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Towards an Ecosystem-of-Learning for Architectural Education: Reflecting on a network of six pedagogical clusters

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ABSTRACT

This research is situated in the context of our collective exploration of a new ecosystem-of-learning for architectural education, as a catalyst for change following the experience of the COVID-19 pandemic. To move online architectural education beyond emergency remote teaching, requires a total reset of current thinking and practices. In this essay, we propose a complex network of six new pedagogical clusters, namely Anthropy Pedagogy, Catalytic Pedagogy, Synergic Pedagogy, Co-generative Pedagogy, Spatio-temporal Pedagogy, and Meta-morphic Pedagogy. We approached our research using an iterative and reflective narrative inquiry method. Examining the development of these complex pedagogical clusters, we highlight the most promising potential contributions towards a responsive, resilient, and replicable ecosystem-of-learning approach for architectural education.

KEYWORDS

architectural education, design studio pedagogy, ecosystems, hybrid learning, learning design

Introduction

A shift of the architectural studio to a digital space was prompted by a health emergency in 2020. Following prior persistent resistance to online learning in architectural education, the rapid online pivot was motivated, almost entirely, by a triaged approach to risk mitigation rather than an intentional and gradual transition. Architectural educators were expected to switch from one mode to another, with little time to consider online pedagogical theories or to develop best practice approaches.

When adapting to a new condition, students often exhibit signs of vulnerability[1] and educators must address concerns about inequality and access.[2] Further to this, in the studio, 'the tactile experience of paper, the physical building of models and making together, the serendipitous moments of discovery, the instances of informal and social learning, the stressing together, and of course the fun – were all 'lost' to the disrupted dimensions of space and time'.[3] To move online architectural education beyond 'emergency remote teaching',[4] shifting from 'contingency to sustainability', requires a total reset of current thinking and practices.[5]

In response to the sudden pivot brought about by COVID-19, and advocating for thoughtful learning design that considers the dimensions of the different learning settings, Jesse Stommel writes:

> We have known (and written) all along that the stuff of teaching in a classroom does not port or shift, or "pivot" into digital spaces. The culture of a classroom is unique, and the architecture of the Web is unique as well. The physical environment of a bricks-and-mortar classroom is not equivalent to the 1s and 0s of a learning management system. In fact, these digital spaces (and the ways they traffic in educational data) are sometimes, or often, anathema to the relationships at the centre of the work of teaching and learning.[6]

As authors, we approach learning as an intrinsically human activity that transpires in many places and in a variety of different ways[7] and we understand pedagogy as 'all spaces in which knowledge is produced and identities are formed'.[8] An ecosystem-of-learning can describe a complex space and a network of tools, technologies, resources, people, places, and the interconnected systemic relationships between these elements. In this research, we accept the challenge posed by Valerie Hannon and others:

> Our conclusion is that, without a doubt, the movement towards learning ecosystems is full of potential for a transformation of how learning happens. But (at least at this level of complexity) it is in the very early stages and faces formidable challenges to evolve into a new normal [...] As a field, it is still in ferment. A number of models will fail and disappear, as natural ecosystems do. Some will morph and develop in as yet unpredictable ways. The need now is to collect and share many more examples of initiatives in the field, particularly those from the global South.[9]

We approach this challenge by questioning how the resonating pedagogical clusters we identified might contribute to learning and inform pedagogy in a resilient and responsive ecosystem-of-learning approach for architectural education. The complexities of architectural education, specifically of the physical studio, are well documented. However, the literature on architectural pedagogy adopted beyond the western world, for example including the global South,[10] as well as online learning in architecture,[11] and pedagogy for blended and online studios, is limited. As suggested by Mark Olweny, it is important to consider relevant pedagogies for architectural education 'because it is through these processes that students adopt and develop architectural values'.[12] In this essay we wish to address this gap in the literature.

Methodology

Taking a constructivist ontological position, we adopted social constructivism as a theory[13] to explore an image of what a responsive, resilient, and replicable ecosystem-of-learning for architectural education might resemble. Our work builds on an international presentation originally delivered by Jolanda Morkel and Hermie Delport, titled 'Responsive Ecosystems for Architectural Education'.[14] This presentation revealed the potential to employ the ecosystem as a metaphor and a framework to build a new ecosystem to mitigate the impact of the COVID-19 pandemic and to guide architectural education and practice towards the future.

In this essay we draw on the natural and earth sciences as being 'essential to understanding current global change, to helping us sustain the Earth'.[15] This offered us a language and structure to explore the pedagogies as part of an ecosystem that may hold some clues for the way forward. Investigating academic literature and contemporary media, we identified 32 current and emerging pedagogies that are not limited to architectural education but feature more broadly in higher education (Table 1). The selection of pedagogies was informed by the Morkel and Delport presentation in which a series of conceptual prompts were identified. In this essay, we employed a narrative inquiry method to reflect on these pedagogies and to contextualise these for architectural education and specifically the design studio setting, in terms of the new proposed ecosystem. Drawing from the work of Michael Polanyi and Joseph Swchab, Conle describes narrative inquiry as an assembly of 'experiential stories that combine the social and the personal' and provide a 'voice to tacitly held personal knowledge [...] without abandoning the particular, the contextual and the complex'.[16] Our narrative approach was both iterative and reflective, 'gaining insight from group sharing, and providing various levels of support',[17] as we regularly debriefed our teaching approaches through online interactions.

Through our online discussions, comprising live meetings via Zoom, and ongoing collaborative writing in Google Drive, diagram making and whiteboard

drawing, we shared our respective experiential accounts to contextualise the pedagogies that we explored. We considered our diverse contexts as situated in both the global North and the global South, namely the United Kingdom, Australia, South Africa, and Uganda. We reflected on our experiences that contrasted others' perspectives that it is impossible to successfully facilitate design studio in an online environment, both before and during the pivot.

These perspectives prompted us to search for pedagogies that could facilitate, include, support, and create the architectural studio anywhere and anytime; for this we referenced pedagogies beyond the traditional architectural landscape. We conducted a web-based search that was informed by the Morkel and Delport presentation and which focused on the themes that we found were most absent in architectural education literature and most prevalent in discussions about the recent radical changes in the architectural studio. These themes are empathy/human, activist/activism, structural/inclusion, practice/ making, digital access/mode, and change (Table 1). Through thematic clustering around the themes, we then tested these pedagogies. Following this process, we completed a comparative literature overview for each, seeking resonating and contradicting meanings. Each cluster was named, drawing on the natural and earth sciences and ecosystem vocabulary to locate the different contributing pedagogies. Finally, we reflected on our respective experiences to contextualise and finalise the clusters.

Our online reflections, provocations, and deliberations culminated in the formulation of a complex network of six new pedagogical clusters, namely: *Anthropy Pedagogy, Catalytic Pedagogy, Synergic Pedagogy, Co-generative Pedagogy, Spatio-temporal Pedagogy, and Meta-morphic Pedagogy*. With these, we want to demonstrate the possibility and importance of providing responsive and resilient learning environments, which can be replicable and more digital than were previously assumed. We present these pedagogies below, per cluster, in an integrated format that, for each, includes the relevant literature, contextualisation, reflection and discussion. Finally, we used a graphic illustration technique to visualise the six pedagogical clusters in a specific ecosystem-of-learning scenario that was informed by the pivot. This scenario helped us explore the six pedagogical clusters in combination.

The six clusters display some inevitable overlaps that reinforce the interconnected systemic relationships between the elements, namely the tools, technologies, resources, people, and places. This resonates with the premise of a new ecosystem-of-learning approach for architectural education, as a catalyst for change.

New Pedagogical Cluster	*Contributing Pedagogies*
Cluster 1 ***empathy/****human* ***Anthropo-pedagogy***	▪ critical compassionate pedagogy ▪ pedagogy of care ▪ post human pedagogy ▪ pedagogy of discomfort ▪ pedagogy of hope ▪ pedagogy of the heart
Cluster 2 ***activist/****activism* ***Catalytic Pedagogy***	▪ ecopedagogy ▪ place based pedagogy/ critical ▪ pedagogy of place ▪ critical pedagogy ▪ pedagogy of the oppressed
Cluster 3 ***structural/****inclusion* ***Synergic Pedagogy***	▪ equity pedagogy ▪ feminist pedagogy ▪ indigenous pedagogy ▪ social justice pedagogy ▪ inclusive pedagogy ▪ decolonised pedagogy
Cluster 4 ***practice/****making* ***Co-generative Pedagogy***	▪ live project pedagogy ▪ maker pedagogy ▪ vocational pedagogy ▪ design-build pedagogy ▪ hands-on pedagogy ▪ experiential pedagogy/learning
Cluster 5 ***digital access/****mode* ***Spatio-temporal Pedagogy***	▪ critical digital pedagogy ▪ hybrid pedagogy ▪ open pedagogy ▪ resilient pedagogy
Cluster 6 ***change/****change* ***Meta-morphic Pedagogy***	▪ adaptive learning pedagogy ▪ flux pedagogy ▪ transformative pedagogy ▪ transformational pedagogy ▪ micro-learning pedagogy

Table 1:
Six pedagogical clusters and the contributing pedagogies.

Cluster 1: Anthropy Pedagogy

Anthropy Pedagogy draws on a cluster of pedagogies that speaks to affective qualities and what it means to be human. The term 'anthropy' originates from the Greek word *Anthrōpos*, which means 'human'. Anthropy Pedagogy recognises the increasing entanglement with anthropology and the role of the human as the catalyst of:

> [...]-architectural interventions [that] foster the active engagement of its users, it embraces, and it encourages its users to embrace diversity (of background, of opinion, of experience etc.) and ideas of multiplicity (of identities, realities etc.) through creative appropriation and interpretation of the built environment.[18]

Anthropy Pedagogy is informed by critical compassionate pedagogy, pedagogy of the heart, pedagogy of hope, pedagogy of discomfort, pedagogy of care, and posthuman pedagogy. This cluster of pedagogies acknowledges human needs and emotions, vulnerability, caring human relationships, and support. Critical compassionate pedagogy was formulated by Richie Neil Hao,[19] by intersecting compassionate communication with critical pedagogy. He wanted to highlight how the 'education system has failed many students from the start',[20] expressing the need to 'move toward a pedagogy that allows open communication between students and teachers'.[21] Kathryn Waddington expands on the role of educators and the university to act with care and compassion:

> We need to be kind to ourselves and to each other. In seeing universities as caregiving organisations, we need to put staff and students at the centre of a caregiving network of systems that support, empower, and enable.[22]

Paulo Freire's pedagogy of the heart and pedagogy of hope focus on the commitment to the vulnerable, the illiterate, and the marginalised.[23] In his reflection on Freire's pedagogy of hope, Le Grange warns against

> ...offering hope to communities (in all scalar contexts), as if it is something that we possess and that we can give/offer. Rather hope is what emerges through serious and critical engagement in authentic partnerships with real-life challenges faced by contemporary society at local, regional, and global scales.[24]

Megan Boler's pedagogy of discomfort is most relevant in the architecture studio,[25] where critical inquiry, observation and reflection form the backbone of the educational process.[26] Her insistence on how 'emotions define how and what one chooses to see, and conversely, not to see', and the importance that inquiry should be understood 'in relation to others, and in relation to personal and cultural histories and material conditions',[27] must be foregrounded in the studio of the future. Pedagogy of care is associated with Noddings' seminal work on 'ethic of care' as central to the practice of teaching.[28] Andrea Deacon insists that, creating nurturing spaces online is even more critical than in face-to-face instruction,[29] while Ellen Rose and Catherine Adam ask:

> How do the responsibilities to students and the expectations of care differ for online teachers from instructors who teach only in brick-and-mortar classrooms? What might an ethic of online pedagogical care entail? Can the "disembodied" online student evoke the same sense of care that may be experienced by the teacher in face-to-face situations?[30]

These questions are particularly relevant in the current climate of increased online surveillance, analytics, and data management. Michalinos Zembylas presents posthuman pedagogy as expanding the binary distinctions between human and non-human entities.[31] Rosi Braidotti suggests that '[p]osthuman subjectivity reshapes the identity of humanistic practices, by stressing heteronomy and multi-faceted relationality, instead of autonomy and self-referential disciplinary purity'.[32]

Pivoting online we consider social presence as an important variable in the learning environment.[33] This is necessary considering the reliance of the signature pedagogy of the architectural studio[34] on personal interactions between the design tutor and the student.[35] These interactions are often associated with asymmetrical power relations, stress, and anxiety.[36] Therefore, personalised learning that aims for 'increased student control over the time, place, path, and/or pace of learning'[37] can lead to student autonomy and freedom, and as a result, may support Anthropy Pedagogy. This should be attainable through carefully considered blended learning design. If social presence can be achieved in online architecture studios, participants will be able to present themselves to each other as 'real people'.[38] If they are able to connect with others through affective connectedness,[39] they are likely to experience a sense of belonging in a course.[40] As Raquel Wright-Mair highlights:

> Leading with critical compassion and vulnerability may be the only way the academy will stay relevant as our society is forced to triage how they will use scarce resources and radically re-envision the delivery of knowledge in a new climate fraught with fear and uncertainty. Now more than ever we should focus on, and execute criticality, compassion, and love.[41]

Cluster 2: Catalytic Pedagogy

Catalytic Pedagogy has its basis in pedagogies of activism first brought to light in the landmark publication, Pedagogy of the Oppressed, by Paulo Freire.[42] Freire's seminal text proposed a radical new pedagogical approach that moved away from a prevalent pedagogy he described as a banking model of education[43] because it treated students as empty vessels, waiting to be filled up with pre-digested information and knowledge. Freire argued that it would be more appropriate to treat students as co-creators of knowledge.[44] This new pedagogical approach presented as critical pedagogy, was described by Ira Shor as:

> Habits of thought, reading, writing, and speaking which go beneath surface

> meaning, first impressions, dominant myths, official pronouncements, traditional clichés, received wisdom, and mere opinions, to understand the deep meaning, root causes, social context, ideology, and personal consequences of any action, event, object, process, organization, experience, text, subject matter, policy, mass media, or discourse.[45]

Critical pedagogy emerged as being problem posing, thus lending itself to an educational setting where change was warranted, hence its initial association with decolonisation movements and a desire to detach pedagogies (specifically in South America) from their 19th-century European origins, or to counter what was termed 'epistemicide'.[46] Educational theorist Henry A. Giroux suggests that critical pedagogy proposes education as a form of political intervention, thus, through its inherent processes, it is capable of acting as a catalyst for social transformation.[47]

Social transformation is often a slow process that requires a trigger, often a momentous event, a catalyst that resonates widely in a community, society, or even globally, spurred on by a common appreciation of the need for change or a transformation of an approach or a societal position. It was just such a scenario that led to a critical pedagogy of place, which aimed to 'contribute to the production of educational discourses and practices that explicitly examine the place-specific nexus between environment, culture, and education'.[48] Critical pedagogy of place was linked to cultural and ecological politics, or what David Gruenewald described as an ethic of eco-justice,[49] one that borrowed from socio-ecological traditions that eventually led to ecopedagogy, a move away from the prevailing anthropocentric paradigm, toward an ecological paradigm. Ecopedagogy was

> [...] a chance for education to renew its old systems, based on competitive principles and values. Introducing a culture of sustainability and peace into school communities is essential so that these communities can be more cooperative and less competitive.[50]

Taking its cues from these preceding pedagogies, a Catalytic Pedagogical approach is an activist pedagogy that gains its significance from contemporary concerns and the need to address these concerns. Included are the desire to transform architectural education as prompted by a growing awareness of the Climate Crisis, #RhodesMustFall starting in 2015 and #BlackLivesMatter in 2020. While initially viewed as peripheral, these factors have emerged as critical defining issues for architectural education. A Catalytic Pedagogy presents a means to address these and other emerging socio-political concerns through an activist position by challenging the master-apprentice approach to architectural education. While the master-apprentice concept has served the profession well, it is increasingly cited as failing to account for growing calls for change, which, for environmental concerns, has caused some to suggest that architects are a lagging indicator of sustainability.[51] Catalytic Pedagogy suggests an approach that provokes change through its actions. Within an ecosystem, this can be broadened to what Michiel Veldhuis

and others term 'autocatalysis',[52] a process by which species or populations promote each other in a loop through positive feedback. This, they argue, is at the heart of resource competition theory, within which the species with the most effective resource use comes out better. This is important in the current paradigmatic context in which ecological concerns are of increasing significance.

Reflecting on the word 'catalyst', which is 'something that gives rise to change', we are cognisant of the adage '[c]hange is the only constant in life' attributed to Greek philosopher Heraclitus of Ephesus (350 BCE). This is significant for architecture, with change as an ever-present reality, but often not reflected in the educational processes that are mostly about reflecting on past successes. It is here that architectural education becomes unstuck, failing to keep up with constantly and rapidly evolving societal changes. How then can architectural education appropriately become a catalyst for change? The Catalytic Pedagogy provokes students (and educators) to reflect on architecture as more than merely building, to look at it as an inherently social and political act as presented by architect Lebbeus Woods.[53] As Giroux notes, pedagogy is more than teaching, but a force that can initiate cultural change.[54] Similarly, architectural education can be a catalyst for cultural and societal change; a means to embed change into the core of the architectural curriculum.

Cluster 3: Synergic Pedagogy

Synergic Pedagogy embraces, promotes, and celebrates diversity, equity, and inclusivity. Inequalities and exclusive practices were foregrounded in the sudden move off-campus during 2020. Reflecting on the inescapable pivot, educators acknowledged systemic injustices in architectural education[55] and committed to moving forward on goals for equity and inclusion. However, they also recognised that the impact of any such commitment (e.g. a dedication of resources) may be disparate across diverse groups, that often recommendations are made quickly without fully understanding the implications, and that at times there is a reversion to what works for the majority, which is usually the dominant culture.[56] It became more evident than before that architectural students have varied home circumstances, access to tools, means for resource acquisition, internet connectivity, and the ability to communicate and collaborate with others.[57]

Established pedagogies that inform the development of Synergic Pedagogy include equity pedagogy, feminist pedagogy, indigenous pedagogy, social justice pedagogy, inclusive pedagogy, and decolonised pedagogy. These pedagogies speak about relationships, specifically between educators and students, refer to responsibilities, power relationships and democracy in the learning environment, the role of community, and the range of perspectives that diversity brings. In addition, each of these pedagogical approaches emphasises further concepts and principles. Equity pedagogy places the onus on the educator by calling for:

> teaching strategies and classroom environments that help students from diverse racial, ethnic, and cultural groups attain the knowledge, skills, and attitudes needed to function effectively within, and help create and perpetuate a just, humane, and democratic society.[58]

Feminist pedagogy, on the other hand, shifts the focus to the student, stating that 'the best learning environment should be one wherein students' opinions and ideas are regularly contributed to the learning process' and emphasises the 'privilege of voice'.[59] Indigenous pedagogy, born originally from an aboriginal perspective, underscores principles that should be embraced in a responsive ecosystem-of-learning. These include the importance of considering the whole human being, 'cognitive knowledge, self-awareness, emotional and spiritual growth are all equally valued'[60] and it adds learning relationships beyond the human, including the 'physical material that composes the environments we live in, largely organic and inanimate objects'.[61] Indigenous pedagogy further highlights inclusive ways of learning, that deeply resonate with an architectural mindset. These include processes of 'learning through narrative', 'mapping/visualising processes', non-verbal learning that extends to the use of 'symbols and images [...] to understand concepts and content'.[62] They further extend to 'place-based' and 'non-linear' learning, which entails 'producing innovations and understanding by thinking laterally or combining systems [...] [d]econstruct/(r)econstruct: [m]odelling and scaffolding, working from wholes to parts [...]'.[63]

Social justice pedagogy reminds us that education is 'the greatest human equalizer' and that 'education is a political act'.[64] Inclusive pedagogy addresses the selection of content that is taught as a means to include,[65] and decolonised pedagogy stresses the importance of identifying

> deeper processes of exclusion and oppression, de-centering [*sic*] the dominance of Western ways of knowing and doing [...] foreground[ing] indigenous and other marginalized knowledges [...]. With this come new opportunities to engage innovative methodologies to achieve socially just and transformative research and action [...] going beyond the dominant modes of knowledge production.[66]

Reflecting on the COVID-19 pivot experience in online webinars, architectural educators discussed the many positives that emerged during the pandemic, such as the importance of community and the new empowering culture of far-reaching discussions, public webinars and contact with the world beyond specific institutions.[67] In their online conversations, educators lamented the general lack of empathy in architectural spaces, its intensity and often intimidating nature – reminiscing on how both educators and students created safe and supporting community spaces online.[68] Students from minority and marginalised groups reported feeling unwelcome in the traditional studio process, but by contrast, they found the new online spaces more inclusive.[69]

Learning from these reflections and pedagogies, a Synergic Pedagogy goes beyond calling for inclusion, equity, and the acceptance of diversity. Rather, a Synergic Pedagogy positions diversity as a strength which can bring forward new knowledges and inform inclusive ways of learning, doing and being; it celebrates the individual as a complete human and emphasises the importance of mind-body-spirit in the learning process. Synergic Pedagogy furthermore highlights community as part of a healthy ecosystem-of-learning and stresses the importance of healthy relationships with people, place, and nature. To sustain its synergy, it calls for continuous review and reflection on established practices towards better and more inclusive ways of doing.

Cluster 4: Co-generative Pedagogy

Each part of an ecosystem has its own role and all the parts work together to sustain, build and regenerate the system. Co-generative Pedagogy provides direction and principles to the working relationships of the different parts of an architectural ecosystem-of-learning. Co-generative Pedagogy has its first root buried in hands-on and vocational pedagogies which are fed by both concrete experience and reflection. These pedagogies involve 'complex, intelligent activity which engages mind and body together'.[70] Dewey conceptualised 'learning-by-doing', where students become active participants through real-world engagement.[71] Kolb's respected experiential learning model presents learning as an integrated process with 'doing' as 'active experimentation' representing one of the four stages of the process.[72] The next stage is 'reflective observation' or making sense of the 'doing'. Reflection as an active part of learning is echoed by Schön's theory of reflective learning, which theorises the individual learning process and the role of reflection.[73] More recently maker communities and maker pedagogy are characterised by 'collaboration amongst members within the do-it-yourself culture [...] driven by affinity-to and curiosity-towards the activity at hand'.[74] As Özkar Steinø suggests,

> Hands-on learning is generally thought of as the default path to follow through design school. It is thought to be epitomized in the design studio where design is exercised through solving design problems of varying complexity. Design is generally learnt through practice because it simultaneously involves making, seeing (often with the whole body), reflecting, and forming habits.[75]

The second root of Co-generative Pedagogy is entrenched in collaborative learning pedagogies that are broadly underpinned by Lev Vygotsky's social constructivist theory,[76] Jean Piaget's cognitive development theory,[77] and the cooperative learning concepts of Robert and David Johnson.[78] Collaborative learning commonly refers to groups of students who are 'mutually searching for understanding, solutions, or meanings, or creating a product' and educators who act 'less as expert transmitters of knowledge to students, and more as expert designers of intellectual experiences'.[79]

Architectural studio pedagogy is both experiential and reflective (Schön based his theory on the studio crit) but is predominantly an individual pursuit.[80] The lack of collaboration in the studio is evident in the architectural workplace.[81] Live and design-build projects in architectural education are complex education constructs[82] and have experiential, reflective and collaborative characteristics. Especially in design-build projects, where a built structure is created, collaboration is inherent since students have no choice but to work together. The complexity and scale of a design-build project makes it impossible to work individually.[83] Live and design-build projects also often address community needs and reach out beyond the higher education institution.

Co-generative Pedagogy has a third root, which is an offshoot from the 2020 context of rapid change, displacement, and uncertainty. During 2020, established live and design-build programmes were unable to continue as before and the hands-on, tactile architectural studio experience was lost in the rapid move online. This environment fuelled a rethink and the development of creative solutions for the continuity of hands-on approaches by both educators and students. Some of these solutions to rapidly changing architectural education were shared openly by educators in online cross-institutional collaborative spaces where experiments, mistakes and successes were presented and discussed for the benefit of all. These solutions included engaging through digital making spaces, making do with materials found at home, collaborating closer with fabricators outside the academic space and finding alternative ways to engage with communities.[84] Students, educators and the outside community worked together, not only *on* projects but also on actively co-creating innovative solutions *for* the viability and continuity of projects. Harrington writes that

> the entire system from which creative activity emerges, include[es] three basic elements, the centrally involved creative person[s], the creative project, and the creative environment, as well as the functional relationships which connect them.[85]

Co-generative Pedagogy focuses on the entire learning ecosystem rather than a single project. This environment is a complex space, anchored by all three roots where students, educators and communities can generate solutions together, share knowledge and skills, develop projects, and work collaboratively. They can do this through active reflection, safely making mistakes and creating successes, adapting to the context, and tapping into creativity and innovation. Collaboration should actively seek to be inclusive, with true collaboration displaying strong links with the Synergic Pedagogy.

Cluster 5: Spatio-temporal Pedagogy

Space and time are fundamental and intertwined architectural concepts. Architect and theorist Juhani Pallasmaa writes that the 'incredible acceleration of speed during the last century has collapsed time into the flat screen of the present, upon which the simultaneity of the world is projected'.[86] As a phenomenologist, Pallasmaa has 'for some time understood the relationship between time and space and how they can fuse to create powerful architectural experiences' writes Mette Aamodt.[87] In an antidote to this time-rush, and drawing on Pallasmaa, Aamodt proposes the idea of 'Slow Space' as 'a carefully crafted physical space that creates the right atmosphere and conditions for slowing time and fostering deep meaningful experiences',[88] and explains that time 'is necessary for those fundamentally human aspects of life—love, connection, meaning, inspiration, awe, wonder. Things like creativity, art and intimacy cannot be done faster without paying a steep price'.[89]

Spatio-temporal Pedagogy considers the relationship of space and time in learning settings and how to create the right atmosphere and conditions for slowing time and fostering deep meaningful (learning) experiences. This pedagogical cluster references models formulated by Chen and others[90] to understand the dynamic changes observed in real ecosystems. The need of a system to evolve both with time and space aligns with the accelerated changes in learning settings and modes as a result of the COVID-19 pandemic. Emergency Remote Teaching (ERT) has foregrounded flexible, blended and hybrid learning and teaching methodologies. Prior to COVID-19, only a few Schools of Architecture actively employed blended or fully online learning designs.[91] Stommel clarifies the difference between 'blended' and 'hybrid' as follows:

> [...] hybrid pedagogy does not just describe an easy mixing of on-ground and online learning, but is about bringing the sorts of learning that happen in a physical place and the sorts of learning that happen in a virtual place into a more engaged and dynamic conversation.[92]

For example, 'blended learning' describes the place where learning happens, but 'hybrid pedagogy fundamentally rethinks our conception of place'.[93] The sudden move of on-ground studios to the online space appeared seamless thanks to synchronous web seminars or webinars, e.g., via Zoom. However, Zoom fatigue was soon reported, which directed our attention to the need for thoughtful learning design. Such learning design should carefully consider different synchronous and asynchronous, on-ground, online and blended, self-directed, and facilitated learning experiences.

The cluster of pedagogies that inform Spatio-temporal Pedagogy includes critical digital pedagogy, open pedagogy, hybrid pedagogy, and resilient pedagogy. Stommel proclaims that '[d]igital pedagogy is becoming, for me, coterminous with critical pedagogy, given the degree to which the digital can function both as a tool for and an obstacle to liberation' and defines

critical pedagogy as 'an approach to teaching and learning predicated on fostering agency and empowering learners (implicitly and explicitly critiquing oppressive power structures)'.[94] Open pedagogy that is enacted through Open Educational Practices (OEPs)[95] is a student-centred approach with the potential to address social injustices.[96] Open pedagogy includes Open Education, Open Access, Open Science, Open Data, Open Source, Open Government, etc.,[97] but it's not limited to content through Open Educational Resources (OERs); it also includes the processes.[98]

Although not formulated specifically for architectural education, the principles that underscore the resilient pedagogy formulated by the Michigan University,[99] namely transformed access, inclusive learning communities, problem-based interdisciplinary education, lifelong learning, and multimodal design, resonate with recent literature in architectural education. Quintana and DeVaney position resilient teaching as the antithesis of ERT.[100]

Drawing on Spatio-temporal Pedagogy to navigate an uncertain post-COVID-19 future, it may well be possible to reimagine the studio signature pedagogy[101] towards a more responsive, resilient, and replicable solution.[102] Such a reimagined studio should critically consider all possible modes of time and space to enable access and social justice through thoughtful learning (co-)design, involving students and other stakeholders. Remembering the fundamentals of Slow Space, Spatio-temporal Pedagogy aims to make learning experiences meaningful and accessible through and across time(s) and space(s).

Cluster 6: Meta-morphic Pedagogy

Meta-morphic Pedagogy references the alteration that occurs when pre-existing rocks are subjected to changing environmental conditions such as changes in temperature, pressure, mechanical stress, or composition of chemical components.[103] This pedagogical cluster is shaped by the key elements of pedagogies of change including adaptive learning, flux, micro-learning, transformative and transformational pedagogies. Adaptive learning pedagogy is associated with Universal Design for Learning (UDL)[104] and promotes personalised learning that provides efficient, effective, and customised learning paths to engage each student.[105] As many diversified teaching methods as possible, is offered to expand a student's choice, based on three classifications by Kang and others,[106] namely representation, action and expression methods, and multiple opportunities for engagement.

Sharon Ravitch formulated flux pedagogy in response to the Coronavirus in a time of radical flux. Flux Pedagogy is constructivist, student-centred, relational, and reflexive; it's a humanizing pedagogy that examines the goals and processes of education in moments of uncertainty with a goal of mutual growth and transformation'.[107]

Mobile learning is under-researched in architectural and design education, but available literature suggests that durable mobile learning experiences are possible in-field,[108] in studio,[109] and in augmented reality.[110] Perhaps the most prominent impact of micro-learning pedagogy[111] is the potential for enhanced mobile learning, allowing the delivery of micro-content on mobile devices for anytime, anyplace and any pace learning. Transformative pedagogy describes the 'interactional processes and dialogues between educators and students which invigorate the collaborative creation and distribution of power in the learning setting'.[112] Ashraf Salama argues that transformative pedagogy can be instrumental to moving the design studio from a place of passive domain-knowledge consumption, to one that is active, critically reflective, and responsive to broader social patterns and issues.[113] Salama also promotes the view that transformative learning has a dialogic nature, and that it focuses on the educator-student and peer-to-peer relationships, and the potential for collaborative creation and equitable power distribution.[114]

Transformational pedagogy is described by George Slavich and Philip Zimbardo as the creation of 'dynamic relationships between teachers, students, and a shared body of knowledge to promote student learning and personal growth'.[115] They position the belief that educators can inspire their students to make self-discoveries that shape their fundamental attitudes about themselves as a central component of transformational teaching and argue that educators are 'intellectual coaches' who facilitate both student-student and student-educator collaboration, not only to assist students in mastering key course concepts, but also to augment their own personal and intellectual growth, and 'transform their learning-related attitudes, values, beliefs and skills'.[116]

The concept of 'metamorphic architecture' is an architecture that can continuously adapt in 'size, form and [...] configuration' as a response to the ever-changing human and environmental conditions.[117] Meta-morphic Pedagogy responds in a similar way to these ever-changing human and environmental conditions. Inherently defined as a humanist and transformational approach to teaching in times of radical and unpredictable change, Meta-morphic Pedagogy advocates customised learning paths to individually engaged students. This enables the delivery of personalised online learning in small, digestible components, with whatever resources are readily accessible at the time. Often this occurs while having to rapidly respond to uncontrollable external social challenges.

Being dialogic in nature and focusing on the educator-student and peer-to-peer relationships, and the potential for collaborative creation and equitable power distribution, Meta-morphic educators assume the role of intellectual coaches who facilitate collaboration to augment ethical, personal, and intellectual growth. Under certain circumstances,[118] students, in turn, are empowered and transformed into their learning-related attitudes, values, beliefs, skills, and critical consciousness. Within an ecosystem-of-learning,

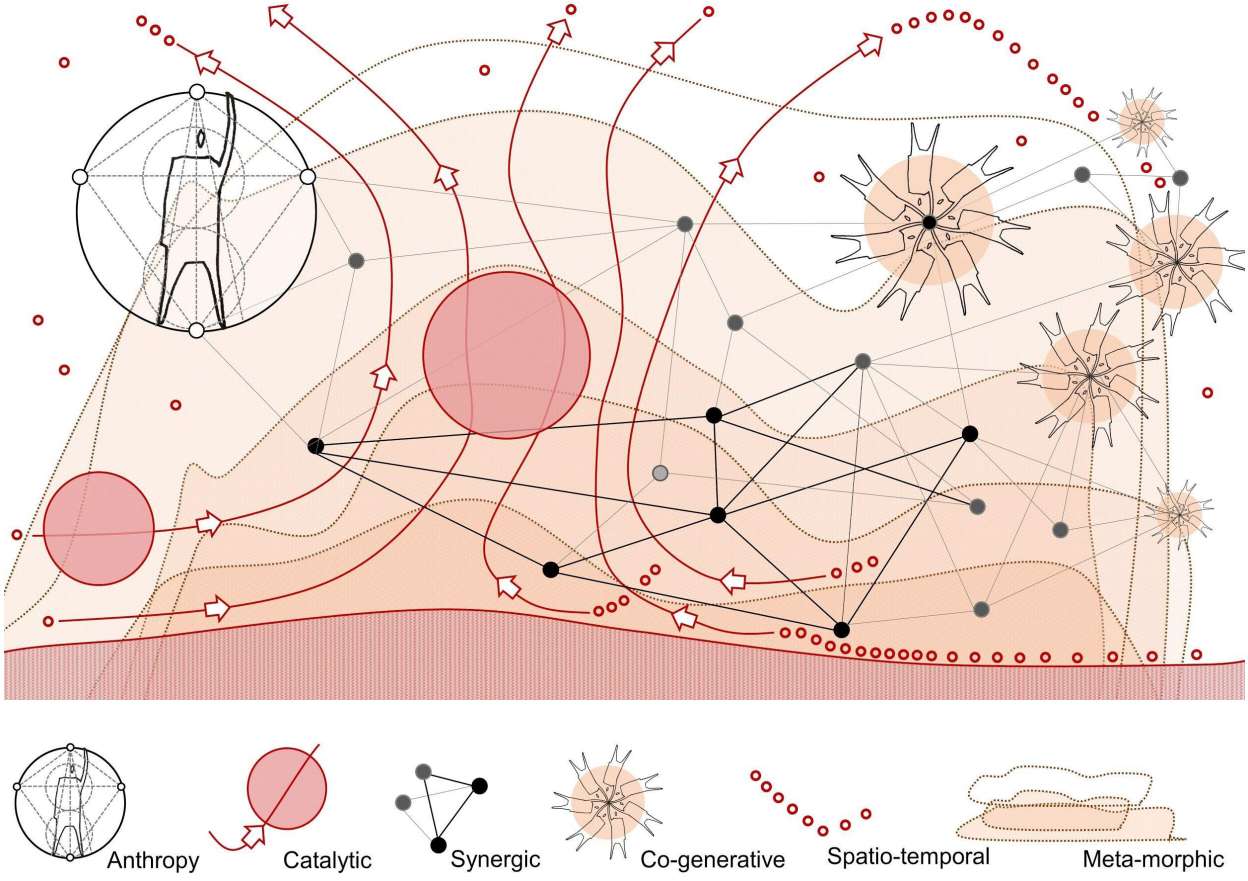

Figure 1:
An ecosystem-of-learning:
Six pedagogical clusters.

Meta-morphic Pedagogy has the potential to facilitate learning experiences that are adaptable to fluctuating conditions and disruptions, allowing learning to take place anytime, anyplace, and at any pace.

Culmination

In this essay we presented six pedagogical clusters. We considered pedagogies that are not typically associated with architectural education, drawing on the natural and earth sciences with ecosystems as a language and structure for our investigation and reflection. The six clusters are Anthropy Pedagogy, Catalytic Pedagogy, Synergic Pedagogy, Co-generative Pedagogy, Spatio-temporal Pedagogy, and Meta-morphic Pedagogy. Pedagogies related to the human aspect and empathy are addressed by Anthropy Pedagogy, activism is associated with the Catalytic Pedagogy cluster, and inclusion is the main theme of Synergic Pedagogy. Making-together pedagogies belong with Co-generative Pedagogy, learning and teaching modes, including time and space, are addressed by the Spatio-temporal Pedagogy cluster and Meta-morphic Pedagogy describes change.

The six pedagogical clusters form part of a new responsive, resilient, and replicable ecosystem-of-learning approach for architectural education. This approach describes a complex space that may include a network of tools,

technologies, resources, people, and places. Through graphic visualisation, we speculate how each cluster can exist in relation to the other, and how they may potentially be sustained by and grow with the others (illustrated in Fig. 1). We recognise, however, that this illustration suggests only one of multiple ways that the pedagogical clusters can potentially be organised and connected. It depends on the specific circumstances and context, as well as the network of elements, and the interconnected systemic relationships between them.

As a potential scenario, in the context of the pivot which demanded rapid change, the illustration depicts Meta-morphic Pedagogy prominently situated as the foundation – the constant and the change in the ecosystem. In this scenario, Meta-morphic Pedagogy is activated through Catalytic Pedagogy, which is located at the heart of the ecosystem as a catalyst of change. Metamorphic Pedagogy intersects with Anthropy Pedagogy and Synergic Pedagogy – the latter two equally prominent and embedded, connecting all the clusters, and for the most part overlapping with Meta-morphic Pedagogy. Co-generative and Spatio-temporal Pedagogies extend beyond Meta-morphic Pedagogy, drawing on influences from outside the ecosystem-of-learning. Future research should further explore these pedagogical clusters, and how they may exist in an ecosystem-of-learning with many other elements. Consideration should be given to what extent these acted as catalysts in the successful transition beyond the pivot, and to understand their application to new post COVID-19 architectural education contexts and situations.

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