

Collaborative Ecosystem Emergence: Growing coherence and effectiveness in decentralised permaculture networks

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Abstract:

As a holistic design system based on complex systems, ecological principles and energy literacy, permaculture has the potential to have a transformative impact on social, economic and agricultural systems for climate change mitigation and adaptation. As a community of practice, permaculture practitioners are horizontally networked around the world, with self-identifying permaculturists in over 150 countries. The Permaculture CoLab project has emerged from this global network to foster greater coordination internationally to facilitate linkages, education opportunities, and resource sharing across the movement.

The challenge for the Permaculture CoLab has been to bring coherence and collaboration to a diverse, anti-hierarchical and globally dispersed community of practice whose advocates tend towards pioneering grassroots approaches to sustainability transition. Specifically, the Permaculture CoLab has worked on (1) developing a shared vision incorporating both coherence and diversity; (2) developing a horizontal governance model at international scale as a negotiated, iterative process; and (3) facilitating international decentralised collaboration using appropriate online digital technologies.

In our critical reflection as participant-researchers in the Permaculture CoLab project, we find that decision-making about online technology adoption needs to co-evolve consciously with (a) the existing working patterns of group members and (b) the governance processes adopted by distributed teams. Spaces like the CoLab allow for social innovation of organisational models and bring to the fore conflicts between linear project management approaches (familiar to traditional hierarchical organisations) and more lean and agile approaches to project delivery (more familiar to horizontal decentralised collectives).

Keywords (6-7):

- Permaculture,
- Computer Supported Cooperative Work,
- De-centralisation,
- Collaborative systems,
- Horizontal organisation,
- Sustainability transition

Introduction

Our present moment in history has been labelled with monikers such as the “Anthropocene” (Dalby 2007), the “Age of Consequences” (Campbell 2007), and the “Long Emergency” (Kunstler 2005), among others. They are apt descriptors for the global ecological crisis and related economic, political, and social upheavals that we are presently living through, from catastrophic natural disasters to a global pandemic, economic depression and political uprisings and protests. These are the upheavals predicted a half-century ago in the famous *Limits to Growth* report (Meadows *et al* 1972).

Not long after *Limits to Growth* was published, Bill Mollison and David Holmgren developed “permaculture”, a design system to help practitioners develop more “permanent” “agricultural” systems; those that mimic the diversity, multi-functionality and self-regulation of natural ecosystems. Permaculture practice is based upon a system of ethics (Earth care, people care and fair share) and holistic design principles (Holmgren 2018; Holmgren 2002; Mollison 1988; Mollison and Holmgren, 1979). Over time, the ethics and principles on which the permaculture design system is founded have been flexibly adapted to a wide range of applications and arenas from personal interactions and community building (e.g. Macnamara, 2012) to end of life care (Shepherd, 2019), and the term is now also strongly identified with “permanent” “culture”. The movement encompasses broader sustainability-related goals associated with the organisational and community-building innovations required to nurture permaculture agricultural systems and build sustainable human environments (Birnbaum 2014, p. 32; Holmgren 2013, p. 3; Michael 2001, p. 42). As a holistic design system based on systems thinking, ecological principles, and energy literacy (Holmgren 2002), permaculture has the potential to have a transformative impact on how we sustainably operate our social, economic, and agricultural systems through this period of global crisis.

From its humble beginnings in Tasmania, Australia, the network of permaculture practitioners has grown into a global community of practice and social movement spanning over 150 countries. However, despite this rapid spread and its global reach, the permaculture movement is notably ‘grassroots’ with a high level of self-identification of practitioners and self-organisation of individuals and communities, including predominantly peer-to-peer learning and information sharing, although some countries have self-appointed national organisations which certify courses delivered to their standardised criteria. Several countries host regular national and regional practitioner-focused knowledge-exchange meetings, ‘convergences,’ and there are biennial international convergences with associated conferences. The movement is rapidly evolving on multiple fronts and highly complex in its structure, organisation, and identity. It has significant transformative potential as a methodology for sustainable living as it becomes more mainstream.

However, the very flexibility of permaculture, which enables it to be applied in so many bioclimatic and thematic situations, also hinders more mainstream uptake. From a scientific perspective, the lack of a single definition to specify what permaculture design and practice

is (and isn't) means that comparisons of implementation and efficacy with other approaches (e.g. with conventional or organic farming), is problematic. Whilst there are thousands of anecdotal examples and individual case studies, it is difficult to draw wider conclusions on the effectiveness, and appropriate context, of different practices or designs without greater coherence in methods for investigation and aggregated analysis and reporting of results. This contributes to the lack of a sound evidence base for permaculture. The lack of international, and even national, collaboration also means there are high levels of replication of effort and learning in other areas, such as setting up national and regional organisations. Individuals can feel isolated in their efforts to build local communities and in learning the requirements and needs for creating a successful organisation. The permaculture movement, at the International Permaculture Convergence (IPC) in Cuba in 2013, identified its own need to become better organised at an international level in order to address these and other challenges so to more rapidly become transformative at societal and transnational scales. Here, we report on the emergence and collective development of the response to this need.

Ecosystem Emergence of Permaculture CoLab

At the IPC 2013 in Cuba, it was identified that the permaculture movement needed to become more organised at an international level, combining the traditionally diffuse horizontal organisation of the permaculture movement with the benefits of scale that might come from greater global coordination. The challenge for this work has been to bring coherence and collaboration to a diverse, anti-hierarchical and globally dispersed community of practice whose greatest advocates tend to be individuals with strongly independent, pioneering approaches.

Despite this context, an international team, composed largely of volunteers, began to ask: How could permaculture practitioners work together to create something greater than the sum of its parts? This initial project, which ran from 2014 to 2017, was called The Next Big Step [in Permaculture], and consisted of the identification of the highest strategic level of permaculture in each country (national, regional, or smaller organisations, informal networks, or even individual projects or practitioners), followed by global consultation by targeted survey of the identified permaculture organisations and an open survey for individuals. This consultation asked about current situation and needs, interest and how they might benefit from and contribute to a collaboration with others at international scale. This stage also raised awareness of the intention to work together for greater international coherence, and invited organisations to participate.

Four priority areas were identified: 1. build communities; 2. improve access to key knowledge; 3. embed resilience and sustainability of practice (physical and social); and, 4. change the world beyond our own boundaries (van der Velden, 2017). A common thread identified across these priority work areas was the need for digital spaces to facilitate ongoing collaborative projects to enable people and organisations to work more effectively with each other outside of face-to-face gatherings (conferences and convergences).

Following this initial period of observation and interaction and subsequent identification of key needs, the second phase of the project developed from 2017 and was named The

Permaculture Collaborative Laboratory (Permaculture CoLab). This is an experimental, collaborative framework to help connect permaculture practitioners and organisations across the global permaculture movement, and make it easier for practitioners to work collaboratively, at international scales, as a community of practice. Interested parties were brought together to negotiate a shared vision for transnational collaboration across the permaculture movement and to find appropriate governance models and online technologies to facilitate ongoing collaboration. Negotiating a shared vision has been no small achievement. The difference in assumptions and ideals that inform the “permaculture way of life” are as diverse across the permaculture movement as the demographics of its practitioners. Indeed, it is this diversity of people, contexts, and knowledges that CoLab has attempted to bridge. It is the initiation and development of this second phase of active participation and wider collaboration that is the focus of this paper.

Specifically, we report on the three key aspects of the Permaculture CoLab: (1) developing a shared vision incorporating both coherence and diversity; (2) developing a horizontal governance model at international scale as a negotiated, iterative process; and (3) facilitating international decentralised collaboration using appropriate online digital technologies.

Each of the authors has been a participant in the CoLab project through various phases of its lifespan. In our critical reflection as participant-researchers, we find that decision-making about online technology adoption needs to co-evolve consciously with (a) the existing working patterns of group members and (b) the governance processes adopted by distributed teams. Spaces like the CoLab allow for social innovation of organisational models and bring to the fore conflicts between linear project management approaches (familiar to traditional hierarchical organisations) and more lean and agile approaches to project delivery (more familiar to horizontal decentralised collectives). These challenges, along with our main findings are considered in further detail below, and the implications of these are discussed.

Findings

The Permaculture CoLab represents a fascinating case study of a decentralised community of practice from which we identify three key findings, specifically in terms of the iterative process through which its shared vision, governance structures, and choice of collaborative tools have developed.

Developing a shared vision incorporating both coherence and diversity requires a lowest common denominator. From its inception in Australia in the 1970s, permaculture has spread rapidly in both numbers and remit to become a world-wide community of practice and social movement. For most people, the journey into permaculture starts as awareness of permaculture practices linked to their own interests (e.g. gardening, creating a home, empowerment) or through being part of an ethically aligned community (e.g. Transition Town movement, Ecovillages Network, Agroecology). As a design system, permaculture is based around three core ethics—*Earth care*, *People care*, and *Fair share*—and twelve design principles (Mollison and Holmgren 1978; Holmgren 2002), along with a collection of strategies and interventions that are deployed to actualise permaculture designs, many of

which are not exclusive to permaculture. As praxis, it champions holistic and regenerative practices that recognise human and ecological inter-dependencies to create sustainable agricultural, social, and economic systems. It is this commitment to sustainable and regenerative practice that represents the lowest common denominator upon which the Permaculture CoLab has been built and forms the stated vision, mission and aims (Table 1).

<u>Vision</u>	A healthy, peaceful and socially just world in which we care for the earth, each other and future generations, in harmony with nature.
<u>Mission</u>	To work together to enhance the coherence and effectiveness of local to global permaculture networks both formal and informal.
<u>Aims</u>	<ul style="list-style-type: none"> • Provide a collaborative and convivial online space; • Identify opportunities to enhance the coherence and effectiveness of permaculture; • Research, assess and provide information about the current state and extent of permaculture thinking and practice to enable; • Identify and mobilise resources that support members to nurture existing initiatives; • To communicate with permaculture networks and allies to make effective links & ensure wide understanding; • Work towards a multi-lingual platform that enables wide participation; • Work towards eliminating racism, patriarchy, the class system and any other manifestations of the oppressive society; • Provide and document existing training and learning resources to enable participation; • Use and document the process of CoLab development to actively learn and unlearn.

Table 1: Permaculture Collaborative Laboratory: Vision, Mission, and Aims

Developing a horizontal governance model at international scale is a negotiated, iterative process. Permaculture-inspired organisational design calls for organisational structures that mimic the diversity and multi-functionality of natural ecosystems, that are participatory and allow for emergence, and are characterised by flat power structures over more conventional hierarchies (Mannen 2012, p. 355; Starhawk 2011). Permaculture-inspired organisational models draw on the viral diffusion effect of positive demonstration models and processes for symbiosis and multi-functionality (Randall 2015, p. 158-159). Nowhere is this embodied more clearly than in the horizontal diffusion of the permaculture design course (PDC), where PDC graduates have been empowered to themselves become permaculture teachers and in so doing creating a network of practitioners through which the permaculture knowledge domain has spread.

Each empowered practitioner can therefore add their own style, slant and interests to what they teach to others. This allows for self-organising flexibility and agility in application (Beck

et al, 2001), such as biogeographical specification of content (e.g. consideration of food production design in water-abundant regions could differ significantly to that in water-scare locations) as well as different thematic foci for different courses. This adds to the overall complexity – one PDC may be very different from another and those who complete PDCs will have different depths and breadths of knowledge. There is significant debate within the movement on the value of imposing or encouraging specific core content to be included in a PDC course. This is one example of the many tensions and challenges in bringing cohesion to the movement: Who has the right to decide? For whom may they decide? How might a decision be widely communicated and uptake encouraged by the wider permaculture community? For how long can a decision last before being revised, superceded or nullified, and what does that process of review look like? One solution in the PDC example exists in national schemes whereby certified teachers agree to adhere to a basic list of content in exchange for course certification and promotion (e.g. Permaculture Association (Britain), 2018).

In line with this example, the CoLab needed to find a structure and governance model that was appropriate for this decentralised, globally-networked community of practice and social movement. The working group explored numerous organisational and governance models for the project, such as the anarchic horizontal model used by the Occupy movement (Byrne 2012), as an umbrella for a diverse network of supporters, to the theory of chaordic organisation pioneered by Dee Hock (1999), in which systems combine the characteristics of chaos and order. Eventually the working group negotiated the adaptation of a stewardship model to guide the project moving forward based on a hybrid framework incorporating the *constellation* model (Surman 2006; Surman and Surman 2008) and *sociocracy* (Endenburg 1998).

The constellation model provided a structure within which to house collaboration. The constellation model is a framework for distinct organisations to collaborate on areas of shared need without compromising their own integrity or the need to setup new organisations to hold the work. It's formed of 'constellations' (akin to working groups) that arise at need to address specific issues or areas of activity which some, or all, of the organisations involved might work on together. This is supported by a secretariat, which deals with the administrative matters, and overseen by a stewardship group, which is intended to be an independent and altruistic in aligning all constellation activity with the shared vision and guiding principles of the participating organisations.

Sociocracy was used as the method for interaction within the structure of the constellations. Sociocracy offered a more detailed approach to the design and running of meetings and decision making to ensure full opportunity for each person to participate, as well as giving processes for alignment between leadership and working groups. It brought the idea that selected members of each constellation working group (or 'circles' in sociocracy terminology) should form most of the stewardship group (often called a 'general circle'), thus ensuring that their concerns, needs, and feedback are represented at the higher levels whilst also bringing the relevant operational needs into the working groups.

Built into this were opportunities to review specific mechanisms at regular intervals – X time for working groups and Y time for strategic aspects, thus embedding the intention for

iteration through trial, review, and improvement of individual components and over-arching processes.

International decentralised collaboration can only be effective when facilitated by appropriate online digital technologies. An important part of the CoLab journey has been the trial of different online technologies to find a suite of digital tools that would best support and facilitate international cooperation, drawing on asynchronous collaborative platforms and real-time communication applications (Habib, Miles and Pawsey 2016). There is a cyclical relationship at play here: the technologies are chosen through the negotiations of the working group, whose very interactions are shaped by the technologies that are chosen. The Permaculture Collaborative Laboratory has its name partially due to the idea that it trials, assesses, and learns about computer supported collaborative work. As mentioned above, transnational collaboration among permaculture practitioners has traditionally been ad-hoc, often clustered at international conferences and convergences, when practitioners would come together to exchange ideas and co-create an international community. Enthusiasm tends to peak at such events, only to fall away when practitioners head home. Part of the purpose of the Permaculture CoLab is that it enables international collaborative projects to maintain momentum outside of face-to-face interactions in specially-curated online spaces. Finding the right online applications that are fit for purpose has been a trial-and-error process that has reflected the perspectives and experiences that have emerged from the diversity of the (100+) volunteers involved.

Discussion

There are several implications to tease out from the three primary findings we have identified, all of them based on the iterative journey of the Permaculture CoLab.

Communication Patterns: Reaching Agreement on a Shared Vision

It became apparent early on that the ethics, body of knowledge, and pre-existing patterns of interaction that participants brought to the CoLab process as members of the permaculture community of practice would not in and of themselves equate to a shared vision for the CoLab project. Obstacles to communication quickly became apparent through the CoLab process, including barriers of language, differences in culture and expectations, and varying access to, and ability to use, online communication tools. We found that both the capacity and interest in participating in international collaboration was not evenly spread across geographies or organisations.

The diversity and, inherent complexity, of the international permaculture movement is partially due to no single interpretation being shared among practitioners globally. Whilst the term is widely used and recognised within networks of regenerative practitioners it has been adopted and adapted for/in a huge variety of situations and contexts. The malleability inherent in the permaculture concept and associated ideas, and the fact that it seemingly formalises a wide range of practices that were present in, for example, traditional farming

communities around the globe prior to the concept of permaculture emerging, means there is large diversity within the community of self-identified permaculture practitioners.

Thus, the role that permaculture plays in the lives of practitioners differs widely. For some, it is associated with their main income generating activities. For many, it is a system of thought that they are inspired and informed by as they design their own lives and livelihoods. For others, it is merely an additional term used to describe the kind of practices and philosophies they are subscribing to. Adding to this diversity in digital literacy, socioeconomic backgrounds, language barriers, etc. leads to the firm conclusion that the Permaculture CoLab is designed to address what is called a wicked problem (Rittel & Webber, 1973).

Increasing the coherence (and through that the effectiveness) of the movement when it is partially defined by its inherent complexity is a creative tension the Permaculture CoLab has been working and struggling with. This is no surprise as wicked (or complex) issues cannot be addressed by adopting best or good practices. As indicated by the Cynefin framework (Snowden & Boone, 2007) such situations and context call for emergent practice (ongoing innovation in action). Therefore, the volunteer led team decided to take an iterative approach to the development of the CoLab.

The stated intentions were to investigate potential online tools to support collaborative working, to try out and evaluate the technologies and processes that looked promising, and to keep those that were effective and improve or replace those that were not. In terms of communication, some simple decisions were taken early in view of limited time and financial resources. For example, the organising team's working language would be English. Surveys would be translated into French, German and Spanish, with options for volunteer translations into any other language offered.

We discovered that shared values did not automatically translate into a shared vision for organising at transnational scale. During the initial agenda-setting phase of the project, significant time and energy was spent debating the working details of the organisational model – how to work together - before consensus was reached on what this collaborative venture might actually do. A mix of personalities, experiences and intentions within the original working group compounded these frustrations. Some of the more detail-oriented members of the group concentrated on the minutiae of the organisational model and reaching agreement on that, whilst those focused on the bigger picture wanted more conceptual thinking to identify the role and function of the CoLab within the permaculture movement. There were further contrasts between those participants who were keen to start work on specific areas of practice that they were interested in pursuing, and those who were keen to clearly develop the frameworks to best support subsequent work.

In addition, the process attracted some funding through one of the participating organisations with some paid staff time to support the coordination of the volunteer group, alongside specific commitments and deliverables for the funder. This expanded the capacity of the people coordinating the volunteer group and supported momentum, but also increased inequalities across the volunteer cohort which had significant impact on patterns of cooperation between volunteers, exposing the division between those who could devote time to the CoLab as a primary concern and those for whom CoLab was a side project among other more immediate priorities. Some individuals were key to the process and

strongly influenced the shaping of the emergent network because they had the financial and organisational backing to do so, along with their personal capacity. There was also a correlation between the degree to which volunteers conceived of the CoLab as being a high priority for the permaculture movement and the support they had to devote time and energy to the project.

Ever since its inception in the CoLab project, the voluntary stewardship group struggled to place itself in service to the collective when the requirements of the role were significant (time & cognitive effort). The people who made themselves available for the stewardship group were those with the space to be involved, who had the time and relative financial safety to commit to the role as volunteers. This issue of biographical availability (Snow and Soule 2010) raises questions about an inherent selection bias in the composition of CoLab's operational roles, in relations socio-economic, geographic, ethnic, and gender representation.

Governance and Power: Operationalising Non-hierarchical Collaboration

Most democratically structured organisations face Robert Michels' "Iron Law of Oligarchy" (Michels 1959), where increasing bureaucratisation and centralisation of power is said to be inevitable as organisational scale increases. The objective of CoLab to facilitate transnational collaboration while paying homage to permaculture's decentralised roots is no less ambitious than to circumvent the tendency toward oligarchy that correlates with increasing organisational scale.

CoLab participants quickly learned that the complexity of collaboration increases as scale increases. Agenda-setting and decision-making as a representative body at international scale presents additional challenges to those which permaculturists have already become adept at navigating at the organisational and community levels. The inevitable slow progress of the CoLab working group, comprised of more than fifteen busy volunteers from numerous time zones across the globe, meant that some people left during the process and others joined. Volunteers were enthusiastic to advance the project but struggled with governance and accountability dilemmas arising from the need to develop processes that would be useful to diverse stakeholder groups. That each member of both the initial working group and the later stewardship group represented a larger community or constituency within the permaculture movement, each with its own specific needs and preferences, has been an under-appreciated issue within the CoLab. Further, this representation was not necessarily made with the wider consent or approval of that community since such mechanisms did not always exist at national or regional scales and participants were self-selecting rather than e.g. nominated representatives. Despite the best efforts toward inclusivity via the survey and workshops at international and regional convergences, the final representation remains inevitably somewhat arbitrary and most likely to be taken-up by native English-speakers with sufficient capacity and passion to commit a high number of volunteer hours to a process that is slow to offer tangible rewards and results..

Transnational negotiations in which representatives act on behalf of larger constituencies can be conceived of as a two-level game (Putnam 1988), where representatives have to

arrive at decisions that will satisfy the needs of local communities as well as the needs of the emerging international entity. To come to a successful agreement, representatives can only promise or concede as much as their local communities have previously bought into. This is where the representative aspect of CoLab fell apart. Working group members stepped into their role as volunteers, not as elected representatives, presenting an ongoing issue about their legitimacy to speak on behalf of larger communities.

The legitimacy of the CoLab thus rests solely on its ability to provide benefits to the movement that CoLab participants believe the movement wants. This presents two key issues to overcome: First, the extraordinary diversity of the movement (Ferguson and Lovell 2014) makes it difficult to operationalise its shared ethics and vision for sustainable living with tangible projects at international scale, without the CoLab morphing into the kind of hierarchical umbrella organisation that the movement would reject. Second, the CoLab has to offer tangible benefits to attract permaculture practitioners from across the movement to participate. However, without shared agreement on the organisational scope of CoLab amongst the working group, it was not clear what CoLab could offer the movement. Given these constraints, the CoLab moved toward a non-prescriptive horizontal organisational model within which the shared interests of practitioners within the movement could crystallise.

A new working group, called the Stewardship group, started work in November 2017, with the aim of supporting working groups active in specific practices or areas of wider interest (called 'constellations'). The CoLab was drawing on various governance frameworks at the time and attempted to innovate its way into the kind of governance that squared the circle of operational decentralisation at scale. The first inspiration was the constellation framework (that contains a stewardship group in its model).

The Constellation model is a complexity-inspired governance framework for multi-organizational collaboration. It is a way of organizing a group of interested parties to meet a need without having to create a new organization to 'hold' the issue. It is a tool to help us recognize and become conscious designers in a complex ecosystem of organizational collaboration (Surman, 2006, p.1).

This was soon after complemented with the sociocracy model. A stewardship group, in this model, serves "the broader collective vision of the group" (Surman, 2006, p.4) and "in the case of a network or ecosystem, members of the stewardship group are playing the role of 'stewards' for the ecosystem by providing a clear vision and strategic plan to guide the work of the collaboration. Self-interest should exist primarily in the arena of the constellations and collective interest is stewarded primarily by this stewardship group" (Surman, 2006, p.5).

The hybrid constellation-sociocracy model of CoLab was not only a creative adaptation to the Iron Law of Oligarchy, but also a bargaining compromise between two factions of volunteers within the original working group. When the funded phase of the CoLab project began, emerging from its initial birth as Permaculture's Next Big Step, there was a period where the constellation and sociocracy governance models were seen to be complementary. However, those dynamics changed with more people with a strong background in sociocracy joining the CoLab and pushing for fuller implementation of that model. As the proportion of equivalent voices championing the constellation model had declined, the factional balance

within the working group pushed the constellation model into the background. What remains within the architecture of CoLab is the amalgam of this dynamic tension. At the time of writing, CoLab maintains a secretariat that, in the constellation model, deals with meeting facilitation, digital communications, administration, documentation, and such like for the whole network. However, in most versions of sociocracy, people take on roles within their teams/circles that fulfil these functions for the collective. Friction between the constellation legacy and aspirational sociocracy implementation is still frequent. Governance within CoLab remains a confusing endeavour for most participants, a state of affairs that arises because a shared vision for the project was never fully articulated, which would have informed the choice of governance model and helped participants to develop a more coherent response to the Iron Law of Oligarchy problem

Creating Community: Use of Digital Technologies

At the outset of the CoLab project a range of technological choices were made that appeared valuable to the group/users at the time. Ongoing communications would happen on a messaging platform (Slack/not paid). Meetings were to be held via online conferences (first appear.in and then a paid for Zoom account). Asynchronous decision making is supported by its own tool (Loomio/not paid) whenever necessary. To manage the tasks within the CoLab a digital Kanban board was chosen (Trello/free account). File storage and online collaborative working (e.g. document editing) was to be accomplished by using Google Apps (one of the organisations involved used this tool and offered to host documents, etc.). The suitability and use of these tools are evaluated below.

Real-time online communication becomes more cumbersome and time-consuming as the number of participants increases. Facilitating real-time interaction online with any online application, particularly with large groups, usually requires the scheduling of interaction times, which is often problematic for international collaborations across different time zones meaning that some people are working well outside of usual working hours. While real-time meetings have been a staple of the collaboration, and are noted as critical in maintaining momentum elsewhere (Ramesh and Dennis, 2002), it was not always clear that the payoff from real-time interaction in terms of deliverable outcomes from meetings justified the time required to coordinate scheduling, preparation of agendas and materials, and the facilitation of the meetings themselves. This is a factor in the high turnover of volunteers that have cycled through the CoLab project since its beginnings.

Simultaneous networked interaction is possible through a two-way medium through apps such as Skype, Zoom etc. The difficulty comes when the group of participants in an audio-visual interaction expands beyond a small group of 3-4 people. Online video-conferencing technologies attempt to replicate the dynamic interactions of a group, but their capacity to do this is limited by having to interface with a large group through a screen, akin to communicating through a tube. This is not how people communicate in group settings, where the interaction is spatially distributed and networked across multiple simultaneous exchanges, and where body language and facial expressions provide cues for interaction (Blum 2020).

This interaction process is often unwieldy and painfully slow, requiring significant facilitator mediation (which in CoLab proceeded according to sociocracy principles) particularly when participants attempted to mimic in-person meeting formats. While the sociocratic practices of checking in with each group member at the beginning of a meeting, and having a facilitated go-round of all participants on each discussion topic is more democratic and provides equal opportunities for participants to speak, the fact that this process inevitably takes longer in the virtual realm made these meetings uncomfortable to sit through for some participants, negating the democratic promise of the sociocratic method. Because of their cumbersome nature, real-time CoLab meetings were not meeting the needs of participants in the group, as volunteers with limits on their availability. Thus, while real-time online communication is indeed possible, it is not always desirable as the most efficient use of participants' time (Habib et al 2016).

Volunteer engagement in the CoLab and its tasks on an ongoing basis was challenging. Although this is not unexpected (Cnaan and Cascio, 1999; Vecina et al., 2003), we focus here on the disparity between perceptions on responsibilities of paid workers and volunteers. As an example, the organisation of tasks on the Trello board was always driven by the CoLab's part-time paid participants who worked with the volunteers as well as to the commitments made in the funding application that paid for their salaries.¹ Volunteers never began using the Trello board without prompting, despite clear guidance, training and support in its use. Without an engaged, or perceived, critical mass of participants (Lou *et al.*, 2000), even paid participants eventually abandoned the tool (despite some of them using it for private purposes or other projects).

Some of this inertia in the use of tools may connect to group dynamics in which certain modes of working (enacted through technologies) were perceived by some as staff members (paid participants) of a single organisation managing volunteer efforts, rather than volunteers setting the direction and actively participating. This gave the impression (alongside other signals sent) that the CoLab really was the project of one organisation rather than its own endeavour with a range of organisations and individuals participating. Non-participation on the Trello board likely links to this (as well as digital literacy, bandwidth limitations, and other common barriers to technology adoption). This highlights, once again, the interconnectedness of socio-technical systems.

Loomio adoption has been varied. It was always used in a very constrained way. Individuals involved in the decision to use it championed it, but it was never explored in depth as a tool for the CoLab. Once a proposal had been shaped by the community (in other digital space) it would be put on Loomio for "casting votes" in a way that somewhat aligns with sociocratic decision making (by consent). Slack, equally, has seen patchy adoption. Here not only paid participants championed its use but also some volunteers that were used to using it on other projects that they were involved in. However, the championing was never enough to convince a majority to be present in this digital space. This led to a replication of communications via Email, which for many volunteers is the main tool they use for digital

¹ As the CoLab is not a legal entity (and does not intend to become one) paid participants are hosted by a (single) participating organisation. This introduces a whole range of challenges beyond the scope of this case study and mostly unrelated to digital technologies.

communications. Choosing a tool which all participants can use reasonably effectively and supporting those less familiar with the chosen tool is important to effective working.

Google Suite has been adopted throughout the CoLab by volunteers and paid participants alike. The folders used in the project are publicly visible, to meet the goals of transparency, but only editable by members of the CoLab. Access to any of the described platform is managed by the secretariat (paid participants). The case of file management is a good example how governance and digital technologies relate in banal ways. In the constellation framework the secretariat handles such matters. In the case of sociocracy every circle (team) is responsible for their own files (they elect people into a role that covers this). Since the CoLab is not at a stage yet where governance has been worked out to any comprehensive degree, such issues still lead to significantly more friction/inefficiency in collaboration processes than would seem reasonable to most.

At time of writing the CoLab is making big leaps with regards to the technological exploration. This is mainly due to the Digital Circle (one of the constellations) having attracted a significant amount of highly skilled individuals that are keen to connect digital tools to permaculture practice.

Slack and Zoom are now the main tools for communication in the CoLab but more ethical alternatives [in particular Open Source] are being considered. Miro (online whiteboarding) has been introduced to the technological mix for distributed design work across the CoLab. Google Suite I still the primary space for storing and editing documents but alongside it a more ethical alternative (Nextcloud) has been procured and capacity in the network is gradually increasing for migrating to this tool (and offering it as a service to actors in the wider permaculture movement). The CoLab is also offering website design, development, and hosting services.

Conclusions and Recommendations

The Permaculture CoLab has sought to combine the traditionally diffuse horizontal organisation of the permaculture movement with the benefits of scale that might come from greater international coordination of this movement as a global community of practice. In our critical reflection as participant-researchers in the Permaculture CoLab project, we find that decision-making about online technology adoption needs to co-evolve consciously with the existing working patterns of group members as well as the governance processes adopted by distributed teams.

The above challenges with technologies are deeply interwoven with other challenges. The way the decisions about technologies were made was not sufficiently based on the prevalent working patterns among participants (supporting it being the most common Computer Supported Cooperative Work (CSCW) mistake being made). Governance, communication patterns, and technology use need to co-evolve in a gentle and sustainable manner; this was not often the case in the coming into being of the CoLab. At the core of this was a continuous paradox: some felt that the CoLab tried to run before it could walk (and thus were keen to focus further on building common ground or developing internal procedures and policies) and others suggested that if you are only practicing walking you will never be able

to run (and thus suggested opening up participation in the CoLab to more people to trial and feedback upon what had been created so far). The former was often underpinned by a linear project management focus and the latter by a more lean and agile approach to project delivery. The former was often supported by people (paid and unpaid) that had more resources and time available to contribute to the CoLab and the latter by people that related to the CoLab in much looser ways (something that emerges alongside things that demand most of their attention).

The CoLab is a very ambitious and difficult project considering all the factors outlined above (and others that go beyond the scope of this case study). The Permaculture CoLab is built upon the foundation of a commitment to a shared vision of permaculture as a transformative sustainability transition (Farla *et al*, 2012) methodology, building on Permaculture's core ethics and design principles. Whilst this is a valuable commitment in principle it does not constitute common ground yet. The CoLab has grown significantly recently and more and more teams addressing specific topics are coming into being. At this crucial stage we are also reviewing collaborative processes, spaces, and digital technologies through a facilitated social learning approach.

More funding has been secured for the continuation of the paid for aspects of the network. The focus is on enhancing the capacity of the CoLab (now a self-organising network of individuals and organisations) to address its own VMA. This work incorporates the key recommendations from previous phases of the project. The ones outlined above include: a. prioritising the alignment of digital tools with working patterns and digital literacies of current participants whilst continuously seeking to move towards tools that align more with stated VMA of the collective, b. recognising that complex issues can only be addressed through emergent practice (and designing processes and systems for collaboration that facilitate this), c. demonstrating value early and often (to maintain volunteer engagement and develop critical mass), d. resolving governance issues/concerns in practice (rather than in theory) to not lose sight of the practical value of an initiative, e. acknowledge and address issues of/with representation early on in collaborative processes before patterns become more rigid.

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