University Press.

Bourdieu, P. (2008). *The logic of practice*. Stanford University Press.

Bowker, G. C., & Star, S. L. (2000). *Sorting things out: Classification and its consequences*. The MIT Press. https://doi.org/10.7551/mitpress/6352.001.0001

Brandt, C. B., Cennamo, K., Douglas, S., Vernon, M., McGrath, M., & Reimer, Y. (2013). A theoretical framework for the studio as a learning environment. *International Journal of Technology and Design Education*, *23*(2), 329–348. https://doi.org/10.1007/s10798-011-9181-5

Bresnihan, P. (2015). The more-than-human commons: From commons to commoning. In S. Kirwan, L. Dawney, & J. Brigstocke (Eds.), *Space, Power and the Commons*. Routledge. https://doi.org/10.4324/9781315731995

Brewer, S., Pearson, S., Maull, R., Godsiff, P., Frey, J. G., Zisman, A., Parr, G., McMillan, A., Cameron, S., Blackmore, H., Manning, L., & Bidaut, L. (2021). A trust framework for digital food systems. *Nature Food*, *2*(8), 543–545. https://doi.org/10.1038/s43016-021-00346-1

Brie, M. (Ed.). (2017). *Karl Polanyi in dialogue: A socialist thinker for our time*. Black Rose Books.

Briley, R. (2007). Woody Guthrie and the Christian left: Jesus and "commonism". *Journal of Texas Music History*, *7*(1). https://digital.library.txst.edu/items/1e167c6d-9c58-4ae8-9906-42b63d2ab698

Brouker, S. (Director). (2012, April 5). *A pinch of love really does make food taste better* [Broadcast]. University of Florida Health. https://podcasts.ufhealth.org/a-pinch-of-love-really-does-make-food-taste-better/

Bruner, J. S. (1978). The role of dialogue in language acquisition. In A. Sinclair, R. J. Jarvelle, & W. J. M. Levelt (Eds.), *The child's concept of language*. Springer-Verlag.

Buchanan, R. (2001). Design research and the new learning. *Design Issues*, *17*(4), 3–23. https://doi.org/10.1162/07479360152681056

Buck-Morss, S. (2011). *A commonist ethics*. Communism: A new beginning, Cooper Union, New York. https://globalization.gc.cuny.edu/2011/11/susan-buck-morss-a-commonist-ethics/

Burkett, I. (2020a). *Using the Business Model Canvas for social enterprise design* (2nd ed.). Griffith University.

Burkett, I. (2020b, March 8). Using the Business Model Canvas for social enterprise design. *Medium*. https://medium.com/good-shift/business-model-canvas-for-social-enterprise-design-fb82e3e85bc5

Burns, R. (1786). To a mouse, on turning her up in her nest, with the plough, November 1785. In *Poems, chiefly in the Scottish dialect*. John Wilson.

Butler, J. (1993). *Bodies that matter: On the discursive limits of 'sex'*. Routledge.

Caffentzis, G. (2010). The future of 'the commons': Neoliberalism's 'Plan B' or the original disaccumulation of capital? *New Formations*, *69*(69), 23–41. https://doi.org/10.3898/NEWF.69.01.2010

Çakıcı, F. Z., & Örmecioğlu, H. T. (2017). Education and space for mobile lives: A joint studio experiment in Ayvalık. *Journal of Human Sciences*, *14*(3), 2839. https://doi.org/10.14687/jhs.v14i3.4666

Caldas, L., & Duarte, J. (2005). Fabricating ceramic covers: Rethinking roof tiles in a contemporary context. *23nd eCAADe Conference Proceedings*, 269–276. https://doi.org/10.52842/conf.ecaade.2005.269

Cameron, J., & Gibson, K. (2020). Action research for diverse economies. In J. K. Gibson-Graham & K. Dombroski (Eds.), *The handbook of diverse economies*. Edward Elgar Publishing. https://doi.org/10.4337/9781788119962.00070

Cameron, J., & Gibson-Graham, J. K. (2022). The diverse economies approach. In F. Stilwell, D. Primrose, & T. Thornton (Eds.), *Handbook of alternative theories of political economy* (pp. 329–343). Edward Elgar Publishing. https://doi.org/10.4337/9781789909067

Castell, P. (2016). Institutional framing of citizen initiatives: A challenge for advancing public participation in Sweden. *International Planning Studies*, *21*(4), 305–316. https://doi.org/10.1080/13563475.2015.1124756

Castoriadis, C. (1987). *The imaginary institution of society* (K. Blamey, Trans.). Polity Press.

Cennamo, K. S. (2016). What is studio? In E. Boling, R. A. Schwier, C. M. Gray, K. M. Smith, & K. Campbell (Eds.), *Studio teaching in higher education* (pp. 248–259). Routledge. https://doi.org/10.4324/9781315697420

Cennamo, K. S., Brandt, C., Scott, B., Douglas, S., McGrath, M., Reimer, Y., & Vernon, M. (2011). Managing the complexity of design problems through studio-based learning. *Interdisciplinary Journal of Problem-Based Learning*, *5*(2). https://doi.org/10.7771/1541-5015.1253

Centre for Systems Innovation. (n.d.). *Griffith University*. Retrieved 5 January 2024, from https://www.griffith.edu.au/griffith-business-school/centre-for-systems-innovation

Chesbrough, H. W. (2003). The era of open innovation. *MIT Sloan Management Review*, *44*(3), 35–41.

Choi, B., Lütticken, S., & Seijdel, J. (2015, June 6). Commonist aesthetics. *Open! Platform for Art, Culture and the Public Domain*. https://onlineopen.org/commonist-aesthetics

Ciancio, G. (2018). When commons becomes official politics. In N. Dockx & P. Gielen (Eds.), *Commonism: A new aesthetics of the real*. Valiz.

Cibin, R., Robinson, S., J. Bidwell, N., Linehan, C., Maye, L., Pantidi, N., & Teli, M. (2021). Land, water and sun: Tuning into socio-ecological relations in radio design. *Designing Interactive Systems Conference 2021*, 1954–1969. https://doi.org/10.1145/3461778.3462104

Cibin, R., Robinson, S., Scott, K. M., Sousa, D., Žišt, P., Maye, L., Sciannamblo, M., Ashby, S., Csíkszentmihályi, C., Pantidi, N., & Teli, M. (2020). Co-designing convivial tools to support participation in community radio. *Radio Journal:International Studies in Broadcast & Audio Media*, *18*(1), 43–61. https://doi.org/10.1386/rjao_00015_1

Cibin, R., Teli, M., & Robinson, S. (2019). Institutioning and community radio. A comparative perspective. *Proceedings of the 9th International Conference on Communities & Technologies - Transforming Communities*, 143–154. https://doi.org/10.1145/3328320.3328392

Cila, N., Ferri, G., De Waal, M., Gloerich, I., & Karpinski, T. (2020). The blockchain and the commons: Dilemmas in the design of local platforms. *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, 1–14. https://doi.org/10.1145/3313831.3376660

Civil Justice Data Commons. (n.d.). Georgetown Law. Retrieved 26 December 2023, from https://www.law.georgetown.edu/tech-institute/initiatives/georgetown-justice-lab/civil-justice-data-commons/

Clare, N., & Habermehl, V. (2016). Towards a theory of 'commonization'. In M. Lopes de Souza & R. J. White (Eds.), *Theories of resistance: Anarchism, geography, and the spirit of revolt* (pp. 110–121). Rowman & Littlefield.

Clement, F. (2010). Analysing decentralised natural resource governance: Proposition for a "politicised" Institutional Analysis and Development framework. *Policy Sciences*, *43*(2), 129–156. https://doi.org/10.1007/s11077-009-9100-8

Cole, D. H., Epstein, G., & McGinnis, M. D. (2019). The utility of combining the IAD and SES frameworks. *International Journal of the Commons*, *13*(1), 244. https://doi.org/10.18352/ijc.864

Community Economies Collective. (n.d.). *Diverse economies iceberg* [Graphic]. Retrieved 13 December 2020, from https://www.communityeconomies.org/resources/diverse-economies-iceberg

Community Economies Collective. (2019). Community economy. In Antipode Editorial Collective, T. Jazeel, A. Kent, K. McKittrick, N. Theodore, S. Chari, P. Chatterton, V. Gidwani, N. Heynen, W. Larner, J. Peck, J. Pickerill, M. Werner, & M. W. Wright (Eds.), *Keywords in radical geography: Antipode at 50*. Wiley. https://doi.org/10.1002/9781119558071

Cooper, R. (2022). Design value versus design values. From mission oriented innovation to ecosystem enabling. *DIID*, *1*(75). https://doi.org/10.30682/diid7521e

Cooperativa digital: Creating a community-run mobile app in Brazil. (n.d.). *ESRC Digital Good Network*. Retrieved 5 October 2023, from https://digitalgood.net/dg-research/truly-ethical-digital-design-the-digital-commons-and-social-enterprise-in-brazil-2-7/

Costa, A., & Kallick, B. (1993). Through the lens of a critical friend. *Educational Leadership*, *51*(2), 49–51.

Coulton, P., & Lindley, J. G. (2019). More-than human centred design: Considering other things. *The Design Journal*, *22*(4), 463–481. https://doi.org/10.1080/14606925.2019.1614320

Cox, M. (2014). Applying a social-ecological system framework to the study of the Taos valley irrigation system. *Human Ecology*, *42*(2), 311–324. https://doi.org/10.1007/s10745-014-9651-y

Coyle, D. (2020, October 30). Common governance of data: Appropriate models for collective and individual rights. *Ada Lovelace Institute*. https://www.adalovelaceinstitute.org/blog/common-governance-of-data/

Cozza, M., & De Angeli, A. (2015). Scaling up participatory design. *STPIS'15: Proceedings of the 1st International Workshop on Socio-Technical Perspective in IS Development*, 106–113. https://ceur-ws.org/Vol-1374/

Craigon, P. J., Sacks, J., Brewer, S., Frey, J., Gutierrez, A., Jacobs, N., Kanza, S., Manning, L., Munday, S., Wintour, A., & Pearson, S. (2023). Ethics by design: Responsible research & innovation for AI in the food sector. *Journal of Responsible Technology*, *13*, 100051. https://doi.org/10.1016/j.jrt.2022.100051

Crawford, S. E. S., & Ostrom, E. (1995). A grammar of institutions. *American Political Science Review*, *89*(3), 582–600. https://doi.org/10.2307/2082975

Croson, R. (2002). Why and how to experiment: Methodologies from experimental economics. *University of Illinois Law Review*, 921–946.

Cross, N. (1982). Designerly ways of knowing. *Design Studies*, *3*(4), 221–227. https://doi.org/10.1016/0142-694X(82)90040-0

Cross, N. (2011). *Design thinking: Understanding how designers think and work*. Berg.

Crowther, P. (2013). Understanding the signature pedagogy of the design studio and the opportunities for its technological enhancement. *Journal of Learning Design*, *6*(3), 18–28. https://doi.org/10.5204/jld.v6i3.155

Cruickshank, L., Whitham, R., Rice, G., & Alter, H. (2017). Designing, adapting and selecting tools for creative engagement: A generative framework. *Swedish Design Research Journal*, *15*, 42–51. https://doi.org/10.3384/svid.2000-964X.17142

Dabaieh, M., Lashin, M., & Elbably, A. (2017). Going green in architectural education: An urban living lab experiment for a graduation green design studio in Saint Catherine, Egypt. *Solar Energy*, *144*, 356–366. https://doi.org/10.1016/j.solener.2017.01.010

Dafermos, G. (2020). Prophets and advocates of peer production. In M. O'Neil, C. Pentzold, & S. Toupin (Eds.), *The handbook of peer production* (pp. 87–100). Wiley. https://doi.org/10.1002/9781119537151.ch7

Dannels, D., Gaffney, A. H., & Martin, K. N. (2008). Beyond content, deeper than delivery: What critique feedback reveals about communication expectations in design education. *International Journal for the Scholarship of Teaching and Learning*, *2*(2). https://eric.ed.gov/?id=EJ1146687

De Angelis, M. (2017). *Omnia sunt communia: On the commons and the transformation to postcapitalism*. Zed Books Ltd. https://doi.org/10.5040/9781350221611

de Bloois, J. (2016, February 1). The ontologized commons. *Open! Platform for Art, Culture and the Public Domain*. https://onlineopen.org/the-ontologized-commons

de Lautour, R. (2017). Inaudible visitors: Theories of sound reproduction in the studio practice of Pierre Schaeffer. *Organised Sound*, *22*(2), 161–171. https://doi.org/10.1017/S1355771817000073

de Sousa Santos, B. (2009). The World Social Forum: Toward a counter-hegemonic globalization (Part I). In J. Sen & P. Waterman (Eds.), *World Social Forum: Challenging empires* (2nd ed., pp. 235–245). Black Rose Books.

De Tullio, M. F. (2018). Commons towards new participatory institutions. In N. Dockx & P. Gielen (Eds.), *Commonism: A new aesthetics of the real*. Valiz.

DEAL team. (2021, November 1). Stepping into the Doughnut: Exploring methods to introduce the Doughnut with Devon, Guildford and Milton Keynes. *Doughnut Economics Action Lab*. https://doughnuteconomics.org/stories/133

DeFelice, K. (n.d.). *How to write a design brief that gets you results*. Retrieved 23 September 2023, from https://www.canva.com/learn/effective-design-brief/

del Mar Delgado-Serrano, M., & Ramos, P. A. (2015). Making Ostrom's framework applicable to characterise social ecological systems at the local level. *International Journal of the Commons*, *9*(2), 808. https://doi.org/10.18352/ijc.567

Dellheim, J., & Wolf, F. O. (2015). Can 'commonification' be used as an alternative to 'commodification'? A report on a debate on what can be achieved by 'going along with the Ostroms'. *International Journal of Pluralism and Economics Education*, *6*(1), 82. https://doi.org/10.1504/IJPEE.2015.070454

DeMotts, R., Haller, T., Hoon, P., & Saum, R. (2009). Dynamics of common pool resource management in the Okavango Delta, Botswana. *Development Southern Africa*, *26*(4), 569–583. https://doi.org/10.1080/03768350903181357

Derrida, J. (1976). *Of grammatology* (G. C. Spivak, Trans.; 1st American edition). Johns Hopkins University Press.

Deviren, A. S. (2006). A design studio experiment on site and building integrations towards placemaking. *DS 36: Proceedings DESIGN 2006, the 9th International Design Conference*, 1109–1114.

Dewey, J. (2005). *Art as experience*. Perigee Books.

Dimmons. (n.d.). Dimmons. Retrieved 23 January 2021, from https://dimmons.net/

Dinnage, D., Thwaites, E., & Davies, M. (2022, December 16). Data decade: Data and public policy. *Open Data Institute*. https://www.theodi.org/article/data-decade-data-and-public-policy/

DiSalvo, C. (2009). Design and the construction of publics. *Design Issues*, *25*(1), 48–63. https://doi.org/10.1162/desi.2009.25.1.48

Dockx, N., & Gielen, P. (Eds.). (2018). *Commonism: A new aesthetics of the real*. Valiz.

Donut Berlin. (2023, March 3). A Doughnut lab for hands-on sustainable action: A mobile and modular doughnut lab to make the Doughnut Economy tangible on the streets of Berlin. *Doughnut Economics Action Lab*. https://doughnuteconomics.org/stories/133

Dorst, K. (2015). *Frame innovation: Create new thinking by design*. The MIT Press.

Doyle, J., Jones, S., & Lopez, E. (2023). Pandemic experimentalism: Decentering studio art education in an ongoing global emergency. *Artnodes*, *0*(31). https://doi.org/10.7238/artnodes.v0i31.403473

Duarte, J., Caldas, L., & Rocha, J. (2004). Free-form ceramics: Design and production of complex architectural forms with ceramic elements. *22nd eCAADe Conference Proceedings*, 174–183. https://doi.org/10.52842/conf.ecaade.2004.174

Duarte, J., Nazarian, S., & Ashrafi, N. (2018). Designing shelters for 3D-printing: A studio experiment. *Proceedings of the 36th eCAADe Conference, Volume 2*, 31–38. https://doi.org/10.52842/conf.ecaade.2018.2.031

Dunne, A., & Raby, F. (2013). *Speculative everything: Design, fiction, and social dreaming*. The MIT Press.

Dyer-Witheford, N. (2007). Commonism. *Turbulence*, *1*(1), 28–29.

Dyer-Witheford, N. (2009, October 29). *The circulation of the common*. Future of the Commons, University of Minnesota. https://commonism.wordpress.com/2009/11/30/the-circulation-of-the-common/#more-72

Eberly Center. (n.d.). *Labs / Studios*. Carnegie Mellon University. Retrieved 17 March 2023, from https://www.cmu.edu/teaching/designteach/teach/instructionalstrategies/labsstudios.html

Eddy-Spicer, D., Arce-Trigatti, P., & Young, M. D. (2020). Field building through strategic bricolage: System leadership and the institutionalizing role of intermediary organizations. *Journal of Professional Capital and Community*, *6*(1), 29–43. https://doi.org/10.1108/JPCC-11-2019-0032

Elden, M. (1981). Sharing the research work: Participative research and its role demands. In P. Reason & J. Rowan (Eds.), *Human inquiry: A sourcebook of new paradigm research* (pp. 253–266). J. Wiley.

Elden, M., & Levin, M. (1991). Cogenerative learning: Bringing participation into action research. In W. Whyte, M. Elden, & M. Levin (Eds.), *Participatory action research*. SAGE Publications, Inc. https://doi.org/10.4135/9781412985383

El-Latif, M. A., Al-Hagla, K. S., & Hasan, A. (2020). Overview on the criticism process in architecture pedagogy. *Alexandria Engineering Journal*, *59*(2), 753–762. https://doi.org/10.1016/j.aej.2020.01.019

Elliott, J. (1998). *Action research for educational change*. Open University Press.

Elzenbaumer, B., Graziano, V., & Trogal, K. (2016). *Introduction: The politics of commoning and design*. Design Research Society Conference 2016. https://doi.org/10.21606/drs.2016.614

Escobar, A. (2015). Commons in the pluriverse. In D. Bollier & S. Helfrich (Eds.), *Patterns of commoning*. Commons Strategies Group. http://patternsofcommoning.org/commons-in-the-pluriverse/

Escobar, A. (2018). *Designs for the pluriverse: Radical interdependence, autonomy, and the making of worlds*. Duke University Press. https://doi.org/10.1215/9780822371816

Esteva, G. (2014). Commoning in the new society. *Community Development Journal*, *49*(suppl 1), i144–i159. https://doi.org/10.1093/cdj/bsu016

Euler, J. (2016). Commons-creating society: On the radical German commons discourse. *Review of Radical Political Economics*, *48*(1), 93–110. https://doi.org/10.1177/0486613415586988

Extended summary. (n.d.). *Cosmolocalism*. Retrieved 26 March 2023, from https://www.cosmolocalism.eu/extended-summary

Fallman, D. (2007). Supporting studio culture in design research. *Proceedings of IASDR 2007*. https://www.sd.polyu.edu.hk/iasdr/proceeding/

Farías, I., & Wilkie, A. (2018a). Studio studies: Notes for a research programme. In I. Farías & A. Wilkie (Eds.), *Studio studies: Operations, topologies and displacements* (pp. 1–22). Routledge.

Farías, I., & Wilkie, A. (Eds.). (2018b). *Studio studies: Operations, topologies and displacements*. Routledge.

Farnham, L., Nothmann, E., Tamaki, Z., & Daniels, C. (2020). *Field building for population-level change: How funders and practitioners can increase the odds of success*. The Bridgespan Group. https://www.bridgespan.org/insights/field-building-for-population-level-change

Fattori, T. (2013). From the water commons movement to the commonification of the public realm. *South Atlantic Quarterly*, *112*(2), 377–387. https://doi.org/10.1215/00382876-2020253

Fisher, M. (2009). *Capitalist realism: Is there no alternative?* Zero Books.

Flores, H. C. (2006). *Food not lawns: How to turn your yard into a garden and your neighborhood into a community*. Chelsea Green Publishing.

Fordyce, R. (2015). Manufacturing imaginaries: Neo-Nazis, men's rights activists and 3D printing. *Journal of Peer Production*, *6*(1), 1–11.

Forlano, L. (2017). Posthumanism and design. *She Ji: The Journal of Design, Economics, and Innovation*, *3*(1), 16–29. https://doi.org/10.1016/j.sheji.2017.08.001

Foster, G. (2015). Experimental economics. In *International encyclopedia of the social & behavioral sciences* (pp. 546–551). Elsevier. https://doi.org/10.1016/B978-0-08-097086-8.71052-X

Foster, S., & Iaione, C. (2019). Ostrom in the city: Design principles and practices for the urban commons. In S. Bloemen & T. de Groot (Eds.), *Our commons: Political ideas for a new Europe* (pp. 52–62). Institute of Network Cultures.

Foster, S. R., & Iaione, C. (2022). *Co-cities: Innovative transitions toward just and self-sustaining communities*. The MIT Press.

Foth, M. (2017). Lessons from urban guerrilla placemaking for smart city commons. *Proceedings of the 8th International Conference on Communities and Technologies*, 32–35. https://doi.org/10.1145/3083671.3083707

Foth, M., & Turner, T. J. (2019). The premise of institutioning for the proliferation of communities and technologies research. *Proceedings of the 9th International Conference on Communities & Technologies - Transforming Communities*, 24–28. https://doi.org/10.1145/3328320.3328398

Foucault, M. (1991). Politics and the study of discourse. In G. Burchell, C. Gordon, & P. Miller (Eds.), *The Foucault effect: Studies in governmentality: With two lectures by and an interview with Michel Foucault* (pp. 53–72). University of Chicago Press.

Frangos, M., & Balli, F. (2017). Breathing games: Promoting respiratory health through co-creation. *The Design Journal*, *20*(sup1), S4738–S4741. https://doi.org/10.1080/14606925.2017.1352976

Frangos, M., Garvey, T., & Knezevic, I. (2017). Infrastructuring place. Citizen-led placemaking and the commons. *The Design Journal*, *20*(sup1), S3279–S3293. https://doi.org/10.1080/14606925.2017.1352832

Franz, F., & Elzenbaumer, B. (2016). *Commons & community economies: Entry points to design for eco-social justice?* Design Research Society Conference 2016. https://doi.org/10.21606/drs.2016.96

Frayling, C. (1993). Research in art and design. *Royal College of Art Research Papers*, *1*(1), 1–5.

Freire, P. (2014). *Pedagogy of the oppressed* (30th Anniversary). Bloomsbury.

Friedman, K., Barron, D., Ferlazzo, S., Ivanka, T., Melles, G., & Yuille, J. (2008). *Design research journal ranking study: Preliminary results*. http://hdl.handle.net/1959.3/45468

Frischmann, B. M., Madison, M. J., & Strandburg, K. J. (Eds.). (2014). *Governing knowledge commons*. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780199972036.001.0001

Fritsch, J., Saad-Sulonen, J., & Poderi, G. (2022). The problem(s) of caring for the commons. *Nordic Human-Computer Interaction Conference*, 1–9. https://doi.org/10.1145/3546155.3547287

Fuchs, C. (2019). Appropriation of digital machines and appropriation of fixed capital as the real appropriation of social being: Reflections on Toni Negri's chapter. In D. Chandler & C. Fuchs (Eds.), *Digital Objects, Digital Subjects: Interdisciplinary Perspectives on Capitalism, Labour and Politics in the Age of Big Data* (pp. 215–221). University of Westminster Press. https://doi.org/10.16997/book29.s

Fuster Morell, M. (2014). Governance of online creation communities for the building of digital commons: Viewed through the framework of the institutional analysis and development. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2842586

Gaete Cruz, M., Ersoy, A., Czischke, D., & Van Bueren, E. (2022). A framework for co-design processes and visual collaborative methods: An action research through design in Chile. *Urban Planning*, *7*(3). https://doi.org/10.17645/up.v7i3.5349

Galabo, R. (2023). Challenging capitalism through design for commonism. In N. Dunn, L. Cruickshank, & G. Coupe (Eds.), *Flourish by design* (pp. 43–46). Routledge. https://doi.org/10.4324/9781003399568

Galabo, R., & Cruickshank, L. (2022). Making it better together: A framework for improving creative engagement tools. *CoDesign*, *18*(4), 503–525. https://doi.org/10.1080/15710882.2021.1912777

Galabo, R., & Sacks, J. (2021). A commons creation framework for co-designing new commons. *14th International Conference of the European Academy of Design, Safe Harbours for Design Research*, 467–474. https://doi.org/10.5151/ead2021-135

Galil, R. A., & Kandil, Y. (2015). Indifferent or devoted: An exploration of student identity through the design studio. *Open House International*, *40*(2), 96–101. https://doi.org/10.1108/OHI-02-2015-B0013

Galloway, A. (2017). More-than-human lab: Creative ethnography after human exceptionalism. In L. Hjorth, H. Horst, A. Galloway, & G. Bell (Eds.), *The Routledge companion to digital ethnography* (pp. 496–503). Routledge. https://doi.org/10.4324/9781315673974

Garcia Diaz, L., & Gielen, P. (2018). Precariat: A new revolutionary class. In N. Dockx & P. Gielen (Eds.), *Commonism: A new aesthetics of the real*. Valiz.

Garrett, B. L. (2016, February 16). What the battle for Freeman's Wood says about the future of our common land. *The Guardian*. https://www.theguardian.com/cities/2016/feb/10/battle-for-freemans-wood-lancaster-common-land-locals-property-development

Gaver, B., Dunne, T., & Pacenti, E. (1999). Design: Cultural probes. *Interactions*, *6*(1), 21–29. https://doi.org/10.1145/291224.291235

Gaver, W. (2012). What should we expect from research through design? *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 937–946. https://doi.org/10.1145/2207676.2208538

Gibbons, S. (2017, August 17). Service blueprints: Definition. *Nielsen Norman Group*. https://www.nngroup.com/articles/service-blueprints-definition/

Gibson-Graham, J. K. (1996). *The end of capitalism (as we knew it): A feminist critique of political economy*. Blackwell Publishers.

Gibson-Graham, J. K. (2003). Poststructural interventions. In E. Sheppard & T. J. Barnes (Eds.), *A companion to economic geography* (pp. 95–110). Wiley. https://doi.org/10.1002/9780470693445.ch7

Gibson-Graham, J. K. (2006). *A postcapitalist politics*. University of Minnesota Press.

Gibson-Graham, J. K. (2008). Diverse economies: Performative practices for `other worlds'. *Progress in Human Geography*, *32*(5), 613–632. https://doi.org/10.1177/0309132508090821

Gibson-Graham, J. K. (2014). Rethinking the economy with thick description and weak theory. *Current Anthropology*, *55*(S9), S147–S153. https://doi.org/10.1086/676646

Gibson-Graham, J. K., Cameron, J., Dombroski, K., Healy, S., Miller, E., & The Community Economies Collective. (2020). Cultivating community economies: Tools for building a liveable world. In J. Speth & K. Courier (Eds.), *The new systems reader: Alternatives to a failed economy* (pp. 410–432). Routledge.

Gibson-Graham, J. K., Cameron, J., & Healy, S. (2013). *Take back the economy: An ethical guide for transforming our communities*. University of Minnesota Press. https://doi.org/10.5749/minnesota/9780816676064.001.0001

Gibson-Graham, J. K., Cameron, J., Healy, S., & McNeill, J. (2019). Roepke Lecture in Economic Geography—Economic geography, manufacturing, and ethical action in the Anthropocene. *Economic Geography*, *95*(1), 1–21. https://doi.org/10.1080/00130095.2018.1538697

Gibson-Graham, J. K., & Dombroski, K. (2020). Introduction to the handbook of diverse economies: Inventory as ethical intervention. In J. K. Gibson-Graham & K. Dombroski (Eds.), *The handbook of diverse economies* (pp. 1–24). Edward Elgar Publishing.

Gibson-Graham, J. K., & Dombroski, K. (Eds.). (2020). *The handbook of diverse economies*. Edward Elgar Publishing.

Gibson-Graham, J. K., Resnick, S. A., & Wolff, R. D. (2000). Introduction: Class in a poststructuralist frame. In J. K. Gibson-Graham, S. A. Resnick, & R. D. Wolff (Eds.), *Class and its others* (pp. 1–22). University of Minnesota Press.

Gielen, P. (2018). Common aesthetics: The shape of a new meta-ideology. In N. Dockx & P. Gielen (Eds.), *Commonism: A new aesthetics of the real* (pp. 75–90). Valiz.

Gielen, P., & Lavaert, S. (2018). The salt of the earth. On commonism: An interview with Antonio Negri. In N. Dockx & P. Gielen (Eds.), *Commonism: A new aesthetics of the real* (pp. 91–116). Valiz.

Gilson, N. (n.d.). How to make effective service blueprints. *Miro*. Retrieved 2 December 2021, from https://miro.com/guides/service-blueprints/

GivingTuesday Data Commons. (n.d.). GivingTuesday; GivingTuesday.org. https://www.givingtuesday.org/data-commons/

Glanville, R. (1999). Researching design and designing research. *Design Issues*, *15*(2), 80. https://doi.org/10.2307/1511844

Gómez, G. M. (2023). How far does the diverse economies approach take us? *Development and Change*, *54*(2), 442–460. https://doi.org/10.1111/dech.12762

Gotbaum, R. (Director). (2017, March 29). One of the world's best chefs says you can taste the love in really good food [Broadcast]. In *The World*. PRX. https://theworld.org/stories/2017-03-29/one-worlds-best-chefs-says-you-can-taste-love-really-good-food

Grant, M. J., & Booth, A. (2009). A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Information & Libraries Journal*, *26*(2), 91–108. https://doi.org/10.1111/j.1471-1842.2009.00848.x

Gray, C. M. (2016). Emerging views of studio. In E. Boling, R. A. Schwier, C. M. Gray, K. M. Smith, & K. Campbell (Eds.), *Studio teaching in higher education* (pp. 271–281). Routledge. https://doi.org/10.4324/9781315697420

Gray, C. M., & Smith, K. M. (2016). Critical views of studio. In E. Boling, R. A. Schwier, C. M. Gray, K. M. Smith, & K. Campbell (Eds.), *Studio teaching in higher education* (pp. 260–270). Routledge. https://doi.org/10.4324/9781315697420

Griffith Centre for Systems Innovation. (2024, July 22). Governance in and for complexity. Part 1: Collective governance within intermediary organisations. *Medium*. https://medium.com/good-shift/governance-in-and-for-complexity-eac108d8b589

Hack4Blood. (n.d.). Hack4Blood; Spectrum Analytics. Retrieved 16 September 2023, from https://www.hack4blood.org/

Haldrup, M., Samson, K., & Laurien, T. (2022). Designing for multispecies commons: Ecologies and collaborations in participatory design. *Proceedings of the Participatory Design Conference 2022 - Volume 2*, 14–19. https://doi.org/10.1145/3537797.3537801

Haraway, D. J. (2003). *The companion species manifesto: Dogs, people, and significant otherness*. Prickly Paradigm Press.

Hardin, G. (1968). The tragedy of the commons. *Science*, *162*(3859), 1243–1248.

Hardt, M., & Negri, A. (2009). *Commonwealth*. Harvard University Press. https://doi.org/10.2307/j.ctvjsf48h

Harvey, D. (2011). The future of the commons. *Radical History Review*, *2011*(109), 101–107. https://doi.org/10.1215/01636545-2010-017

Harvey, D. (2012). *Rebel cities: From the right to the city to the urban revolution*. Verso.

Healy, L., & Krogh, P. G. (2022). Emergent participation in DIY designed bike trails. *Proceedings of the Participatory Design Conference 2022 - Volume 2*, 76–83. https://doi.org/10.1145/3537797.3537814

Hee, L. (2007). Rethinking Shanghai's urban housing. *Urban Design International*, *12*(2–3), 131–142. https://doi.org/10.1057/palgrave.udi.9000193

Heitlinger, S., Bryan-Kinns, N., & Comber, R. (2019). The right to the sustainable smart city. *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, 1–13. https://doi.org/10.1145/3290605.3300517

Heitlinger, S., Houston, L., Taylor, A., & Catlow, R. (2021). Algorithmic food justice: Co-designing more-than-human blockchain futures for the food commons. *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*, 1–17. https://doi.org/10.1145/3411764.3445655

Helfrich, S. (2013, May 22–24). *Economics and commons?! Towards a commons-creating peer economy*. Economics and the common(s): From seed form to core paradigm, Berlin. https://www.boell.de/sites/default/files/ecc_report_final.pdf

Helfrich, S. (2015). Patterns of commoning: How we can bring about a language of commoning. In D. Bollier & S. Helfrich (Eds.), *Patterns of commoning*. Commons Strategies Group.

Hess, C., & Ostrom, E. (Eds.). (2006). *Understanding knowledge as a commons: From theory to practice*. The MIT Press. https://doi.org/10.7551/mitpress/6980.001.0001

Hillgren, P.-A., Seravalli, A., & Emilson, A. (2011). Prototyping and infrastructuring in design for social innovation. *CoDesign*, *7*(3–4), 169–183. https://doi.org/10.1080/15710882.2011.630474

Hitchcock, P. (2011). Commonism. *Mediations, 25*(2), 23–36.

Hitchcock, P. (2019). Commonists like Us. *The Minnesota Review*, *2019*(93), 75–82. https://doi.org/10.1215/00265667-7737283

Hofkirchner, W. (2017). Creating common good: The global sustainable information society as the good society. In M. S. Archer (Ed.), *Morphogenesis and Human Flourishing* (pp. 277–296). Springer International Publishing. https://doi.org/10.1007/978-3-319-49469-2_13

Home. (n.d.). *Internet of Food Things Network Plus*. Retrieved 4 June 2023, from https://www.foodchain.ac.uk/

Hook, A. (2019). Exploring speculative methods: Building artifacts to investigate interspecies intersubjective subjectivity. *Alphaville: Journal of Film and Screen Media*, *17*, 146–164. https://doi.org/10.33178/alpha.17.09

Huron, A. (2015). Working with strangers in saturated space: Reclaiming and maintaining the urban commons. *Antipode*, *47*(4), 963–979. https://doi.org/10.1111/anti.12141

Hussein, T., Plummer, M., & Breen, B. (2017). How field catalysts galvanize social change. *Stanford Social Innovation Review*, *16*, 4854. https://doi.org/10.48558/9K95-QC55

Huybrechts, L., Benesch, H., & Geib, J. (2017). Institutioning: Participatory design, co-design and the public realm. *CoDesign*, *13*(3), 148–159. https://doi.org/10.1080/15710882.2017.1355006

Huybrechts, L., Devisch, O., & Tassinari, V. (2022). Beyond polarisation: Reimagining communities through the imperfect act of ontologising. *CoDesign*, *18*(1), 63–77. https://doi.org/10.1080/15710882.2021.2001537

IIPP. (n.d.-a). Curriculum. *UCL Institute for Innovation and Public Purpose*. Retrieved 18 December 2023, from https://www.ucl.ac.uk/bartlett/public-purpose/study/master-public-administration-mpa-innovation-public-policy-and-public-value/curriculum

IIPP. (n.d.-b). UCL Institute for Innovation and Public Purpose. *UCL Institute for Innovation and Public Purpose*. Retrieved 18 December 2023, from https://www.ucl.ac.uk/bartlett/public-purpose/

Ingold, T. (2013). *Making: Anthropology, archaeology, art and architecture*. Routledge.

Irving-Bell, D., Wooff, D., & McLain, M. (2019). Re-designing design and technology education: A living literature review of stakeholder perspectives. *PATT37: Developing a Knowledge Economy through Technology and Engineering Education*, 233–249.

Iversen, O. S., & Dindler, C. (2014). Sustaining participatory design initiatives. *CoDesign*, *10*(3–4), 153–170. https://doi.org/10.1080/15710882.2014.963124

Jacobs, N., Brewer, S., Craigon, P. J., Frey, J., Gutierrez, A., Kanza, S., Manning, L., Munday, S., Pearson, S., & Sacks, J. (2021). Considering the ethical implications of digital collaboration in the Food Sector. *Patterns*, *2*(11), 100335. https://doi.org/10.1016/j.patter.2021.100335

Jacucci, G., & Campagnolo, G. M. (2012). Social practice design. In G. Viscusi, G. M. Campagnolo, & Y. Curzi (Eds.), *Phenomenology, organizational politics, and IT design: The social study of information systems* (pp. 273–288). IGI Global. https://doi.org/10.4018/978-1-4666-0303-5.ch015

Jain, A., & Ardern, J. (2021, November 18). 'We're calling time on human exceptionalism' says Superflux. *Dezeen*. https://www.dezeen.com/2021/11/18/superflux-dezeen-15-manifesto-human-exceptionalism/

Jelley, J. (2013). From perception to paint: The practical use of the camera obscura in the time of Vermeer. *Art & Perception*, *1*(1–2), 19–47. https://doi.org/10.1163/22134913-00002006

Jessop, B. (2010). Cultural political economy and critical policy studies. *Critical Policy Studies*, *3*(3–4), 336–356. https://doi.org/10.1080/19460171003619741

Jessop, B. (2013, April 4). *Economic imaginaries and economic transformation*. https://youtu.be/A-HXVEanAoY

Jonas, W. (2012). Exploring the swampy ground: An inquiry into the logic of design research. In S. Grand & W. Jonas (Eds.), *Mapping design research* (pp. 11–42). Birkhäuser.

Jones, D. (2022). *Studio use in distance design education* [Open University]. https://doi.org/10.21954/ou.ro.00014388

Joyce, A., & Paquin, R. L. (2016). The triple layered business model canvas: A tool to design more sustainable business models. *Journal of Cleaner Production*, *135*, 1474–1486. https://doi.org/10.1016/j.jclepro.2016.06.067

Kamalipour, H., & Peimani, N. (2022). Learning and teaching urban design through design studio pedagogy: A blended studio on transit urbanism. *Education Sciences*, *12*(10), 712. https://doi.org/10.3390/educsci12100712

Karasti, H. (2014). Infrastructuring in participatory design. *Proceedings of the 13th Participatory Design Conference: Research Papers - Volume 1*, 141–150. https://doi.org/10.1145/2661435.2661450

Kelemen, W., Jhangiani, R. S., Chiang, I.-C. A., Cuttler, C., & Leighton, D. C. (2023). *Research methods in psychology* (4th ed.). Pressbooks. https://pressbooks.txst.edu/3402kelemen/

Khalili, H. (2023). A design studio experiment: Pedagogy, digital storytelling, and atmosphere in architectural education. *The International Journal of Design Education*, *17*(1), 213–232. https://doi.org/10.18848/2325-128X/CGP/v17i01/213-232

Kinsley, K. M., Schoonover, D., & Spitler, J. (2016). GoPro as an ethnographic tool: A wayfinding study in an academic library. *Journal of Access Services*, *13*(1), 7–23. https://doi.org/10.1080/15367967.2016.1154465

Kioupkiolis, A. (2017). The lack of the political in the commons and a post-hegemonic strategy of social transformation. *Heteropolitics International Workshop Proceedings*. https://heteropolitics.net/index.php/project-publications/

Kioupkiolis, A. (2019). *The common and counter-hegemonic politics: Re-thinking social change*. Edinburgh University Press.

Kioupkiolis, A. (2022). Digital commons, the political and social change: Towards an integrated strategy of counter-hegemony furthering the commons. *Ephemera*, *22*(2), 51–82.

Koskinen, I. K., Zimmerman, J., Binder, T., Redstrom, J., & Wensveen, S. (2011). *Design research through practice: From the lab, field, and showroom* (1st ed.). Morgan Kaufmann.

Kostakis, V., & Drechsler, W. (2015). Commons-based peer production and artistic expression: Two cases from Greece. *New Media & Society*, *17*(5), 740–754. https://doi.org/10.1177/1461444813511929

Krieger, M., Stark, E. M., & Klemmer, S. R. (2009). Coordinating tasks on the commons: Designing for personal goals, expertise and serendipity. *Proceedings of the SIGCHI*

Conference on Human Factors in Computing Systems, 1485–1494. https://doi.org/10.1145/1518701.1518927

Kulözü, N. (2016). Teaching design to city planning students: After first year planning studio experiment at the department of city and regional planning, Atatürk University, Turkey., 5(1). *Journal of Teaching and Education*, *5*(1), 525–542.

Kunkel, B. (2013, June 13). *Speculations ("The future is commonist")*. Speculations ("The future is _____"), MoMA PS1, New York. https://www.canopycanopycanopy.com/contents/speculations-archive-overextending-ourselves/#talk-eleven-frame

Laermans, R. (2011, February 23). *Artistic collaboration and the promises of communalism*. Kollaborateure, Vienna.

Laermans, R. (2012). Teaching theory and the art of not-knowing: Notes on pedagogical commonalism. *Krisis: Journal for Contemporary Philosophy*, *1*, 63–73.

Last, C. (2017). Global commons in the global brain. *Technological Forecasting and Social Change*, *114*, 48–64. https://doi.org/10.1016/j.techfore.2016.06.013

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge University Press.

Law, J. (2015). What's wrong with a one-world world? *Distinktion: Journal of Social Theory*, *16*(1), 126–139. https://doi.org/10.1080/1600910X.2015.1020066

Law, J., & Urry, J. (2004). Enacting the social. *Economy and Society*, *33*(3), 390–410. https://doi.org/10.1080/0308514042000225716

Lawson, B., & Dorst, K. (2009). *Design expertise*. Architectural Press.

Lay, G. K. (2023). *Goose attacking human* [Icon]. The Noun Project. https://thenounproject.com/icon/goose-attacking-human-1037063/

Le Dantec, C. A., & DiSalvo, C. (2013). Infrastructuring and the formation of publics in participatory design. *Social Studies of Science*, *43*(2), 241–264. https://doi.org/10.1177/0306312712471581

Lee, B. Y. (2017, October 4). FDA tells bakery that 'love' is not an ingredient. *Forbes*. https://www.forbes.com/sites/brucelee/2017/10/04/fda-tells-bakery-that-love-is-not-an-ingredient/

Lee, R., Leyshon, A., & Gibson-Graham, J. K. (2010). Gibson-Graham, J.K. 1996: The end of capitalism (as we knew it): a feminist critique of political economy. Oxford: Blackwell. *Progress in Human Geography*, *34*(1), 117–127. https://doi.org/10.1177/0309132509337654

Leiboff, M. D. (2010, May 19). *Studio classroom: Designing collaborative learning spaces -*. Campus Technology. https://campustechnology.com/articles/2010/05/19/studio-classroom-designing-collaborative-learning-spaces.aspx

Lessig, L. (2002). *The future of ideas: The fate of the commons in a connected world*. Vintage Books.

Lewis, H. (n.d.). *Another world is possible* [Graphic]. Retrieved 15 December 2023, from https://community.amplifier.org/art/another-world-is-possible/

Lin, N., Fu, Y., & Hsung, R.-M. (2017). The position generator: Measurement techniques for investigations of social capital. In N. Lin, K. Cook, & R. S. Burt, *Social Capital* (1st ed., pp. 57–81). Routledge. https://doi.org/10.4324/9781315129457-3

Linåker, J., & Runeson, P. (2022). Sustaining open data as a digital common – design principles for common pool resources applied to open data ecosystems. *Proceedings of the 18th International Symposium on Open Collaboration*, 1–11. https://doi.org/10.1145/3555051.3555066

Lindley, J., & Coulton, P. (2015). Back to the future: 10 years of design fiction. *Proceedings of the 2015 British HCI Conference*, 210–211. https://doi.org/10.1145/2783446.2783592

Linebaugh, P. (2008). *The Magna Carta manifesto: Liberties and commons for all*. University of California Press.

Lodato, T., & DiSalvo, C. (2018). Institutional constraints: The forms and limits of participatory design in the public realm. *Proceedings of the 15th Participatory Design Conference: Full Papers - Volume 1*, 1–12. https://doi.org/10.1145/3210586.3210595

Logan, C. D. (2006). Circles of practice: Educational and professional graphic design. *Journal of Workplace Learning*, *18*(6), 331–343. https://doi.org/10.1108/13665620610682062

Lyle, P., Sciannamblo, M., & Teli, M. (2018). Fostering Commonfare. Infrastructuring autonomous social collaboration. *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*, 1–12. https://doi.org/10.1145/3173574.3174026

Lynn Shostack, G. (1982). How to design a service. *European Journal of Marketing*, *16*(1), 49–63. https://doi.org/10.1108/EUM0000000004799

Maharika, I. F. (2018). Integration of revealed knowledge into design thinking: An urban design studio experiment. *Journal of Islamic Architecture*, *5*(1), 36. https://doi.org/10.18860/jia.v5i1.4202

Makepe, P. M. (2006). The evolution of institutions and rules governing communal grazing lands in botswana. *Eastern Africa Social Science Research Review*, *22*(1), 39–61. https://doi.org/10.1353/eas.2006.0005

Maller, C. (2021). Re-orienting nature-based solutions with more-than-human thinking. *Cities*, *113*, 103155. https://doi.org/10.1016/j.cities.2021.103155

Mancini, C., Lawson, S., & Juhlin, O. (2017). Animal-Computer Interaction: The emergence of a discipline. *International Journal of Human-Computer Studies*, *98*, 129–134. https://doi.org/10.1016/j.ijhcs.2016.10.003

Manning, L., Brewer, S., Craigon, P. J., Frey, J., Gutierrez, A., Jacobs, N., Kanza, S., Munday, S., Sacks, J., & Pearson, S. (2022). Artificial intelligence and ethics within the food sector: Developing a common language for technology adoption across the supply chain. *Trends in Food Science & Technology*, *125*, 33–42. https://doi.org/10.1016/j.tifs.2022.04.025

Manning, L., Brewer, S., Craigon, P. J., Frey, J., Gutierrez, A., Jacobs, N., Kanza, S., Munday, S., Sacks, J., & Pearson, S. (2023). Reflexive governance architectures: Considering the ethical implications of autonomous technology adoption in food supply chains. *Trends in Food Science & Technology*, *133*, 114–126. https://doi.org/10.1016/j.tifs.2023.01.015

Manouvrier, S. (2019, October 22). Every time a civilization is in crisis, there is a return of the commons. *Ouishare Magazine*. https://www.ouishare.net/article/every-time-a-civilization-is-in-crisis-there-is-a-return-of-the-commons-interview-with-michel-bauwens

Mansfield, N. J. (2016). Ranking of design journals based on results of the UK Research Excellence Framework: Using REF as referee. *The Design Journal*, *19*(6), 903–919. https://doi.org/10.1080/14606925.2016.1216212

Martin, B., & Hanington, B. (2018). *The pocket universal methods of design: 100 ways to research complex problems, develop innovative ideas and design effective solutions*. Rockport.

Marttila, S. (2016). *From rules in use to culture in use – commoning and infrastructuring practices in an open cultural movement*. Design Research Society Conference 2016. https://doi.org/10.21606/drs.2016.454

Marttila, S., & Botero, A. (2017). Infrastructuring for cultural commons. *Computer Supported Cooperative Work (CSCW)*, *26*, 97–133. https://doi.org/10.1007/s10606-017-9273-1

Marttila, S., Botero, A., & Saad-Sulonen, J. (2014). Towards commons design in participatory design. *Proceedings of the 13th Participatory Design Conference: Short Papers, Industry Cases, Workshop Descriptions, Doctoral Consortium Papers, and Keynote Abstracts - Volume 2*, 9–12. https://doi.org/10.1145/2662155.2662187

Mary B. (2017). *Goose* [Icon]. The Noun Project. https://thenounproject.com/icon/goose-1175331/

Mazzarol, T., Clark, D., Reboud, S., & Limnios, E. M. (2018). Developing a conceptual framework for the co-operative and mutual enterprise business model. *Journal of Management & Organization*, *24*(4), 551–581. https://doi.org/10.1017/jmo.2018.29

Mazzucato, M. (2013). *The entrepreneurial state: Debunking public vs. private sector myths*. Anthem Press.

Mazzucato, M., Kattel, R., & Conway, R. (2022, February 5). A little less conversation, a little more action. *Medium*. https://medium.com/iipp-blog/a-little-less-conversation-a-little-more-action-7641a02953e4

McGinnis, M. D. (2011). An introduction to IAD and the language of the Ostrom Workshop: A simple guide to a complex framework. *Policy Studies Journal*, *39*(1), 169–183. https://doi.org/10.1111/j.1541-0072.2010.00401.x

McGinnis, M. D., & Ostrom, E. (2014). Social-ecological system framework: Initial changes and continuing challenges. *Ecology and Society*, *19*(2). https://doi.org/10.5751/ES-06387-190230

McKay, D., Cahill, A., & Gibson, K. (2007). Strengthening community economies: Strategies for decreasing dependence and stimulating local development. *Development Bulletin (Canberra)*, *72*, 60–65.

McLain, M. (2020). Key pedagogies in design and technology. In A. Hardy (Ed.), *Learning to teach design and technology in the secondary school: A companion to school experience* (4th ed.). Routledge. https://doi.org/10.4324/9780429321191

McLain, M. (2022). Towards a signature pedagogy for design and technology education: A literature review. *International Journal of Technology and Design Education*, *32*(3), 1629–1648. https://doi.org/10.1007/s10798-021-09667-5

Medeiros de Freitas, D. (2023). Making urban design teaching more permeable to regional green infrastructure: An urban design studio experiment. *Landscape Research*, *48*(4), 477–487. https://doi.org/10.1080/01426397.2021.1875204

Meretz, S. (2012, December 29). Die doppelten Commons. *Keimform*. https://keimform.de/2012/die-doppelten-commons/

Milburn, K., & Russell, B. (2018). What can an institution do? Towards Public-Common partnerships and a new common-sense. *Renewal*, *26*(4).

Milburn, K., & Russell, B. (2019). *Public-common partnerships: Building new circuits of collective ownership*. Common Wealth. https://www.common-wealth.co.uk/reports/public-common-partnerships-building-new-circuits-of-collective-ownership

Miyazaki, S. (2019). Take back the algorithms! A media theory of commonistic affordance. *Media Theory*, *3*(1), 269–286.

Mogaleemang, T., & Mongale, G. (2022). *Leveraging ecosystem approaches to co-create a sustainable solution to Botswana's blood shortage crisis* [Unpublished].

Moran, D. J., Metcalfe, C., & Graham, T. C. N. (2014). IRC quest: Using the commons dilemma to support a single-screen game for hundreds of players. *Proceedings of the First ACM SIGCHI Annual Symposium on Computer-Human Interaction in Play*, 359–362. https://doi.org/10.1145/2658537.2662991

Morss, K., & Murray, R. (2005). *Teaching at university: A guide for postgraduates and researchers*. SAGE Publications Ltd.

Mouffe, C. (2000). *The democratic paradox*. Verso.

Moumakwa, P. C. (2011). *The Botswana kgotla system: A mechanism for traditional conflict resolution in modern Botswana: case study of the Kanye kgotla* [Master thesis, University of Tromsø]. https://munin.uit.no/handle/10037/3211

Mullagh, L., Cooper, R., Thomas, L., & Sacks, J. (2024). Design reactions. In R. Cooper & L. Mullagh (Eds.), *Design and Covid-19: From reaction to resilience*. Bloomsbury.

Mullagh, L., Cooper, R., Thomas, L., Sacks, J., Lloyd Jones, P., & Jacobs, N. (2021). Designing for a pandemic: Towards recovery and resilience. *Strategic Design Research Journal*, *14*(1), 161–174. https://doi.org/10.4013/sdrj.2021.141.14

Nancy, J.-L. (1991). Of being-in-common. In Miami Theory Collective (Ed.), *Community at loose ends* (pp. 1–12). University of Minnesota Press. https://www.jstor.org/stable/10.5749/j.ctttsqk7.4

Neary, M., & Winn, J. (2012). Open education: Common(s), commonism and the new common wealth. *Ephemera*, *12*(4), 406–422.

Nelson, H. G., & Stolterman, E. (2012). *The design way: Intentional change in an unpredictable world*. The MIT Press. https://doi.org/10.7551/mitpress/9188.001.0001

Network grants. (n.d.). Retrieved 4 June 2023, from https://www.ukri.org/councils/epsrc/guidance-for-applicants/types-of-funding-we-offer/network-grants/

Neumüller, D., & Meretz, S. (2019). Generalized agency and commonism. *Annual Review of Critical Psychology*, *16*, 333–352.

Nielsen, J. (2000, March 18). Why you only need to test with 5 users. *Nielsen Norman Group*. https://www.nngroup.com/articles/why-you-only-need-to-test-with-5-users/

North, D. C. (1990). *Institutions, institutional change and economic performance* (1st ed.). Cambridge University Press. https://doi.org/10.1017/CBO9780511808678

North, D. C. (1991). Institutions. *Journal of Economic Perspectives*, *5*(1), 97–112. https://doi.org/10.1257/jep.5.1.97

Nthubu, B. (2021). The value of a co-design visualization approach: Enhancing the understanding of local entrepreneurial ecosystems. *The Design Journal*, *24*(5), 749–760. https://doi.org/10.1080/14606925.2021.1957327

Nthubu, B. (2022). *Co-design and visualisations as boundary objects: Navigating complexity in a blood donation ecosystem project* [Unpublished].

O'Donovan, Ó. (2015). Conversing on the commons: An interview with Gustavo Esteva—part 2. *Community Development Journal*, *50*(4), 742–752. https://doi.org/10.1093/cdj/bsv014

Oh, Y., Ishizaki, S., Gross, M. D., & Yi-Luen Do, E. (2013). A theoretical framework of design critiquing in architecture studios. *Design Studies*, *34*(3), 302–325. https://doi.org/10.1016/j.destud.2012.08.004

OLDitshweu. (2013). *Kgotla ya Kgosing* [Graphic]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:Kgotla_ya_Kgosing.jpg

Olson, M. (1965). *The logic of collective action: Public goods and the theory of groups*. Harvard University Press.

Orlikowski, W. J. (2006). Material knowing: The scaffolding of human knowledgeability. *European Journal of Information Systems*, *15*(5), 460–466. https://doi.org/10.1057/palgrave.ejis.3000639

Osmond, J., & Tovey, M. (2015). The threshold of uncertainty in teaching design. *Design and Technology Education: An International Journal*, *20*(2), 50–57.

Osterwalder, A. (2004). *The business model ontology: A proposition in a design science approach* [PhD thesis]. University of Lausanne.

Osterwalder, A., & Pigneur, Y. (2010). *Business model generation: A handbook for visionaries, game changers, and challengers*. Wiley.

Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action*. Cambridge University Press. https://doi.org/10.1017/CBO9781316423936

Ostrom, E. (2005). *Understanding institutional diversity*. Princeton University Press.

Ostrom, E. (2009). A general framework for analyzing sustainability of social-ecological systems. *Science*, *325*(5939), 419–422. https://doi.org/10.1126/science.1172133

Ostrom, E. (2010). Beyond markets and states: Polycentric governance of complex economic systems. *American Economic Review*, *100*(3), 641–672. https://doi.org/10.1257/aer.100.3.641

Ostrom, E., Gardner, R., & Walker, J. (1994). *Rules, games, and common-pool resources*. University of Michigan Press. https://doi.org/10.3998/mpub.9739

Ostrom, E., & Parks, R. B. (1999). Neither Gargantua nor the Land of Lilliputs: Conjectures on mixed systems of metropolitan organization. In M. D. McGinnis (Ed.), *Polycentricity and local public economies: Readings from the Workshop in Political*

Theory and Policy Analysis. University of Michigan Press. https://doi.org/10.3998/mpub.16061

Otte, H., & Gielen, P. (2018). When politics becomes unavoidable: From community art to commoning art. In N. Dockx & P. Gielen (Eds.), *Commonism: A new aesthetics of the real* (pp. 269–282). Valiz.

P2P Lab. (n.d.-a). *P2P Foundation*. Retrieved 23 January 2021, from https://wiki.p2pfoundation.net/P2P_Lab

P2P Lab. (n.d.-b). P2P Lab. *P2P Lab*. Retrieved 14 March 2023, from https://www.p2plab.gr/en/

Palmieri, T., Huybrechts, L., Devisch, O., & De Ridder, R. (2018). Everyone shares in Hasselt: A perspective on the political potential of spatial commoning. *Proceedings of the 15th Participatory Design Conference: Short Papers, Situated Actions, Workshops and Tutorial - Volume 2*, 1–3. https://doi.org/10.1145/3210604.3214359

Papadimitropoulos, V. (2017). The politics of the commons: Reform or revolt? *tripleC: Communication, Capitalism & Critique*, *15*(2), 563–581. https://doi.org/10.31269/triplec.v15i2.852

Papadimitropoulos, V. (2020). *The commons: Economic alternatives in the digital age*. University of Westminster Press. https://doi.org/10.16997/book46

Parker, P., & Schmidt, S. (2017). Enabling urban commons. *CoDesign*, *13*(3), 202–213. https://doi.org/10.1080/15710882.2017.1355000

Parker, S. (2015). *Taking power back: Putting people in charge of politics*. Bristol University Press. https://doi.org/10.46692/9781447326885

Parr, A. (2018). *Birth of a new earth: The radical politics of environmentalism*. Columbia University Press.

Pasin, B. (2017). Rethinking the design studio-centered architectural education. A case study at schools of architecture in Turkey. *The Design Journal*, *20*(sup1), S1270–S1284. https://doi.org/10.1080/14606925.2017.1352656

Paton, B., & Dorst, K. (2011). Briefing and reframing: A situated practice. *Design Studies*, *32*(6), 573–587. https://doi.org/10.1016/j.destud.2011.07.002

Pavid, K. (2020, September 30). Beekeeping in cities is harming other wildlife, study finds. *The Natural History Museum*. https://www.nhm.ac.uk/discover/news/2020/september/beekeeping-in-cities-harming-other-wildlife.html

P.D. Commoners. (2020). *Commoning design: A pluriversal slide-deck v2*. https://doi.org/10.5281/zenodo.4117771

Pederson, J. R. (2017). Laboratory experiments. In M. Allen (Ed.), *The SAGE Encyclopedia of Communication Research Methods*. SAGE Publications, Inc. https://doi.org/10.4135/9781483381411

Penuel, W. R. (2019). Infrastructuring as a practice of design-based research for supporting and studying equitable implementation and sustainability of innovations. *Journal of the Learning Sciences*, *28*(4–5), 659–677. https://doi.org/10.1080/10508406.2018.1552151

Poblet, M., & Sierra, C. (2020). Understanding help as a commons. *International Journal of the Commons*, *14*(1), 481–493. https://doi.org/10.5334/ijc.1029

Poderi, G. (2019). Sustaining platforms as commons: Perspectives on participation, infrastructure, and governance. *CoDesign*, *15*(3), 243–255. https://doi.org/10.1080/15710882.2019.1631351

Postill, J., & Pink, S. (2012). Social media ethnography: The digital researcher in a messy web. *Media International Australia*, *145*(1), 123–134. https://doi.org/10.1177/1329878X1214500114

Poteete, A. R. (1999). *Disaggregating state and society: Accounting for patterns of tenure change in Botswana, 1975-1996* [PhD thesis]. Duke University.

Prakash, M. S. (2011). Commons, common sense, and community collaboration in hard times. *PowerPlay: A Journal of Educational Justice*, *3*(1), 39–70.

Prendeville, S., Syperek, P., & Santamaria, L. (2022). On the politics of design framing practices. *Design Issues*, *38*(3), 71–84. https://doi.org/10.1162/desi_a_00692

Projects. (n.d.). Cross Cultural Bridges. Retrieved 10 November 2021, from https://www.crossculturalbridges.org/projects/

Puig de la Bellacasa, M. (2010). Ethical doings in naturecultures. *Ethics, Place & Environment*, *13*(2), 151–169. https://doi.org/10.1080/13668791003778834

Puig de la Bellacasa, M. (2017). *Matters of care: Speculative ethics in more than human worlds*. University of Minnesota Press.

Pusey, A. (2010). Social centres and the new cooperativism of the common. *Affinities: A Journal of Radical Theory, Culture, and Action*.

Qureshi, H. (2019). Collaborative architectural design studio environment: An experiment in the studio of Architectural Design-I. *Archnet-IJAR: International Journal of Architectural Research*, *14*(2), 303–324. https://doi.org/10.1108/ARCH-12-2018-0049

Raworth, K. (2017). *Doughnut economics: Seven ways to think like a 21st century economist*. Chelsea Green Publishing.

Read, D. W., Levy, E., & Levy, D. (Writers)Ciccoritti, J. (Director). (2016, January 16). Family dinner (Season 2, Episode 2) [TV series episode]. In *Schitt's Creek*. Not a Real Company Productions, CBC, Pop TV.

Reboot. (2016). New Readers User persona—Helen—Nigeria. *Wikimedia Commons*. https://commons.wikimedia.org/wiki/File:New_Readers_User_persona_-_Helen_-_Nigeria.png

Redrawing the economy. (n.d.). Retrieved 28 May 2023, from https://redrawingtheeconomy.info/

Resnick, S. A., & Wolff, R. D. (1989). *Knowledge and class: A Marxian critique of political economy*. University of Chicago Press.

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

Robert, G., Williams, O., Lindenfalk, B., Mendel, P., Davis, L. M., Turner, S., Farmer, C., & Branch, C. (2021). Applying Elinor Ostrom's design principles to guide co-design in health(care) improvement: A case study with citizens returning to the community from jail in Los Angeles county. *International Journal of Integrated Care*, *21*(1), 7. https://doi.org/10.5334/ijic.5569

Rorty, R. (2009). *Philosophy and the mirror of nature* (30th anniversary edition). Princeton University Press.

Ruccio, D. (1998). Deconstruction. In J. B. Davis, D. W. Hands, & U. Mäki (Eds.), *The handbook of economic methodology* (pp. 89–93). Edward Elgar Publishing.

Rügemer, J. (2001). Computer generated architectural design: 160 custom-made architectural data flow from schematic design into computer aided manufacturing. *19th eCAADe Conference Proceedings*, 288–292. https://doi.org/10.52842/conf.ecaade.2001.288

Ruhaak, A. (2020, May 28). Data commons & data trust. *Medium*. https://medium.com/@anoukruhaak/data-commons-data-trust-63ac64c1c0c2

Sacks, J. (2021a, April 18). *#commonize: Using commonized design to create a post-capitalist economy*. Design and Economics. https://www.youtube.com/watch?v=Np2l8-yHFx4

Sacks, J. (2021b, October 15). *Training workshop 5: More-than-human commoning*. XVIII Biennial IASC Conference "Our Commons Future". https://2021general.iasc-commons.org/training-workshop-5/

Sacks, J. (2022a). User research to design a more-than-human food commons. In D. Lockton, S. Lenzi, P. Hekkert, A. Oak, J. Sádaba, & P. Lloyd (Eds.), *DRS2022: Bilbao*. https://doi.org/10.21606/drs.2022.219

Sacks, J. (2022b, October 28). *#commonize studio: Creating design briefs for disruptive economics*. Deep Commons 2022: Cultivating ecologies of solidarity and care beyond capitalism, patriarchy, racism and the state. https://www.deepcommons.net/conference-2022

Sacks, J., & Coulton, P. (2020). *Addressing the elephant in the cloudless sky: Designing a commonised mobile network infrastructure*. MobileHCI 2020. https://github.com/floe/cloudless-skies/blob/master/position_paper_1.pdf

Sacks, J., & Coulton, P. (2022). Governing with nature: Applying more-than-human design to the management of shared urban green space. In G. Bruyns & H. Wei (Eds.), *[ ] With design: Reinventing design modes* (pp. 3624–3624). Springer Nature Singapore. https://doi.org/10.1007/978-981-19-4472-7_250

Sacks, J., & Galabo, R. (2022). A framework for infrastructuring commons creation. In G. Bruyns & H. Wei (Eds.), *[ ] With design: Reinventing design modes* (pp. 1016–1036). Springer Nature Singapore. https://doi.org/10.1007/978-981-19-4472-7_67

Sacks, J., Galabo, R., & Nthubu, B. (2022). Botswana blood commons: Visualizing blood services as a public-commons partnership. *Proceedings of the Participatory Design Conference 2022 - Volume 2*, 84–93. https://doi.org/10.1145/3537797.3537815

Sacks, J., & Wernli, M. (2022a). Co-design of the pluriversal Commons Model Canvas. *Proceedings of the Participatory Design Conference 2022 - Volume 2*, 227–230. https://doi.org/10.1145/3537797.3537840

Sacks, J., & Wernli, M. (2022b). *Reframing and rendering commoning with a pluriversal commons model canvas* [Unpublished].

Sawyer, R. K. (2018). Teaching and learning how to create in schools of art and design. *Journal of the Learning Sciences*, *27*(1), 137–181. https://doi.org/10.1080/10508406.2017.1381963

Schaeper, J., Kothari, S., & Hamilton, G. (2022). *Social commoning as a way to transition towards alternative systems by design*. DRS2022: Bilbao. https://doi.org/10.21606/drs.2022.511

Schatzki, T. (2013). The edge of change: On the emergence, persistence, and dissolution of practices. In E. Shove & N. Spurling (Eds.), *Sustainable Practices: Social Theory and Climate Change* (0 ed.). Routledge. https://doi.org/10.4324/9780203071052

Schön, D. A. (1983). *The reflective practitioner: How professionals think In action*. Basic Books.

Schön, D. A. (1984). The architectural studio as an exemplar of education for reflection-in-action. *Journal of Architectural Education*, *38*(1), 2–9. https://doi.org/10.1080/10464883.1984.10758345

Schön, D. A. (1985). *The design studio: An exploration of its traditions and potentials*. RIBA Publications Limited.

Schön, D. A. (1992). Designing as reflective conversation with the materials of a design situation. *Research in Engineering Design*, *3*(3), 131–147. https://doi.org/10.1007/BF01580516

Schön, D. A., & Rein, M. (1994). *Frame reflection*. Basic Books.

Schrand, T., & Eliason, J. (2012). Feedback practices and signature pedagogies: What can the liberal arts learn from the design critique? *Teaching in Higher Education*, *17*(1), 51–62. https://doi.org/10.1080/13562517.2011.590977

Schulte, B., Shalawadi, S., Van Kleek, M., & Echtler, F. (2020). Cloudless skies? Decentralizing mobile interaction. *22nd International Conference on Human-Computer Interaction with Mobile Devices and Services*, 1–3. https://doi.org/10.1145/3406324.3424598

Schweizer, E. (2021, May 25). Why the 'commons' may be the future of the food system. *Forbes*. https://www.forbes.com/sites/errolschweizer/2021/05/25/why-the-commons-may-be-the-future-of-the-food-system/

Sedgwick, E. K. (1997). Paranoid reading and reparative reading, or, you're so paranoid, you probably think this essay is about you. In E. K. Sedgwick (Ed.), *Novel gazing: Queer readings in fiction* (pp. 1–38). Duke University Press. https://doi.org/10.1215/9780822382478-001

Sennett, R. (2008). *The craftsman*. Yale University Press.

Seravalli, A. (2018). Infrastructuring urban commons over time: Learnings from two cases. *Proceedings of the 15th Participatory Design Conference: Full Papers - Volume 1*, 1–11. https://doi.org/10.1145/3210586.3210593

Seravalli, A., Agger Eriksen, M., & Hillgren, P.-A. (2017). Co-design in co-production processes: Jointly articulating and appropriating infrastructuring and commoning with civil servants. *CoDesign*, *13*(3), 187–201. https://doi.org/10.1080/15710882.2017.1355004

Service blueprint. (n.d.). *Service Design Tools*. Retrieved 2 December 2021, from https://servicedesigntools.org/tools/service-blueprint

Shaffer, D. W. (1997). Learning mathematics through design: The anatomy of Escher's world. *The Journal of Mathematical Behavior*, *16*(2), 95–112. https://doi.org/10.1016/S0732-3123(97)90019-5

Shaffer, D. W. (2007). Learning in design. In R. A. Lesh, E. Hamilton, & J. J. Kaput (Eds.), *Foundations for the future in mathematics education* (pp. 99–126). Lawrence Erlbaum Associates.

Shantz, J. (2013). *Commonist tendencies: Mutual aid beyond communism*. punctum books.

Shreeve, A. (2015). Signature pedagogies in design. In M. Tovey (Ed.), *Design pedagogy: Developments in art and design education* (pp. 83–94). Gower.

Shreeve, A., Sims, E., & Trowler, P. (2010). 'A kind of exchange': Learning from art and design teaching. *Higher Education Research & Development*, *29*(2), 125–138. https://doi.org/10.1080/07294360903384269

Shrubsole, G. (2020). *Who owns England? How we lost our land and how to take it back*. William Collins.

Shulman, L. S. (2005). Signature pedagogies in the professions. *Daedalus*, *134*(3), 52–59.

Siefkes, C. (2009). The commons of the -future: Building blocks for a commons-based -society. *The Commoner*. https://thecommoner.org/wp-content/uploads/2020/06/siefkes_future-commons.pdf

Siefkes, C. (2012). Commonism. In U. Brand, B. Lösch, B. Opratko, & S. Thimmel (Eds.), *The A to Z of alternatives 2.0: From the aesthetics of resistance to the World Social Forum* (p. 34). VSA Publishers.

Simon, H. A. (1969). *The sciences of the artificial*. The MIT Press.

Sinner, J., Tadaki, M., Challies, E., Kilvington, M., Tane, P., & Robb, C. A. (2022). Crafting collective management institutions in messy real-world settings: A call for action research. *International Journal of the Commons*, *16*(1), 1–13. https://doi.org/10.5334/ijc.1145

Skaggs, P. T. (2013). *The new studio: Breaking a long tradition*. ISDA 2013 Education Symposium: Breaking the Rules. https://www.idsa.org/education-paper/the-new-studio/

Smith, C. K. (1974). *Styles and structures: Alternative approaches to college writing*. Norton.

Smith, R. C., & Iversen, O. S. (2018). Participatory design for sustainable social change. *Design Studies*, *59*, 9–36. https://doi.org/10.1016/j.destud.2018.05.005

Smith, T. S. J. (2020). 'Stand back and watch us': Post-capitalist practices in the maker movement. *Environment and Planning A: Economy and Space*, *52*(3), 593–610. https://doi.org/10.1177/0308518X19882731

Smith, V. L. (1976). Experimental economics: Induced value theory. *The American Economic Review*, *66*(2), 274–279.

Speed, C., Nissen, B., Pschetz, L., Murray-Rust, D., Mehrpouya, H., & Oosthuizen, S. (2019). Designing new socio-economic imaginaries. *The Design Journal*, *22*(sup1), 2257–2261. https://doi.org/10.1080/14606925.2019.1595023

Spinosa, C., Flores, F., & Dreyfus, H. (1995). Disclosing new worlds: Entrepreneurship, democratic action, and the cultivation of solidarity. *Inquiry*, *38*(1–2), 3–63. https://doi.org/10.1080/00201749508602373

Spitzberg, D. (2021, August 3). Introducing the Ownership Model Canvas. *Medium*. https://medium.com/start-coop/introducing-the-ownership-model-canvas-62244cb36a55

St. Martin, K., Roelvink, G., & Gibson-Graham, J. K. (2015). Introduction: An economic politics for our times. In G. Roelvink, K. St. Martin, & J. K. Gibson-Graham (Eds.), *Making other worlds possible: Performing diverse economies* (pp. 1–25). University of Minnesota Press.

Star, S. L., & Ruhleder, K. (1994). Steps towards an ecology of infrastructure: Complex problems in design and access for large-scale collaborative systems. *Proceedings of the 1994 ACM Conference on Computer Supported Cooperative Work - CSCW '94*, 253–264. https://doi.org/10.1145/192844.193021

Steger, M. (2009). Political ideologies and social imaginaries in the global age. *Global Justice: Theory Practice Rhetoric*, *2*. https://doi.org/10.21248/gjn.2.0.13

Stickdorn, M., Hormess, M. E., Lawrence, A., & Schneider, J. (2018). *This is service design doing: Applying service design thinking in the real world*. O'Reilly Media, Inc.

Strandburg, K. J., Frischmann, B. M., & Madison, M. J. (Eds.). (2017). *Governing medical knowledge commons* (1st ed.). Cambridge University Press. https://doi.org/10.1017/9781316544587

Sustainable Business Model Canvas. (n.d.). *CASE*. Retrieved 12 January 2022, from https://www.case-ka.eu/index.html%3Fp=2174.html

Swinnen, E., & Bauwens, M. (2018). Commoning art, democracy, and the precariat, a dialogue. In N. Dockx & P. Gielen (Eds.), *Commonism: A new aesthetics of the real* (pp. 183–198). Valiz.

Tarkowski, A., & Zygmuntowski, J. J. (2022). *Data commons primer: Democratizing the information society*. Open Future. https://openfuture.eu/publication/data-commons-primer/

Tarrant, D., Maddison, J., & Thereaux, O. (2021, June 28). The Data Ethics Canvas. *The Open Data Institute*. https://theodi.org/insights/tools/the-data-ethics-canvas-2021/

Taylor, R. (2018). *Experiencing participation: A phenomenological study of the transforming of a rooftop in Manchester, UK (2014-2016) and the methodological reframing of research through design* [PhD thesis, Lancaster University]. https://doi.org/10.17635/lancaster/thesis/499

Taylors, A. (2016, December 7). Science-backed reasons why food cooked with love is more delicious. *University Herald*. https://www.universityherald.com/articles/53686/20161207/science-backed-reasons-why-food-cooked-love-more-delicious.htm

Team Asana. (2022, November 1). How to create a design brief in 7 steps. *Asana*. https://asana.com/resources/design-brief

Teivainen, T. (2014). Brazilian socialist roots and global commonist horizons in the World Social Forum. In S. K. Brincat (Ed.), *Communism in the 21st century* (Vol. 3, pp. 27–503). Praeger.

Teli, M., Bordin, S., Menéndez Blanco, M., Orabona, G., & De Angeli, A. (2015). Public design of digital commons in urban places: A case study. *International Journal of Human-Computer Studies*, *81*, 17–30. https://doi.org/10.1016/j.ijhcs.2015.02.003

Teli, M., Di Fiore, A., & D'Andrea, V. (2016). Computing and the common: An empirical case of participatory design today. *Proceedings of the 14th Participatory Design Conference: Full Papers - Volume 1*, 1–10. https://doi.org/10.1145/2940299.2940312

Teli, M., Di Fiore, A., & D'Andrea, V. (2017). Computing and the common: A case of participatory design with think tanks. *CoDesign*, *13*(2), 83–95. https://doi.org/10.1080/15710882.2017.1309439

Teli, M., Foth, M., Sciannamblo, M., Anastasiu, I., & Lyle, P. (2020). Tales of institutioning and commoning: Participatory design processes with a strategic and tactical perspective. *Proceedings of the 16th Participatory Design Conference 2020 - Participation(s) Otherwise - Volume 1*, 159–171. https://doi.org/10.1145/3385010.3385020

Teli, M., Lyle, P., & Sciannamblo, M. (2018). Institutioning the common: The case of Commonfare. *Proceedings of the 15th Participatory Design Conference: Full Papers - Volume 1*, 1–11. https://doi.org/10.1145/3210586.3210590

Teli, M., McQueenie, J., Cibin, R., & Foth, M. (2022). Intermediation in design as a practice of institutioning and commoning. *Design Studies*, *82*, 101132. https://doi.org/10.1016/j.destud.2022.101132

The Prize in Economic Sciences 2019. (2019). *The Nobel Prize*. https://www.nobelprize.org/prizes/economic-sciences/2019/summary/

TheOtherSchool. (n.d.). *TheOtherSchool*. Retrieved 26 March 2023, from https://theotherschool.art/

Tomitsch, M., Wrigley, C., Borthwick, M., Ahmadpour, N., Frawley, J., Kocaballi, A. B., Núñez-Pacheco, C., Straker, K., & Loke, L. (2018). *Design. Think. Make. Break. Repeat: A handbook of methods*. BIS Publishers B.V.

Tools & toolboxes. (n.d.). *Leapfrog*. Retrieved 3 January 2024, from https://leapfrog.tools/tools/

Türkkan, S., Sönmez, N., & Kürtüncü, B. (2012). Neither individual, nor group: A first year design studio experiment. *Proceedings of the 2012 ACSA Conference: Change, Architecture, Education, Practice*, 7–14.

Tzoumakers. (n.d.). Tzoumakers in a nutshell. *Tzoumakers - a Community Workshop*. Retrieved 26 March 2023, from https://www.tzoumakers.gr/english/

UK Parliament. (n.d.). *Enclosing the land*. Retrieved 15 December 2023, from https://www.parliament.uk/about/living-heritage/transformingsociety/towncountry/landscape/overview/enclosingland/

Ulusu Uraz, T., & Balamir, A. (2006). Themes of place and space in design teaching: A joint studio experiment in Amasya. *METU Journal of the Faculty of Architecture*, *23*(1), 1–18.

Urquhart, L. D., & Craigon, P. J. (2021). The Moral-IT Deck: A tool for ethics by design. *Journal of Responsible Innovation*, *8*(1), 94–126. https://doi.org/10.1080/23299460.2021.1880112

Varela, F. J. (1999). *Ethical know-how: Action, wisdom, and cognition*. Stanford University Press.

Veselova, E., & Gaziulusoy, A. İ. (2019). Implications of the bioinclusive ethic on collaborative and participatory design. *The Design Journal*, *22*(sup1), 1571–1586. https://doi.org/10.1080/14606925.2019.1594992

Villari, B. (2014). Action research approach in design research. In P. A. Rodgers & J. Yee (Eds.), *The Routledge companion to design research* (pp. 306–316). Routledge. https://doi.org/10.4324/9781315758466-28

Vink, J., Nillsson, F., Frietas, T., & Prakash, S. (2021). Attempting to resist ontological occupation when designing for scale in healthcare. *Nordes 2021: Matters of Scale*. https://doi.org/10.21606/nordes.2021.32

Volont, L. (2018). Who steals the goose from off the common? An interview with Peter Linebaugh. In N. Dockx & P. Gielen (Eds.), *Commonism: A new aesthetics of the real*. Valiz.

Vygotsky, L. S., & Cole, M. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

Waller, L. (2018). Rediscovering Daphne Oram's home-studio: Experimenting between art, technology and domesticity. In I. Farías & A. Wilkie (Eds.), *Studio studies: Operations, topologies and displacements* (pp. 159–174). Routledge.

Walljasper, J. (2011, October 2). Elinor Ostrom's 8 principles for managing a commons. *On the Commons*. https://www.onthecommons.org/magazine/elinor-ostroms-8-principles-managing-commmons

Waterman, P. (2003). All in common. *The Commoner*, *Winter 2003*(6). https://thecommoner.org/back-issues/issue-06-winter-2003/

Wei-Skillern, J., Ehrlichman, D., & Sawyer, D. (2015). The most impactful leaders you have never heard of. *Stanford Social Innovation Review*. https://doi.org/10.48558/76ZG-JV21

Wernli, M. (2021). Designing reflexive spaces with human waste: Cases of regenerative metabolism in Brussels, Berlin, and Hong Kong. *The Evolving Scholar | IFoU 14th Edition*. https://doi.org/10.24404/61729A5C7E18910008CA2929

West, A., Swanson, J., & Lipscomb, L. (2017). Scaffolding. In P. Lombardi (Ed.), *Instructional methods, strategies, math and technology to meet the needs of all learners*. Pressbooks. https://opentextbooks.uregina.ca/teachingdiverselearners/chapter/scaffolding-2/

Whaley, L. (2018). The Critical Institutional Analysis and Development (CIAD) framework. *International Journal of the Commons*, *12*(2), 137–161. https://doi.org/10.18352/ijc.848

Wilkie, A. (2014). Prototyping as event: Designing the future of obesity. *Journal of Cultural Economy*, *7*(4), 476–492. https://doi.org/10.1080/17530350.2013.859631

Wilson, F. R. (1999). *The hand: How its use shapes the brain, language, and human culture*. Vintage.

Wittenberg-Cox, A. (2020, May 31). 5 economists redefining… everything. Oh yes, and they're women. *Forbes*. https://www.forbes.com/sites/avivahwittenbergcox/2020/05/31/5-economists-redefining-everything--oh-yes-and-theyre-women/

Wright, E. O. (2010). *Envisioning real utopias*. Verso.

Zhang, M., Ji, D., & Chen, X. (2022). Building trust in participatory design to promote relational network for social innovation. *Proceedings of the Participatory Design Conference 2022 - Volume 2*, 94–102. https://doi.org/10.1145/3537797.3537817

Žižek, S. (2009). *First as tragedy, then as farce*. Verso.

Appendix

Appendix 1. Designing commons database

Source	Records (chronological by source)
CoDesign	Enabling urban commons (P. Parker & Schmidt, 2017)
	Co-design in co-production processes: Jointly articulating and appropriating infrastructuring and commoning with civil servants (Seravalli et al., 2017)
	Computing and the common: A case of participatory design with think tanks (Teli et al., 2017)
	Co-design and urban resilience: Visioning tools for commoning resilience practices (Baibarac & Petrescu, 2019)
	Sustaining platforms as commons: Perspectives on participation, infrastructure, and governance (Poderi, 2019)
	Prototyping open digital tools for urban commoning (Baibarac et al., 2021)
	Beyond polarisation: Reimagining communities through the imperfect act of ontologising (Huybrechts et al., 2022)
The Design Journal	Breathing games: Promoting respiratory health through co-creation (Frangos & Balli, 2017)
	Infrastructuring place. Citizen-led placemaking and the commons (Frangos et al., 2017)
PDC proceedings	Towards commons design in participatory design (Marttila et al., 2014)
	Computing and the common: An empirical case of participatory design today (Teli et al., 2016)
	Everyone shares in Hasselt. A perspective on the political potential of spatial commoning (Palmieri et al., 2018)
	Infrastructuring urban commons over time: Learnings from two cases (Seravalli, 2018)
	Institutioning the common: The case of Commonfare (Teli et al., 2018)
	Wireless in the weather-world and community networks made to last (Bidwell, 2020)
	Commoning design and designing commons (Botero et al., 2020)
	Tales of institutioning and commoning: Participatory design processes with a strategic and tactical perspective (Teli et al., 2020)
	Tensions and trade-offs in community organisations' use of ICTs for 'commoning' during the Covid-19 pandemic (Armouch et al., 2022)
	Off-the-shelf digital tools as a resource to nurture the commons (Bettega et al., 2022)
	Designing for multispecies commons: Ecologies and collaborations in participatory design (Haldrup et al., 2022)
	Emergent participation in DIY designed bike trails (Healy & Krogh, 2022)
	Building trust in participatory design to promote relational network for social innovation (Zhang et al., 2022)

Other ACM conferences	Open-source resilience: A connected commons-based proposition for urban transformation (Baibarac & Petrescu, 2017)
	Lessons from urban guerrilla placemaking for smart city commons (Foth, 2017)
	The premise of institutioning for the proliferation of communities and technologies research (Foth & Turner, 2019)
CHI conferences	Coordinating tasks on the commons: Designing for personal goals, expertise and serendipity (Krieger et al., 2009)
	IRC quest: Using the commons dilemma to support a single-screen game for hundreds of players (Moran et al., 2014)
	Fostering Commonfare: Infrastructuring autonomous social collaboration (Lyle et al., 2018)
	The right to the sustainable smart city (Heitlinger et al., 2019)
	The blockchain and the commons: Dilemmas in the design of local platforms (Cila et al., 2020)
	"It's like a GPS community tool": Tactics to foster digital commons through artifact ecology (Bettega et al., 2021)
	Algorithmic food justice: Co-designing more-than-human blockchain futures for the food commons (Heitlinger et al., 2021)
	The problem(s) of caring for the commons (Fritsch et al., 2022)
	Sustaining open data as a digital common – Design principles for common pool resources applied to open data ecosystems (Linåker & Runeson, 2022)
DRS Digital Library	Designing participation for commoning in temporary spaces: A case study in Aveiro, Portugal (Barbosa et al., 2016)
	Introduction: the politics of commoning and design (Elzenbaumer et al., 2016)
	Commons & community economies: Entry points to design for eco-social justice? (Franz & Elzenbaumer, 2016)
	From rules in use to culture in use – Commoning and infrastructuring practices in an open cultural movement (Marttila, 2016)
	Social commoning as a way to transition towards alternative systems by design (Schaeper et al., 2022)
Added manually	Public design of digital commons in urban places: A case study (Teli et al., 2015)
	Infrastructuring for cultural commons (Marttila & Botero, 2017)
	Co-designing convivial tools to support participation in community radio (Cibin et al., 2020)

Appendix 2. Commonism systematised review database

Reference	Definition contribution
(E. Bell & Scott, 2016)	Commonism questions the legitimacy of authoritarian power, structural inequalities and institutionalised practices of domination, exploitation and dehumanisation. Commonism morally condemns coercion and violence in all their manifestations, promoting instead non-authoritarian ways of organising human life through free agreements, voluntary associations and mutual reciprocation. Rather than cajole, control and destroy, commonism is life-affirming and promotes what Jun calls 'vitality': the point is to help people live. Commonism is radically egalitarian with a strong emphasis on ethical judgement, diversity, freedom, direct participation in decision-making and the democratisation of political representation. As a basic principle of human dignity, ordinary people should be able to speak for themselves and democratic procedures ensure that their voice is both heard and listened to. (p. 61)
(Brie, 2017)	Their special focus lies in a new kind of participatory organisation of public services, of the whole reproduction economy, the living networks of municipal life or also cooperative cultural production and consumption. This kind of libertarian commonism puts at its centre the reproduction of the bases of free communality, on the one hand, and the constant new production of relations of living solidarity, on the other hand. It is here that the economy of caring and gentleness reigns, a politics of commoning and of the commoner as well as a culture of dialogue, of conversation and of dance. Buen vivir positions are also indispensable approaches to a new free communality beyond the imperatives of a market economy and the growth compulsion (for a good example see Acosta, 2009). Only in this new form does the 'protection' of society really become a breakthrough into more freedom, above all more free communality, more direct democratic participation and common ways of life in the spaces of the public sphere and of the commons. This is not a glorified throwback to a lost world but a look ahead to completely new possibilities, many of which have their starting point in the cooperative experiments of the past. (p. 27)
(Briley, 2007)	When there shall be no want among you, because you'll own everything in common. When the Rich will give their goods into [sic] the poor. I believe in this way. I just can't believe in any other way. This is the Christian way and it is already on a big part of the earth and it will come. To own everything in common. That's what the Bible says. Common means all of us. This is pure old 'commonism.'" (p. 3)
(Buck-Morss, 2011)	How are we to conceive of a commonist ethics? ... but rather, by an analysis, a becoming-conscious of the specific society, the specific cares, the specific deaths that are simultaneous with our own, not common in the sense of the same as ours (experiences are very unequal in today's society), but as happening to others who share, in common, this time and this space—a space as big as the globe and a time as actual as now. (p. 60)
(Caffentzis, 2010)	But Ostrom's reliance on social capital (the commonism in capitalism) to explain commons behaviour is part of a tendency among capitalist intellectuals that developed as a complement to neoliberalism. (p. 31)
(Choi et al., 2015)	Or perhaps communism needs to be verbed, as with the notion of communization, which 'requires that we start thinking communism from within the immanent conditions of

	global capitalism rather than from a putatively radical or communist "outside"'. The commons, too, are conceptualised in terms of forms of commoning.
(Ciancio, 2018)	The experience of l'Asilo, according to the official act of 2016, was extended to seven more occupied spaces, giving life to a 'system' of 'freed spaces' in the city. These 'emerging commons' have hence become a notion that coincides with a new way of understanding institutions as something that starts from a collective basis and is characterized, to borrow from Hardt and Negri (2009) and Virno (2004), by a multitude of singularities. The emerging commons thus become public institutions that collaborate with citizens to produce well-being. (p. 289)
(Clare & Habermehl, 2016)	However, while commons are a necessity for any form of (anarchist) communist society, they are not inherently anti-capitalist, and it is therefore important to differentiate between different types of commons, and ensure that those developed are anti-capitalist. (p. 109)
(de Bloois, 2016)	Currently, as a practice and political philosophy, 'commonism' is marginal: at best, it can hope to create a 'shadow economy.' I find this highly problematic: a shadow economy is parasitical, secondary and keeps the 'official' economy, and all of its economic violence, social exclusion and political pathologies (such as populism) perfectly intact. ... I fear commonism may prove to be a euphemism for giving up on the modern public domain and the emancipatory project that gave birth to it.
(De Tullio, 2018)	In short, 'common goods' in Naples are a constant research of new ways to counter privatizations and boost self-government logics by multiplying participatory institutions such as, for example, inhabitants' assemblies and civic observatories or audic processes. Thus, the effectiveness of this movement is measured by the change they are able to produce in the institutional structure and language. (p. 308)
(Dellheim & Wolf, 2015)	'commonification' as an essential dimension of any progress towards a meaningful 'sustainable development' (p. 83)
(Dyer-Witheford, 2007)	If the cell form of capitalism is the commodity, the cellular form of a society beyond capital is the common. (p. 28)
(Dyer-Witheford, 2009)	'Commonism' would thus be a social order assembled from a connection or circulation of different commons, preventing the capitalist cooption and subsumption of current and new commons by linking them up, attaining a critical mass that counters the weight of established relations. If capital is an immense heap of commodities, commonism will be a multiplication of commons—what I, and Hardt & Negri call 'commonwealth'.
(Fattori, 2013)	And so the crux is not so much the impossible elimination of public services but their radical deprivatization and democratization, what I would define as their commonification: the introduction of elements of self-government of the good by the citizens within public management bodies, understood as subjects not managed for profit but in order to guarantee universal access to the good and protection of the resource. (p. 385)
(Fuchs, 2019)	Whereas exploitation is the 'capitalist mode of appropriation', commoning is the commonist mode of appropriation. In capitalism, '[a]ppropriation appears as

	estrangement, as alienation', whereas commonism is the 'real appropriation' of the 'social (i.e., human) being', and the 'appropriation of human life'. Real appropriation requires socially developed productive forces as one of its preconditions in order to transform surplus labour-time into the realm of freedom. In the age of the social worker and the digital machine, the preconditions and germs of real appropriation exist and develop, but are simultaneously constrained by capitalism. (p. 218)
(Garcia Diaz & Gielen, 2018)	So, artists and creative workers who want to escape the contemporary precarious condition need to develop at least three different activities: (1) articulation, (2) composition, and (3) commoning. … In the first place, there is the level of the articulation in which the current economic and political system is criticized and alternatives are formed. ... In the second place, therefore, citizens need to take action and start experimenting with forms of self-organization, or, in the parlance of Butler and Lorey respectively, building compositions based on 'bodies in alliance'. ... In order to build an effective counter-hegemony -- i.e. one that can really overturn the present neoliberal hegemony of precarization--alternative models must be distributed and, especially, shared beyond local borders. (p. 176)
(Gielen, 2018)	Perhaps this is why it has the potential of a meta-ideology. Just like the message of liberty of neoliberalism appeals to both left and right across party lines, so commonism's call for more equality and solidarity today appeals not only to the working class but also to an endangered middle-class, the proletariat and the precariat.... (p. 85)
(Gielen & Lavaert, 2018)	The concept of the common, by contrast, is not one of ownership. In thinking about this issue it is extremely important to make a distinction between 'common goods' (beni comuni), which can be the object of ownership, and 'the common' (il comune) as in 'commonwealth', which is a production, something that is formed by the common from within and which consequently cannot be owned. (p. 103)
(Hitchcock, 2011)	As I hope to emphasize, the difference between 'commonism' and communism is not simply that between the common and the commune, but emerges around fundamental questions about the institutional modes of transformation and the agency putatively meant to achieve it. The form of this irresolution is precisely what pulls Spinoza, reluctantly and controversially, into the present. (p. 24)
(Hitchcock, 2019)	Just as Negri and Guattari's 'Nouvelles espaces de liberté' (translated as 'Communists like Us') can be read only as a historical caesura of sorts rather than 'a project to rescue communism from its own disrepute', is it possible that 'commonism' now names a referential break within a revolutionary allusion, a kind of au delà that means through as in done rather than through as in across? (p. 76)
(Hofkirchner, 2017)	What is needful nowadays is commonism, the commons-orientation of co-operation that even transcends whole societies. Growing interdependence integrates more and more any commons with the global commons, it becomes part of the global commons and cannot be dealt with without respecting that fact. Therefore, global consciousness as well as global conscience needs to develop to do justice to the thriving and surviving of any part of humanity. (p. 293)
(Kioupkiolis, 2017)	His political project is called 'commonism', which is intended as a negation of centralized command economies reigned by repressive states. It is also intended as a set of high level demands in the domain of ecology, networks, and society and labour (e.g. a guaranteed global livelihood) that should be pressed on both the national and international level,

	providing a clear focus and a ground of convergence among diverse movements and struggles.
(Laermans, 2011)	Artistic collaboration anticipates a democracy yet to come whose name is not communism but commonalism. It both insists on and inspires a politics that by all possible means tries to further the chances of self-organizing commons, whatever their nature and whatever their concrete manifestations. ... Commonalism is per definition a common performance, fuelled by a performativity anticipating that which it longs for.
(Laermans, 2012)	The teacher who underwrites the ideal of commonality therefore welcomes the plurality of singularizations that can neither be willed or aimed at nor controlled or managed. The constitutive paradox of every commonalist pedagogy is indeed to intend the non-intended. (p 70)
(Last, 2017)	…the futuristic attractor state towards which we should aim is an attractor with a horizon beyond both capitalism and the state itself. Piketty identifies the failure of international neoliberalism and offers international Keynesianism. But what if Keynesianism was an economic solution uniquely situated to a previous era of the historical-evolutionary process? What if the task is to think 'Commonism in the 21st Century?' (p. 50)
(Miyazaki, 2019)	More important is whether they [affordances] enable more solidarity and commoning, rather than more competition, and whether they might lead to new insights regarding how we can live together in a self-determined fashion and share things, resources, knowledge, and affects. Entangled with this concretely utopian approach is also the aspiration of organizing movements such as commonism in ways that are inseparable from experimentation, design, and an acknowledgement of its reciprocity to body-mind-media-ecosystems. (p. 280)
(Neary & Winn, 2012)	The paper acknowledges the radical possibility of the idea of 'the commons', but argues that its radical potentiality can be undermined by a preoccupation with 'the freedom of things rather than with the freedom of labour'. (p. 406)
(Neumüller & Meretz, 2019)	The relations of mediation at the interpersonal, directly cooperative level – according to the element-system relationship of commons and commonism – find their counterpart in the transpersonal societal context of cooperation. While market mediation in capitalism is only quantitative, separated from usefulness, via the radically reduced information channel of value (expressed as price) and thus only indirectly referring to singular needs, commons mediation represents needs directly and qualitatively. (p. 345)
(O'Donovan, 2015)	Yes, that's beautiful, we are really playing with the word and are going beyond communism and trying to create commonism. But this is very clearly an Anglo-Saxon notion. The commons is not a universal category. It is something that belongs to one specific tradition so we need to have not just one word, not have this as the word that will be universal, but accept from the very beginning that we will have a family of words that includes different traditions. (p. 744)
(Otte & Gielen, 2018)	We do know, however, that a commons policy will be a bottom-up policy. Things will no longer be done by the hierarchic rules and principles that both social democracy and neoliberalism, and antique communism as well, designed for us. Cosmopolitics is commonist by its very nature, meaning that commoners, including commoning artists, make their own laws and can design their own logistic and financial structures. ...

	Cosmopolitical governance would then be no more than checking whether such self-ruling and self-regulating bodies follow constitutional rules--for example, are they democratic, undiscriminating, do they protect freedom and privacy--and then confirming their legality. The rest is up to the commoners themselves and their basic-democratic administration through assemblies. (p. 279)
(Parr, 2018)	Commonism refers to three processes working in tandem. The first is a political project that seeks to construct coalitions between individual, local, regional, national, and even international struggles so as to provide the groundwork for an expansive and wide-ranging politics to form, a politics that aspires to bring about a change in oppressive relations of power. The second is an urbanization process that constructs alternatives to the production and realization of surplus value. The third is collaborative activities involved in concretely transforming the system of exclusive ownership that renders the common non-common. When taken together these three aspects of commonism strive for human emancipation and environmental well-being. (p. 119)
(Prakash, 2011)	What we are doing today is learning and teaching for commonism; celebrating our realization that it is not as individual atoms but as enjoyers of membership in our diverse commons—local or even cyber—we come to cultivate conviviality. Commonism, for us, does not seek to produce a new global slogan for gathering and joining hands across the oceans. We are using the word 'commonism', a word that Windows will resist in your writing, only to allude to and honor what we are already seeing everywhere—minus slogans or globalized superstars. (p. 56)
(Pusey, 2010)	The reproduction of the common, through the act of 'communing', can aid us in our remaking of the world, from one based on capitalism and its endless accumulation and exploitation to a 'commonism' based on a praxis of cooperation, mutual aid, and collaboration. (p. 184)
(Shantz, 2013)	Commonists work to organize against dependency on commodities and professional 'experts', the manifestations of the commodification of needs and market-supplied services. Commonists emphasize the significance of autonomous creativity in the struggles against states and capital. (p. 62)
(Siefkes, 2012)	Commonism theory postulates that commons-based peer production could flourish outside of niches, and could help to reshape radically the whole of society. (p. 34)
(Siefkes, 2009)	Everyone can give as they like. / Taking from the commons means taking something as possession not as property / Everyone can take commons into possession, as long as they don't take them away from others. / If taking would mean taking away, the best way of solving this problem is to produce enough to satisfy everybody's wishes. / Cooperation will be organized by area and by interest, and units of cooperation will nest and overlap as appropriate. / Production will take place in projects of people who work together on an equal footing (as peers).
(Swinnen & Bauwens, 2018)	The construct of our economy, our society, and our relationships that was built upon since the emergence of neoliberalism and capitalism, is being hacked by a new old belief that could be called: commonism. Current research shows the importance of collaboration, intrinsic motivation, appreciation, shared dreams, and belonging as driving the meaning of existence. Commonism proves there is an alternative. (p. 187)

(Teivainen, 2014)	Even if the attempts by Michael Hardt and others to ‘reclaim the common in communism’ are fascinating, in this chapter I prefer the term ‘commonism’—with an ‘o’—for nonstate-centric attempts at commons-based democratic alternatives. (p. 46)
(Volont, 2018)	Also, this is the number one principle from the Charter of the Forest: The Charter said that the king must disaforest what he has taken. Not to forget: to disaforest means to remove the forests from royal jurisdiction, to make them available again as a source of subsistence for the commoner. We want repatriations for the harm that has been done. We want to decapitalize capitalism. What capital is now, was to discommon back then. That's a real word from the 18th century, discommoning, which we would call 'privatizing' today. (p. 326)
(Waterman, 2003)	What are we to call this new Utopia, if not Communism? Commonism? Commonerism? It cannot be called Communism any more, or not at present. That was a utopia of the national-industrial-capitalist era. Many people and peoples are alienated (pace Marx and Engels) from 'Communism'. And the effect of its contemporary use - if not the intention of those who still use it - is to isolate them from those many others who are contributing to a reinvention of the commons. (p. 10)

Appendix 3. Participant information sheet

#commonize studio

imagination LANCASTER

Lancaster University

#commonize studio
Participant information sheet

What is this research about?

#commonize studio is an experimental design studio that designs alternative economies, specifically commons-based economies. What does such a studio look like? We collaborate with people leading the development of commons to create products and processes to support their progress. This research is producing new knowledge about how communities and researchers can use design processes to support the creation of commons-based economies.

Who is leading this research?

This research is being led by Justin Sacks, a PhD candidate at Lancaster University, UK. I hold a B.A. in Architecture from Yale University and an M.Sc. in Economic History from the London School of Economics. #commonize studio is the evolving output of my doctoral research. Prior to starting my PhD, I worked in community economics for 20 years. My university profile is available here: http://imagination.lancaster.ac.uk/person/justin-sacks/.

Why am I involved?

You are involved because you or a colleague invited #commonize studio to support your efforts to explore or create a commons.

What will I have to do?

#commonize studio supports people to create commons. We will engage in two types of activities together: (1) periodic conversations online to determine what you need from the studio to support your process, and (2) co-production of tools to support your process. The frequency and duration of our online conversations will be driven by your needs. The precise tools produced will also be driven by your needs and are likely to include some combination of: workshop guides, slides, and visual aids to support your engagement with stakeholders; service blueprints, member personas, and other service design tools to support the institutional design of your commons; and writing, design, and review of your grants, pitches, and business plans.

What data will be recorded and how will it be used?

These two activities (periodic online meetings, co-production of tools) will be recorded in written form (no video or audio recording). For our meetings, I will take notes and share these notes with you for your review. For the tools we co-produce, I will share ongoing iterations of these tools and you will be free to use them for non-commercial use. The results of these activities will be published in my thesis, and may also be published in papers and presentations. Your identity will be removed from all published materials unless you wish to be included as a co-author (and you are encouraged to do so!).

What are the possible benefits of taking part?

As a form of action research, #commonize studio creates products and processes that directly respond to your needs as a commons leader. You will directly benefit from the collaboration of the studio in the formation of your commons. Your participation in meetings or interviews will help the studio to improve our process to support others trying to create commons.

Appendix 4. #commonize studio summary

Developing a commons model for #commonize studio

What is #commonize studio?

#commonize studio is a design studio that collaborates with commons-makers to make commons through studio experimentalism. The term commonize names a process of bringing resources under community governance; studio, the heart of design teaching and practice, frames commoning and economics as a design process.

#commonize studio is the evolving outcome of three years of collaboration with scholars and communities around the world engaged in commons-making. Several features have come to epitomize #commonize studio's approach:

- *We transform commons scholarship into accessible knowledge*

  Commons scholarship offers robust frameworks and concepts from decades of research about how commons work, but this knowledge is largely inaccessible or opaque to commons-makers. We try to excavate, translate, and transform this scholarship so others can use it.

- *We use design research methods to support commons-making*

  Making commons is a creative process, which requires design thinking and design methods. #commonize studio is grounded in design research, the scholarly study of making, to bring commons scholarship to life in service to commons-makers.

- *We advance studio experimentalism as valid experimental economics*

  Commons-making depends on experiments in creation. Studio experimentalism does exist but remains thinly documented and misunderstood. We try to articulate and develop studio experimentalism as a robust approach to commons-making and experimental economics.

Studio project examples

- *Soil Trust, Hong Kong*

  We increasingly recognize the importance of healthy soils. What goes into creating a commons from scratch, particularly in a megacity disconnected from soil? This project supported the development of a commons for excess food composting that treats soil as the shared resource.

The image above illustrates #commonize studio in action. Here, we co-designed an interactive tool called the "Action Situation Canvas" to support commons-members to make visible how they intuitively make bokashi (compost from home food scraps) as a living "commons manual".

- *Hack4Blood, Botswana*

  Many countries face chronic blood shortages. How might governments partner with communities to design and manage social services? This project is supporting early formation of a public-commons partnership with the Indigenous kgotla system to improve blood services.

- *ReApp, Brazil*

  In contrast with capitalist platforms like Facebook and Uber, what might a platform commons look like? This project is supporting creation of a Brazilian mobile app as a platform commons inspired by *mutirão* that enables residents to donate tax receipts to social service organizations.

Emergent studio functions

Three key functions have emerged from these studio experiments:

- *Scaffolding*

  Scaffolding is an established concept that describes how educators support students to construct new knowledge. Commons-making requires constructing many types of new knowledge, from ideology to logistics. Experiments found that considerable scaffolding is important.

- *Infrastructuring*

  Infrastructuring means the creation of figurative infrastructure, such as templates and tools, that support commons-making. #commonize studio continues to explore how to transform commons scholarship into infrastructure for commons-makers.

- *Institutioning*

  Institutioning is a newer term that, in design research, means the development of institutions that support commons-making. Commons-making experiments have required institutions, such as government bodies, to consider how they might operate differently.

Emergent studio processes

Several studio processes have emerged from these projects and experiments:

- *#commonize studio might be best described as a field catalyst*

  The role of a field catalyst is to serve commons-makers and to grow their power. #commonize studio supports commons-makers to build both their reputation and the profile of their commons but has not explicitly sought visibility or recognition.

- *Collaboration has been most effective with individual commons-makers*

  Studio experiments have been more successful when #commonize studio supports an individual commons-maker, building their capacity within their community, rather than trying to engage the whole community.

- *Collaboration with individual commons-makers has been remote-only*

  #commonize studio developed during the Covid-19 pandemic, so remote collaboration was the only option. Remote-only collaboration allows #commonize studio to engage with people wherever they are.

- *Commons-makers need to make significant time available to see results*

  A typical studio class lasts 2-6 hours, once or twice per week. While #commonize studio did not spend nearly that much time with commons-makers, there was a direct correlation between effectiveness and time spent together.

What might be a "commons model" for #commonize studio?

In #commonize studio projects, exploring commons models has been useful in two ways: first, as a reference point for commons-makers rather than the feeling of reinventing the wheel; second, to communicate commons to external stakeholders, particularly funders.

How might #commonize studio develop a commons model for both internal organization and external engagement? These are the model features identified for consideration so far:

- *How to practice studio across institutions?*

  Most collaborations have been with design researchers at other universities. How might #commonize studio collaborate with scholars outside design? How might these studio members go on to support their own scholarly and commoning communities?

- *How to share knowledge and practice?*

  What might a knowledge or practice commons look like? What is the appetite for sustaining such a commons, rather than creating a website that quickly becomes obsolete? How might embodied knowledge, e.g. physical practices of commoning, be shared as a commons?

- *How to fund research and commoning?*

  Realistically, both researchers and commoning communities still need money to function. What might be the best ways to organize funding? So far, we have written academic research bids as grant partners. Is formal incorporation necessary?

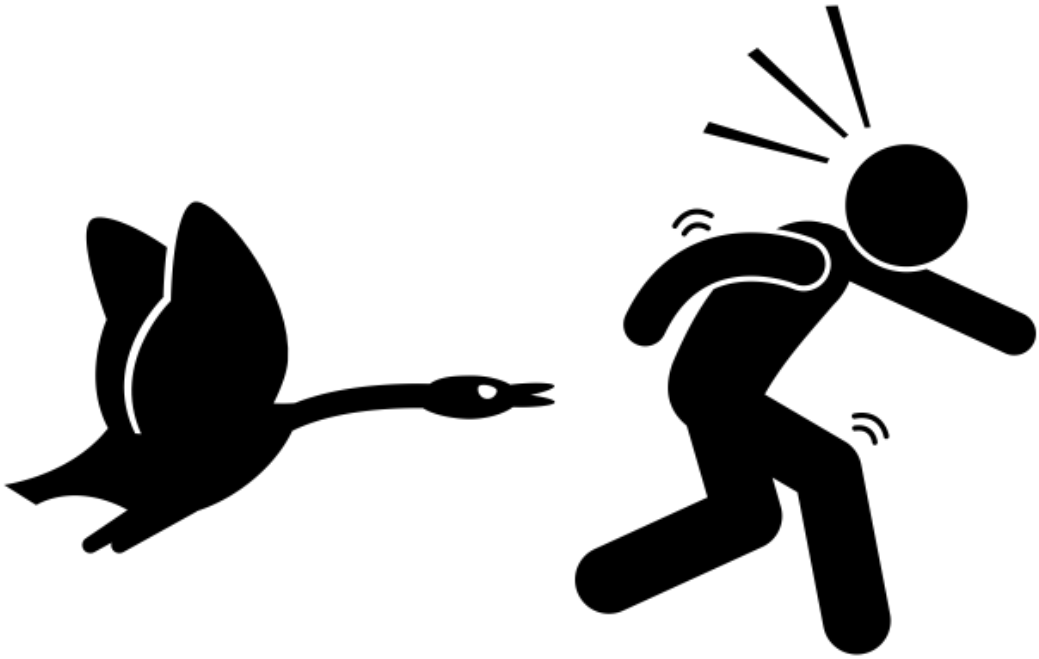
Members and contact

The following individuals have been central to the early development of #commonize studio and continue to be active collaborators:

- Dr. Rosendy Galabo, Lancaster University, UK (ReApp)
- Dr. Markus Wernli, PolyU School of Design, Hong Kong (Soil Trust)
- Dr. Badziili Nthubu, Botswana International University for Science & Technology (Hack4Blood)

The primary instigator for #commonize studio has been Justin Sacks, who developed #commonize studio as his doctoral research at Lancaster University and continues to develop the #commonize studio commons model as Visiting Scholar at the Ostrom Workshop at Indiana University.

Justin can be contacted through his ImaginationLancaster profile. Papers documenting some of this work can be found on Justin's Google Scholar profile.



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