

# P / REFERENCES OF DESIGN



## HYBRID ECOLOGICAL NETWORKS: DESIGNING RELATIONAL AND RECEPTIVE LEARNING.

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**ABSTRACT** | In the rapidly evolving landscape of learning network design, there is a critical need to construct networks that are at the same time resilient and adaptable, equitable and accessible, authentically engage the human and more-than-human and can address the increasing complexity of seemingly intractable global socio-ecological challenges. This paper proposes a reimagined network design by integrating principles from movement ecology, corridor ecology and new materialism, all of which engage the complexity, interactivity, and adaptability inherent in natural ecosystems. Such a design subverts traditional network relationships such that each node in a network can be seen to actively and equitably participate in the learning process. Hybrid ecological networks challenge conventional hierarchies, de-institutionalise learning and platform more resilient, adaptable, participatory and interconnected structures and organisations. The paper adapts the concept of permeability from corridor ecology to describe knowledge and experiential flows through a network. A learning network designed for high permeability encourages the unfettered and efficient exchange of ideas, akin to ecosystem scaffolding for a decentralised and fluid movement of species. By weaving together the principles of new materialism, movement ecology and corridor ecology, the paper shifts the narrative from networks as static constructs to ones that are dynamic, adaptable, and resilient and invites a whole-systems re-imagining of learning networks to support a regenerative future for education.

## 1. Introduction

Within the dynamic and ever-shifting terrain of higher education, there is an increasingly critical need to co-create networks that are at the same time resilient and adaptable, equitable and accessible, and authentically engage learning communities with the complexity of seemingly intractable global socio-ecological challenges. This paper reimagines learning network design by integrating principles from movement ecology, material ecology, corridor ecology and new materialism, each of which contributes to disrupting the fixedness of linear, static and anthropocentric organisational constructs by interweaving the complexity, interactivity, and adaptability inherent in the intersection of human and more-than-human ecosystems. *Hybrid ecological networks* challenge conventional hierarchies and binaries, deinstitutionalise learning and platform more resilient, adaptable, participatory and interconnected structures and organisations.

In a process-based and movement-centred network paradigm, information (defined here as *integrated experience, knowledge and skills*) moves, evolves and interacts with the nodes and edges it encounters, much as species migrate and interact with/in/across ecological systems. This conceptualisation of *networks as movement* is a foundation of the hybrid ecology view of networks as vibrant, living ecosystems. Just as migratory patterns are not purely linear but are influenced by various environmental (and increasingly economic and political) factors and an organism's own agency, the flow of knowledge, experience and ideas within networks is not merely dictated by existing network structures but is also influenced by the behaviour of the information itself, the context within which it operates, and the nodes and edges with which it interacts.

Focusing on movement as a core element of network design acknowledges that movement is itself an actor, and process a central agent, thus underscoring the *agency of information exchange* (leading to the potential of data autonomy within an object-oriented ontology (Harman, 2018)). Recognising movement as central (Nail, 2018a) situates the relational element of networks – the edges rather than the nodes – as an undulating meshwork on which meaningful learning experiences can be co-created to address the demand for more resilient, adaptable, and interconnected learning structures and organisations. For instance, some pieces of information might migrate quickly across the network due to their relevance or urgency, while others might move slowly or even become dormant. As we will see in the discussion of *ecological corridors* (below), the process of movement that this information embodies can be seen as *habitats* that may alter the information, hold onto it temporarily or help it evolve or develop further.

Thomas Nail postulates that society is essentially constituted by movement, with entities (be they beings, objects, or ideas) constantly in flux (Nail, 2018a). Applying a movement philosophy to network design can reframe the way we conceptualise the flow of information and ideas within networks. Rather than viewing data as static entities being transferred from *point a* to *point b*, Nail's articulation of *Movement Ecology* encourages us to see information, experiences, and ideas as migratory entities. In his reading of Lucretius', for instance, Nail re-interprets Lucretian atomism to emphasise that "one never finds a [singular] corpora, but only an infinite corporeal flow as the material condition of any discrete or composite thing" (Nail, 2018b, p.12). In this view, it is clear that relationality, receptivity, and process must be fundamental to any learning network that hopes to meaningfully engage with the dynamics of complex socio-ecological systems.

Hybrid ecological networks are *hybrid* on multiple levels: In their interweaving of site-based and practice-led learning with accessible online spaces to facilitate the exchange of reflection, experience, and knowledge; in their fostering of interspecies collaborations; in their explicit interrogation of boundaries, binaries and borderlands; and of our "interdependence and the mutual construction of . . . subjectivities" (Nasrullah Mambrol, 2016) in understanding cultural and socio-ecological contexts and engaging in the work of democratising and decolonising learning.

Interweaving Nail's articulation of *Movement Ecology*, socio-ecologically situated learning paradigms, and a processual and relational new materialist perspective on network evolution empowers a shift from building networks as static to foregrounding agential imperatives with/in the fluidity of receptive learning. The

integration of these ecologies invites a radically open approach to network design that leverages the complexity, interactivity, and adaptability found in more-than-human ecosystems to disrupt the sedimented conventions of disciplinary thinking and educational linearity. In this model, each node — whether an individual, an ecosystem, a more-than-human actor, a group, or an automated system — actively engages in the learning process. Learning as “knowledge transfer” thus evolves from a unidirectional process to a continuous cycle of interaction, adaptation, and evolution of lived experience. The theoretical imperative of the hybrid ecological network draws from the same critical enquiry with which Karen Barad and Daniela Gandorfer ground their conversation in “Political Desirings”:

“How can we think ontology in a way that opens up different concepts and practices of thought and being, or, to put it more precisely, what are the *onto-epistemological conditions* that allow you to imagine a different mode of doing theory?” (Barad & Gandorfer, 2021, p.16)

Hybrid ecological networks insist upon an onto-epistemological (or indeed *ethico-onto-epistemological* (Barad, 2007)) shift into new terrains of fluid and transdisciplinary thinking and demonstrate how insights from diverse fields can converge to innovate established paradigms. By considering the application of contemporary philosophical frameworks and living-systems thinking to learning network development, this paper proposes a holistic revision of learning network design — one that embraces complexity, cultivates receptiveness, and ultimately can form a pathway toward a more regenerative, ecologically and ethically grounded and resilient model of learning for the future.

## 2. Refashioning Relationality

Imagining, and then enacting, a different mode of doing — whether theory, learning, practice, relationality, or network development — becomes ever more critical as the crisis of education is layered with mounting socio-ecological polycrises. There is little doubt that we are engaging daily in a shared and compounding polycrisis — recently described by Adam Tooze as “so disorientating is that it no longer seems plausible to point to a single cause and, by implication, a single fix” (Tooze, 2022) and recognised even by the World Economic Forum as when “concurrent shocks, deeply interconnected risks and eroding resilience are giving rise to the risk of polycrises – where disparate crises interact such that the overall impact far exceeds the sum of each part” (WEF, 2023, p.9). Timothy Morton’s articulation of this as a not-quite-yet postapocalyptic manifestation of *hyperobjects* that are so complex — dislocated, out of time (“massively distributed in time and space” (Morton, 2013, p.48), and deeply interwoven — so as to be nearly unfathomable and untenable.

Given the escalating complexity of global ecological and social challenges, the demand for more resilient, adaptable, and interconnected learning networks is paramount. *Hybrid ecological networks* propose a dynamic revision of network design — one that embraces complexity, cultivates receptiveness, and advocates for continuous adaptation and learning. This transdisciplinary approach insists upon reimagining traditional boundaries and dualistic thinking, fostering dialogue and collaboration across different areas of expertise and highlighting the potential for innovation.

Framing a learning network as relational can radically open learning to the complex web of interdependencies that exist among teachers, students, institutions, ecosystems, cultures, experiences, and indeed all parts of a learning network. In the context of practice-led learning, such networks underscore that learning is a shared endeavour grounded in authentic relationship – often through community practice, service, or shared activity inclusive of a full diversity of stakeholders that allows learning to be a cooperative evolving process co-created by multiple actors.

The combination of relational and receptive network ontologies offers a potent theoretical structure for understanding and promoting a reimagined learning paradigm that foregrounds relationship, receptivity, co-creation and collaboration in an authentically distributed framework. Acknowledging learners’ interconnectedness, agency, and their openness to a diversity of knowledge and experience allows the co-

creation of inclusive and participatory educational spaces. By adopting this perspective, a distributed and deinstitutionalised learning network can foster an environment that promotes active learning, collaboration, and critical engagement. Specifically, it can empower new learning frameworks in the following areas:

## 2.1 Distributed Agency

Agency can be distributed among all nodes – student, teacher, human and more-than-human, treating each as a valid and capable participant. Whereas existing traditional learning architectures, “our fragmentary and linear approach to systemic problems leads to inadequate solutions and causes social, political, economic, and psychological crises” (Solonen, 2023, p.621), a revised learning approach can translate into a network where participants are not just passive receivers and providers of information, but active participants that engage and shape the network in unique ways. Beyond an emphasis on nodes, the *receptivity* of such a network would give equal agency to connections and relationships as to objects in relation. Practical applications include:

- Recognition of more-than-human agency
- Ethical frameworks for more-than-human participants
- Dynamic role allocation
- Interactive and responsive environments
- Integration of indigenous knowledge systems
- Adaptive learning pathways
- Empowering through technology
- Robust network feedback mechanisms

## 2.2 Collaborative and Co-creative Learning

A relational and distributed learning network emphasises collaborative, experiential, and embodied learning. The network could facilitate interactive experiences, encourage peer-to-peer learning, and even integrate with physical or augmented reality environments to support embodied learning experiences. Practical examples of co-creative learning include:

- Community engagement and service learning
- Community-based research
- Internships, externships, placements, practicums
- Project-based learning
- Global learning, partnership and networked learning - local, regional, bioregional, and global
- Living labs - partner-based living-learning communities
- Interspecies collaboratories
- Action learning
- Full learning community engagement in strategic planning, decision-making, process learning (including staff, students, trustees, directors, volunteers, external stakeholders)

## 2.3 Fluid and Dynamic Structures

Such a network can also have a fluid and dynamic structure, reflecting the constant flux and change of ecological complexity. Rather than being fixed and static, the network continually adapts and evolves in response to the actions and interactions of its participants – human and more-than-human (from *Aardvark* to *Albedo* to *AI*). Practical applications include:

- Adaptive learning models
- Decentralised decision-making
- Flexible organisational structure
- Peer-to-peer learning
- Modular course design
- Hybrid, blended, off-site practice-led learning
- Distributed programme development and delivery

## 2.4 Ethical and Inclusive Design

A key element braided together within an authentically de-institutionalised distributed network model is a foundation of ethical, inclusive, accessible and equitable design principles. The network is designed to inclusively evolve, giving all nodes a voice in shaping network changes, and ensuring that adaptations don't disadvantage certain groups. New identities that blend definitions of learner, teacher, and co-creator roles are valued within the network and contribute to a diverse, vibrant learning ecosystem. Any accessible network also engages in what EF Schumacher described as "appropriate technologies" (Schumacher, 1973), here in the context of minimal computing to empower "students to be their own arbiters of engagement" (Bessette, 2023). Practical applications include:

- Participatory design
- Universal design
- Cultural competencies
- Eco-literacy
- Ethical technologies
- Data privacy, autonomy, and security
- Continuous feedback and adaptation
- Robust systems to support whole community access

## 2.5 Development of New Network Identities

Finally, such a network (inspired as it is by the work of Karen Barad, Felix Guattari, Bruno Latour, Thomas Nail, Rosi Braidotti, Jussi Parikka and others) breaks down barriers between node and relationship; between human and more-than-human; between learning and experience. A receptive relational network could yield an evolution in network identities, an "ecology of practices" that "opens up a world: a world of relations, abstractions, spaces that turn into movements and it becomes an onto-epistemological framework" (Parikka, 2018, p.45). Practical applications include:

- Transdisciplinary programme architectures
- Holistic and whole-systems learning spaces
- Mentorship and partnership
- Collaborative and co-creative workshops across identities
- Transmedia storytelling
- Process-led curriculum design
- Networked performance
- Agential realism workshops
- Performativity workshops

Inroads into the development of distributed and relational learning are not entirely uncommon; however, engaging with dynamic learning networks to implement the elements above, particularly in the context of institutional frameworks can prove challenging. Nonetheless, there are huge opportunities for the co-creation of innovative network ecologies if learning is to continue to develop as a meaningful way to engage in the global ecological and social challenges that increasingly come to define this century.

### 3. (Re)imagining Materiality

Pioneering work in *Material Ecology* by Neri Oxman and her teams both at the MIT Media Lab and at Oxman Architects is an exceptionally helpful material-led framework for conceptualising relational nodes within hybrid ecological learning networks. Each node, akin to a unique material entity in Oxman's schema, possesses inherent characteristics that enable complex interactions and gives each node a unique material identity (*material ontology*) that reflects a symbiosis between the human and more-than-human worlds. Material ecology integrates design and computational biology with traditional fabrication and building processes, and emphasises materials are not simply passive substances used to build objects; they participate in the ecological systems in which they're situated. Oxman frames her work in material ecology in the principles of her *nevalogue*:

- Nature as Client;
- Growth over Assembly;
- Integration over Segregation;
- Non-human-centred Design;
- Difference over Repetition;
- Decay over Disposal;
- Activist Design;
- System over Object;
- Technology over Typology;
- Process over Product;
- Heterogeneity over Homogeneity;
- Scale over Size. (Antonelli and Burckhardt, 2020, pp.20-37)

Applying these principles to learning network design, nodes in the network can be viewed no longer merely points of connection; instead, they become unique material entities possessing distinctive characteristics that influence their interactions and behaviour within a network and create a latticework which enables us to manifest that “knowledge can no longer be ascribed to, or produced within, disciplinary boundaries, but is entirely entangled” (Ben-M 2020). In a *hybrid ecological network*, material characteristics manifest in multiple ways — a node's connectivity to other nodes (its positionality within the network), its ability to process and generate information (its capacity for computational or knowledge/experience/skills exchange), and, importantly, its resilience in the face of disruption.

Taking inspiration from Oxman's *nevalogue* enables a reframing of design from object-oriented to systemic through a process of organic growth where networks can themselves become activist through an integrative and mycelial embrace of a (new)material-led design where contextual flows and relational difference become a new design paradigm. Thus design sets a living and adaptive foundation for a reimagining of possible educational futures as decentralised, student-led, displaced, and deinstitutionalised. Educational thinkers have begun to acknowledge, “the increasingly corporatised, target-driven, and stressful nature of modern academic life far exceeds reasonable human limits. This leaves most of us with no energy to engage with the

greatest challenge of our time – tackling the climate crisis.” (Urai and Kelly 2023: 1). Further, Dan Fitzpatrick offers, “in 2043 school will likely be a concept rather than a place where our children go to learn. Systems of education led by governments will not be able to keep up with innovation, and a decentralised offering will be where most parents go to educate their children” (Fitzpatrick, 2023, p.30).

Maggie Favretti asks toward the end of her book, *Learning in the Age of Climate Disasters*, “what if the purpose of school was actually to engage people of all ages in the co-creation and tending of interrelated, living communities of coherence, belonging, and agency?” (383) Favretti's positive vision of possible learning futures resonates with the work of educational futurists including Fitzpatrick (2023), Urai and Kelly (2023),



Alexander (2020), and more) who see the potential of a regenerative pathway despite the continued financialisation of student enrolment, unethical international student fees in the UK and US, and a general “[m]arketization of international higher education [that] exacerbates issues of educational inequity” (Tannock, 2013) that further distances learners from being full participants in a whole-systems approach to education.

We need a more nuanced understanding of learning networks and their design and an understanding of the urgency of re-thinking learning structures: “To remove ... barriers to action, we need to rethink academia” (Urai and Kelly, 2023, p.1). Acknowledging the inherent variability and dynamism of network participants (nodes), can empower the design of more flexible, resilient networks that can adapt to changing circumstances and (re)generate solutions.

## 4. (Re)/(Dis)locating Pathways: Corridor Ecology

One example of extending a *Material Ecology* grounded design paradigm explicitly into the more-than-human world is through *Corridor Ecology*, an interdisciplinary field including biodiversity corridors and landscape linkages, which lends principles crucial to designing pathways within networks. One can frame hybrid ecological networks as enactive relational spaces through the lens of *ecological corridors* (also known as biodiversity corridors or wildlife corridors). Of the hundreds of corridor projects active worldwide, there are many successful corridor and linkage projects across human and more-than-human relationships across a range of scales and geographies addressing the needs of a diversity of species.

Seeing network pathways as analogous to ecological corridors can open our perception of them as dynamic conduits that facilitate the flow of information and interactions, much like how ecological corridors facilitate species movement. They are not just passive infrastructure but active and vital parts of the network that can adapt and evolve over space and time to better serve the network’s needs.

Ecological corridors are essential for connecting fragmented habitats, allowing species to move and interact — often over multiple generations — thereby enhancing biodiversity, resilience and integration with the surrounding environment. Similarly, in a network context, these “corridors” or pathways can connect different nodes — individuals, groups or systems — and allow for steady, organic evolution of connections between nodes that might otherwise remain siloed from one another. They invite the transfer, mixing, and evolution of ideas and knowledge and foster intellectual diversity and innovation.

By designing pathways that facilitate diverse interactions, we can create networks that are not only more cohesive but also more resilient. These networks can better withstand shocks (such as the loss of a node or disruption to network connections) and are more adaptable, capable of evolving based on the needs of their nodes and the environment.

In addition, the concept of corridor ecology introduces the idea of *permeability*, which refers to how conducive a landscape is to species movement. In network design, this would translate to how easily information and ideas can flow through the network. Designing a learning network with high permeability would mean creating pathways that enable the smooth and efficient flow of knowledge and ideas. Integrating corridor ecology principles enables a transition from a perception of networks as static, rigid structures to an understanding of them as dynamic, adaptable, and resilient systems, much like ecological landscapes themselves.

Multi-scale learning networks are always/already in the process of co-becoming, manifesting a world in which human and more-than-human organisms communicate always in an unfinished processual dynamic. For example, large-scale ecosystem corridors known as landscape linkages allow for the movement of a diversity of both plant and animal species and are designed for multi-generational movement and flourishing of species *within* the linkages themselves. Following the recognition of transboundary (transnational, intercultural, interspecies) linkages, a globally distributed site-based experience can build a



far more resilient learning network than existing site-based, online, or hybrid higher education allows. A hybrid ecological network emphasises the interconnectedness of global partners to integrate site-based and community-centred learning around the world and interweaves it in a multi-species transdisciplinary cross-cultural approach to build a resilient, adaptive, and multi-scale curriculum (Bailey, 2021).

Annika Keeley of the Center for Large Landscape Conservation explains that to address changing habitats and migration patterns resulting from climate change, wildlife “corridors can also incorporate climate refugia. Examples are canopy cover, deep snowdrifts, valleys where cold air pools, northward facing slopes, and areas near or in large deep lakes or oceans.” This often incorporates “modelling current species distribution and their future distribution, using climate change projections, and then designing corridors linking current and future habitat patches”. (Keeley, 2022) Corridors are as much about the interrelatedness of the network partners as they are about inhabiting the space between the network nodes.

Keeley notes, however, that “corridors should be part of larger ecological networks” and will ultimately only be successful when paired with “measures to reduce human population and consumption, while increasing access to resources” (Hilty, 2019, p.275-6), thereby underscoring the need for a broader systemic approach — in and of themselves, ecological corridors — and connectivity initiatives of all kinds — will only succeed if actively and fully embedded in a holistic approach.

Much as flows of more-than-human species across networks need not have rigid connections, but rather flexible, permeable, organic and regenerative connections that evoke and engender flourishing tendrils of new and sometimes unexpected growth. The very movement of species within corridors is itself a dynamic of inhabitation, often with multi-generational and inter-species frameworks, where the static fixedness of ‘being’ gives way to the relationality of ‘becoming’ and the “notion of ‘animating’ can also shift perspective from animal essences to a study of the material-semiotic performativity of human/animal relationships”. (Birke et al., 2004, p.169-170)

Drawing on these fields as well as on communicative ecologies and hybrid or gradient epistemologies (see Altheide, Oxman, Haraway, Tsing, Morton, Witzagal, Crabtree and Rodden, for example), there are ample models for inhabiting the permeability of network edges to engage in the cultivation of further connection and partnership development. It is useful here to draw on the foundational framing of these fields (demonstrated tangibly in the work of Oxman and others) in the articulation of *assemblage* in the work of Deleuze and Guattari and subsequent posthuman articulations. They write, “an assemblage is precisely [an] increase in the dimensions of a multiplicity that necessarily changes in nature as it expands its connections. There are no points or positions in a rhizome, such as those found in a structure, tree, or root” (Deleuze and Guattari, 1987, p.8). Their emphasis on defining the rhizomatic roots of assemblage in movement, action, and transfer underscores the processual underpinnings of active distributed networks in which the nodes themselves recede and “there are only lines” (Deleuze and Guattari, 1987, p.8).

Neri Oxman’s work on (often experimental) hybrid ecological architectures foresees a future in which “material property gradients may be programmed across space and time” (Oxman, 2024) that explodes our current binary paradigm of place-rooted vs distributed and affords entry to a hybrid network model that becomes the meshwork (Morton 2013) for a relational gradient of knowledge and experience exchange. It is useful here to draw on Arthur Koestler’s work, particularly in *The Ghost in the Machine* where he scaffolds emergent systems and complexity theory by balancing his concept of the *holon* between part and whole. Koestler resists a complete holism – what Morton might describe as “some vague sludge of Anaximander’s *aperion*” (Morton, 2013, p.119) or Thales’ *arche* before him – in favour of an almost fractal nesting of interrelated parts, wholes and sub-wholes. He describes “organisms and societies [that] are multi-levelled hierarchies of semi-autonomous sub-wholes branching into sub-wholes of a lower order, and so on” wherein “‘wholes’ and ‘parts’ in [an] absolute sense just do not exist anywhere” (Koestler, 1967, p.56-58). Koestler’s *holon* and the accompanying notion of *holarchy* offer a lens through which to view the interconnectedness and interdependence of entities in both biological and social structures, suggesting that the nature of reality is neither fully reducible to its parts nor entirely explainable as the sum of its parts. Instead, it proposes a dynamic, integrative view of systems where both *partness* and *wholeness* are

essential for understanding the organisation and functioning of complex systems.

Further, Ervin László built upon Koestler's concept of the holon to assert that "consciousness is not produced by the brain, and is not confined to the brain. It is a fundamental phenomenon" that exists everywhere (László, 2017, p.3). This robust form of extended cognition and "active externalism" (see Clark & Chalmers, 1998) reaches into the *alive-space* of human and more-than-human interconnectedness, where "all spheres of consciousness partially overlap... [And] the overlapping part of the spheres of consciousness forms the world that is common to all". (Schrodinger, 1956, p.9) The complementarity of *part* and *whole* held in a permanent state of (co)becoming can empower a shift from hierarchical, pre-structured educational models to fluid, process-oriented, and relational models that prioritise practice-led and experience-based learning networked through a rhizomal architecture, thereby offering a transformative vision for 21st-century education.

## 5. Unsettling the Classroom

The writer and activist Gloria Anzaldúa describes the experience of inhabiting borderlands as *nepantla*, a Nahuatl term meaning *in-betweenness* or *ambiguity* (Anzaldúa, 2015, p.127). *Nepantla* captures the complex and often contradictory nature of identity formation within borderlands, where individuals navigate between multiple cultural, linguistic, and social contexts. In this liminal space, Anzaldúa argues, new forms of identity and consciousness emerge, challenging traditional binaries and hierarchies — between cultures, gender identities, nation-states, human and more-than-human communities, and between ontology and epistemology.

Anzaldúa writes "you're not contained by your skin—you exist outside your body and outside your dream body as well. If the body is energy, is spirit—it doesn't have boundaries. What if you experienced your body expanding to the size of the room, not your soul leaving your body. What if freedom from categories occurs by widening the psyche/body's borders, widening the consciousness that senses self". (Anzaldúa, 2015, p.134-35) As they explore the "enfleshed genealogical sensibilities" embodied in the linguistic and cognitive dance between Anzaldúa's experience and her readers, Nancy Tuana and Charles Scott, point to blurring of place, where, "Enfleshed genealogies remember the reciprocal vulnerability of things in the making. Not my body, your body, but the complex importings of environments, institutions, norms, sensibilities, elements". (Tuana & Scott, 2020, p.118)

In this *alive-space*, where ultimately, "corporeality is a nexus of flux" (Tuana & Scott, 2020, p.118), place itself can be critically unmoored from romantic conceptions separating terrain from its context; Cecil Goodman underscores that "sense of place is a social construction that builds on a socio-cultural context, which includes spatial memory, experiences, and social world relationships" (Goodman 4) and further enriches this discourse framing hybrid ecological networks, advocating for a learning model that is de-institutionalised, distributed, and deeply entwined with socio-cultural and ecological contexts. Arizona's Prescott College, "a leader in experiential and collaborative education" ("Mission, Vision & Values"), demonstrates, for instance, that "reframing recreation *on*, to one of relation *with*, may help to challenge this paradigm and requires the re-learning of Indigenous wisdom erased through the pursuit of western values of escapism and conquest" (Greeson et al., 2022, p.10). Advocating for practice-led, community-centred and ecologically focused education not only challenges but also dismantles romanticised separations between place and context, advocating for a justice-centred education system that mirrors the resilience and adaptability of ecological networks and invites a radical reimagining of place, learning, and community in a way that fosters a regenerative, interconnected educational ecosystem, reflective of and responsive to the complex web of relations that define our socio-ecological landscape.

In the practice-led processual classroom, learning is itself "an iterative process... growing from reflexive positionality, entangled empathy, and involving earth-based ways of knowing and indigenous cosmologies... Such learning is modelled on resilient ecological systems, recognition and celebration of diversity, collaboration, reflexivity, emergent understanding, and individual responsibility and

accountability” (Greeson, 2019). The enfolding of diverse externalities within the curriculum, and indeed modelling the learning framework on an active regenerative paradigm situates learners in an active relationship with process and experience, rather than with siloed knowledge transfer that re-inscribes hierarchical anthropocentric paradigms within and beyond the classroom.

The MA *Movement, Mind and Ecology* at Schumacher College in South Devon, England, now in its third year, provides additional context within a transdisciplinary environmental humanities course focused on exploring and interrogating interrelationships, communications, and performative practices between human and more-than-human participants around the world. The programme’s four taught modules are built upon concepts of out, to use embodied practice, ecological thinking and environmental philosophy to explore the alive-space between human and more-than-human communities, taking as one of its foundations the assertion that concepts “are not descriptive but *performative*. ... calling into question of the presumed separability of epistemology, ontology, and ethics”. (Barad & Gandorfer, 2021, p.25) In the final module, *Performing Place*, students embody their experience in the course and develop meaningful public and community-facing practices that can move both conversation and action forward, inhabiting what Elizabeth St. Pierre describes as an “ontology of immanence, [where] one becomes less interested in what is and more interested in what might be and what is coming into being”. (St Pierre, 2019, p.4)

*Movement, Mind and Ecology* is delivered both onsite in England and online for students across multiple time zones, ecosystems, and cultures and thus presents a tangible opportunity to explore and assess the manifestation of interspecies collaboration, cooperation, and communication in site-based and online contexts. In my (far too) occasional seminars on the course, I would challenge students to consider what happens to a network model when we focus exclusively on the connections over the nodes, and how we might use such a relational framework to reimagine the process of learning through experience. It is precisely this sort of reworking of networks with the motion and movement of experience through the network corridors – rather than fixing on the nodes of the network themselves, that speaks clearly to the need to diversify, decolonise, and democratise the development of learning networks by taking a decentralised view of network development. If we decentralise network architectures and establish a framework based on the active sharing of experience that validates the authentic experience of site-based participants, then we have come a long way indeed toward a democratic & ecological relational network.

Foundational for such an innovative approach to learning — often more apparent in curricula of small progressive colleges and universities (including Schumacher College (UK), Prescott College (US), Sterling College (US), Green School (Bali), Black Mountains College (UK), College of the Atlantic (US), MOME University (Hungary), the international UNDP Conscious Food Systems Alliance (CoFSA) and others) is that “thought cannot get outside itself in order to compare the world as it is ‘in itself’ to the world as it is ‘for us’”. (Meillassoux, 2009, p.3)

## 6. Conclusion

Whether grounded in knowledge exchange, distributed approaches to practice-led learning, or other, “the problem remains ... that organised networks do not yet exist as recognised actors either within the stratum of policy discourse or as concrete-potentialities”. (Rossiter, 2006. p.34) It is clear that in the context of network identity and data autonomy, looking through the lens of dislocated (Morton 2010) interspecies inhabiting, “inclusivity can also enhance innovation” (Chiles et al., 2021: 956), the role of the network itself as an actor within a framework of agential realism that seeks to disrupt “the sedimented assumption in Western philosophy that holds that ontology is strictly a matter of being”. (Barad & Gandorfer, 2021, p.17)

A hybrid ecological network re-frames institutional learning through a deterritorialised epistemic ontology that invites critique of fixedness inherent within and outside of institutions. In this era of polycrises (among which is a fundamental crisis in education), we need to interrogate existing learning paradigms to challenge the notion of institutional fixedness and construct authentic theoretical and practice-led frameworks for de-institutionalised learning. Such a framework invites an inhabitation of an *alive-space* at

the intersection of human and more-than-human identities and encourages a refashioning of how learning communities are formed, how knowledge is engendered and shared amidst these communities, and how the process of learning unfolds in non-hierarchical, open-ended, and interconnected ways.

Hybrid ecological networks open a collaboratory space for a new philosophy of de-institutionalised learning that transcends the conventional boundaries between teacher and learner, formal and informal learning environments, and online and offline educational experiences. Within and around de-institutionalised models, learning unfurls through non-linear, assemblage-driven entanglements. Thus reimagined, learning is less paradigm or framework and more a dynamic, ever-evolving network of relations, where knowledge is not transferred, but emergently co-constructed through the intricate interplay of experiences, practices, and relational engagements.

The openness of distributed learning networks subverts bounded, discrete and siloed learning “centres” that gatekeep and disseminate “knowledge” across a centralised institutional network apparatus. As Anna Tsing offers, “assemblages are open-ended gatherings. They allow us to ask about communal effects without assuming them. They show us potential histories in the making”. (Tsing, 2021, p.22) It is these potential histories – learning unfixed and always in process, that is at the heart of unfinished network assemblages.

Hybrid ecological networks, in their emphasis on relationality and process for learning insist upon transformative action for education and advocate for resilient, adaptive learning networks that integrate human and more-than-human interactions with/in socio-cultural and ecological contexts. Distributed networked learning calls for dismantling hierarchical educational structures in favour of participatory, interconnected learning networks. These networks can shift the future of education from seeking to sustain an unsustainable status quo toward a flourishing, collaborative and regenerative future. When we recognise through relational networked imagining to authentic practice that “all that matters...is that the sensible is a relation, rather than a property inherent in the thing” (Meillassoux, 2009, p.2), we can better engage the dynamic interplay in the alive-spaces between human and more-than-human actors, aiming to address global challenges through a regenerative, inclusive, and ethically grounded paradigm. We are urged to embrace this model, fostering a collaborative effort towards sustainability and ethical engagement with our planet.

Collaboration is the foundation of a regenerative approach and helps us recognise that we are always in the process of evolving. It is through cultivating relationships across boundaries (with education providers, businesses, communities of practice, and human and more-than-human communities) and inhabiting both virtual and actual rhizomal or mycelial networks, that we can build a resilient and adaptive regenerative future for learning that explicitly integrates radical openness, interactivity, adaptability, and equitable participation.

There is no single solution to this crisis; however, “we must see academia not as a research-producing factory but as an organic, diverse, dynamic organisation. An organization where, in the right conditions, small seeds can grow into a diverse ecosystem”. (Urai & Kelly, 2023, p.6) It will take different perspectives and many approaches, but critical will be an acknowledgement that it is through working together — by re-building our relationships with one another, that we can hope to shape a more regenerative future for higher education.

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