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Learning *with* environments: Developing an ecological psychology inspired relational pedagogy

Abstract

A disconnect from environments has largely dominated educational discourse and policy. Attention to place and environment in education has gained momentum recently through several relational theories. Application of these theories in education note the materiality and relationality of pedagogy, though often without specificity as to what the pedagogy is—how it is enacted and what guides such pedagogy. For pedagogical direction in enlivening learning with environments, this paper looks to the potential of ecological psychology theories of environmental affordances and developing specificity via perception and action with environments. To illustrate such, we offer reflections on the pedagogical gap from a teacher education project that attunes preservice teachers to the potential for learning by engaging with spaces produced for children by artists. We then look closely to the pedagogical practices of an artist working with children in a primary school maker space-oriented program. Inspired by ideas and concepts from ecological psychology, we identify four pedagogical principles in practices of responsive learning with environments and suggest these as a possible pedagogical framework for eliciting embodied, emplaced, relational and integrated learning with environments.

We (the authors) are interested in how to work pedagogically *with* environments. We recognise environments as agents and catalysts in learning, aligning with the notion of learning environments as ‘the third teacher’ (Edwards, 2012) espoused in the philosophy of the preschools of Reggio Emilia, Italy. This concept has spread to common usage in early childhood education across the globe, for example in Sweden (e.g., Dahlberg, 1999), the UK (e.g., Kinney & Wharton, 2006) the US (e.g., Curtis & Carter, 2003), Australia (e.g., Stonehouse, 2011), Canada (e.g., Fraser, 2012) and New Zealand (e.g., Terreni, 2006); although the notion of land as pedagogy is timeless (Simpson, 2014). Both examples contrast the long legacy of schools designed as institutions that control and corral (see e.g., Foucault, 1977) with emphasis on utilitarianism (Mulcahy, Cleveland, & Aberton, 2015). Though there has been recent increase and attention on innovation in design of learning environments, the

focus has largely been on the design and not on pedagogical practice (Blackmore, Bateman, Loughlin, O'Mara, & Aranda, 2011; Young, Cleveland Imms, 2019). This is why we seek to explore how to work pedagogically *with* environments, with emphasis being on the *with*, aligning with ecological psychological understandings of organism and environment as indivisible (Ingold, 2000). We seek to clarify pedagogical practice for teachers wishing to engage with their classroom (and indeed other environments) as pedagogical in the ways that it offers possibilities for action tempered by the education of attention or attunement to place (Heft, 2018; Rietveldt & Kiverstein, 2014).

First, we discuss how this problem of the gap of specificity of working pedagogically *with* environments emerged in a teacher education course that looks at designing early years classrooms. Then, we explore the potential of different spatio-material theories to locate a workable theory to produce specificity on how to work pedagogically *with* environments. Case study data of an artist and parents bringing skilled action to a maker-space in a primary school setting provides some focus for detecting pedagogical practices within a particular landscape of affordances (Rietveld & Kiverstein, 2014). The analytical process applied to the data set is explained, and four pedagogical principles identified, with illustrative vignettes and discussion for each principle. We conclude with what contribution these principles may offer in terms of working pedagogically with environments.

Considering classroom space as pedagogical

From 2013, Louise has annually taken early years curriculum students enrolled in a Bachelor of Education (Primary) to visit premier public program spaces designed for under eight year olds in Brisbane (The Corner at the State Library and the Children's Art Centre at Queensland Art Gallery/Gallery of Modern Art) to critically review the features of the space

with regard to what excites young children and motivates them to explore and actively engage with the space. The following is Louise's personal reflections of this initiative. An empirical study has not been conducted, these reflections provide background to the sparking of our inquiry. These sites are visited to inspire preservice teachers to think otherwise about the possibilities for early years classrooms, because they have world class reputations as innovators in spaces for children. Principles of inclusivity and accessibility; multi-sensoriality; and innovation inform the Children's Art Centre interactive exhibits that are responsive to each specific artist/institution with which the Gallery works with to demystify the practice of being an artist (personal communication, Laura Mudge, Senior Program Officer, Children's Art Centre, July 27, 2016). The Corner (SLQ) employs arts-workers on a daily basis to enhance child and family interactions with the artist designed space for children that is refitted based on themes inspired by various stimuli (including the SLQ Collection) three times a year (State Library of Queensland, 2019). Following the inspiration and critique of these spaces the students are then asked to pedagogically plan a learning space for an early years' class to inspire wonder and facilitate co-constructed learning with an accompanying rationale of the pedagogical intent and practice for the learning space.

Each year preservice teacher classroom environment designs apply ideas from the two public programs' children's spaces such as indoor spaces that represent outdoor spaces (e.g., the Antarctica theme at The Corner in April 2017). The assessment shifts thinking away from walls filled with commercial alphabet and number charts, to spaces designed for different kinds of more relational and community connected activity, such as art-making, dramatic play, construction, yarning, musicking, construction, and nature play. But over the years, Louise realised a pattern emerging in many preservice teachers mostly attending to the aesthetics and inspiration of space, rather than attention to pedagogical action in facilitating

learning with environments. The preservice teachers could readily design inviting environments, though the written rationales of their designs offered minimal indication of what the teacher would do to support and enhance children's learning with the designed environment. Roxanne taught in the course in 2017 and 2018 and so began our discussions and inquiries about the limited attention to pedagogical practice in preservice teacher rationales for class designs.

Locating workable theory for pedagogically interacting with environments

Attention to place and environment in education has gained momentum recently through several relational theories, such as socio-material theories, new materialism, posthumanism and place-based pedagogy. Socio-material perspectives (e.g., see Massey 2005; Soja 1989; Thrift 2008) invite attention to the broad conceptualisation of the relationality of classroom spaces. Key new materialist and posthumanist ideas of “matter matters” (Barad, 2003, p. 803), and the flattening of human privilege and hierarchy (e.g., see Braidotti, 2013) offer an ontology for being and engaging with matter and environments. Illustrative examples include the attention to the politics of space and matter and identification of practices of spatial provocations in the set-up of materials and environment, in Olsson, Dahlberg, and Theorell's (2016) work of aesthetic experimentations in early childhood education rooms and Jones et al.'s (2016) readings of children's community-based spatial practices in out of school hours care as social and political acts. Each of these studies recognise the materiality and relationality of pedagogy, though with little if any specificity as to what the pedagogy is — how it is enacted and what guides such pedagogy. With attention to socio-materiality, Mulcahy, Cleveland, and Aberton (2015) noted in their Australian study of public school classrooms that pedagogic change is not elicited from learning spaces alone, but rather that

‘pedagogic change is encompassed within multiple sets of relations and multiple forms of practice’ (575).

Back in 2003, Gruenewald argued that ‘place’ is ‘profoundly pedagogical’ as “places *teach* us about how the world works, and how our lives fit into the spaces we occupy. Further, places *make* us: As occupants of particular places with particular attributes, our identity and our possibilities are shaped” (2003a, 621, italics in original). He offered two broad objectives of ‘decolonisation’ and ‘re-inhabitation’ for critical place pedagogy (2003b), which involves recognizing the ways in which thinking can “injure and exploit other people and place’, followed by identification, affirmation, conservation, and creation of cultural knowledge that nurtures and protects people and ecosystems respectively (9). Somerville (2010) furthered these two objectives with key elements of a pedagogy of place based on feminist post-structural and postcolonial theorizing: “our relationship to place is constituted in stories (and other representations); the body is at the centre of our experience of place; and place is a contact zone of cultural contact” (335). Application of these elements of critical place pedagogy have been applied in teacher education (Power & Green 2014) noting the “expanding curriculum possibilities” procured through attention to learning with environments in outdoor place-based education. Though the default understanding and application in place pedagogies is places beyond the classroom (e.g., see Wattoo & Brown, 2011), and classroom spaces tend to reproduce themselves as Barker’s (1968) seminal work on behaviour settings theory established. Overcoming the constraints of classroom space to accommodate active, agentic learners is beyond changes in design and aesthetics of classrooms, it is a pedagogical challenge for classroom teachers and one difficult for preservice teachers to imagine being done differently. We are seeking ways to clarify to pedagogically work with classroom spaces.

Socio-materialism, posthumanism, new materialism and place-based education provide ontologies for relational engagement between humans, matter and environments, inviting a more generative thinking and activity than realist perspectives of utilitarianism. Osberg, Biesta and Cilliers' (2008) proposition for schooling to focus on questions "about engagement and response" (p. 213), what they refer to as epistemologies of emergence with attention to transactions, comes to the fore. Becoming pedagogical with heightened consideration to how learning is, and might be enacted (May, O'Donoghue & Irwin, 2014), invites consideration to classroom spaces and what occurs within them. The ecological psychological paradigm of organism-environment mutuality inspired a post-cognitive turn with the work of James Gibson's (1979/1986/2015) affordance theory and Eleanor Gibson's (1991) proposal that the human species (among others) both perceive to learn and learn to perceive. These understandings affirm attention in education be on the dynamics of person and place, with the question of how classrooms accommodate active, agentic learners.

The dynamic transactions of person and place is captured by J. J. Gibson's term affordances as environmental opportunities, including material and social opportunities (Heft, 2017), actualised according to one's capabilities. Foraging for information in the perceptual array (the action of listening, touching, sensing, tasting, seeing) expands the perception of affordances and it is this cycle of perception and action that is primary in learning (E. J. Gibson & Pick, 2003). Knowing something, or deploying skilled intentionality as it has recently been theorised (see, Kiverstein & Rietveldt, 2015), develops from changes in perception as increased specificity leading to refinement of action or expertise (E. J. Gibson, 2003). James and Eleanor Gibson (1955) described perceptual learning as a process of

differentiation, through increasingly specified extracted information. Eleanor Gibson (2003) explained this understanding of learning as perceptual, through continual discrimination processes of exploratory and performatory activity in cycles of perceiving and acting, thus informing increasing refinement of learning with environments. Learning is thus the attunement to perception of affordances in information rich landscapes (Rietveld, & Kiverstein, 2014) leading to the realisation or actualisation of the identified and overtime increasingly specified affordances. Szokolszky, Read, Palatinus and Palatinus (2019) make the point that ecological psychology does not shift the learning process from one of making to finding, it promulgates an altogether more holistic view of learning where, the finding is in the making.

The application of affordance theory in learning environments is emerging, with Young, Cleveland and Imms (2019) developing a taxonomy comparing architects and teacher's perceptions of affordances of classroom environments for deep learning. They conclude there is a need for teachers to "recognise and take advantage of various affordances for teaching and learning" (conclusion, para 5), however, while noting an affordance perspective for school design is significant, the implications for understanding learning and pedagogy are vast.

Timothy Ingold's (2000) seminal work, 'The Perception of the Environment' which reconciles the separation of the biophysical and sociocultural distinctions that permeate theory in the sciences, offers application of ecological psychological thinking in organism transactions with environments in social anthropology that we see offer insights into specifying working pedagogically with environments. So that by understanding transactions with environments as perceptual exploratory activity the "perceptually acute organism", be they child, teacher, artist, is Ingold (2000) describes as "one whose movements are closely

tuned and ever responsive to environmental perturbations” (p. 260). Ingold (2000), explains that environment is a relative term, in that there can be no environment without an organism and no organism without an environment (a key premise of James Gibson’s affordance theory). Pedagogically, Ingold values the practice of showing, so that a place is experienced, smelt, touched, tasted, heard and seen, what Eleanor and James Gibson referred to as the education of attention or ‘attunement’ (E.J Gibson, 1963; J.J. Gibson, 1966). Exploration and discovery are critical to the perception of affordances, and attunement to affordances is part of a socialisation process where attention is guided, for example parents and caregivers point out what to attend to in the environment, what is of significance (Zukow-Goldring & Arbib, 2007). Attunement, furnished in the socio-material, and if we include Barker’s (1968) work, the spatio-temporal environment, inspires action or, as J. J. Gibson chose to describe: a hunt for clarity, to further increase perception of affordances. As Szokolszky et al. (2019) surmise, the “Education of attention is an action-based process, involving active search and exploration” (8). Ecological psychology offers guidance to describe how learning is enacted, through attention to transactions between child-adult-matter-environment—the relationality that applied and developmental psychology has ignored (Billington, 2018).

An open-ended exploratory approach to learning with environments, more akin to early childhood education, tasks children (the novice) to discover the meaning that lies within the space (Ingold, 2000). Clue provision assists and enhances the meaning-making process, as Ingold explains a “clue, in short, is a landmark that condenses otherwise disparate strands of experience into a unifying orientation which, in turn opens up the world to perception of greater depth and clarity” (p. 22). Clues thereby unlock doors of perception. As Ingold, further explains “the more keys you hold, the more doors you can unlock, and the more the

world opens up to you” and “that it is through the progressive acquisition of such keys that people learn to perceive the world around them” (p. 22).

From an ecological psychology position, engagement with environments is perceptual activity, that ‘is the looking, listening, touching and sniffing that goes on when the perceptual systems are at work’ (J.J. Gibson, 1982, p. 397–8). Thus we see humans as agents in their environments, and meanings of places are thus produced through being lived *in*, as social anthropologist Timothy Ingold (2000) proposed. We thus see potential in recognition of learning as a perception-action cycle where attunement or clues specifying action possibilities to be realised as affordances by active, intentional agents, might inform consideration to the classroom as a rich landscape of affordances (Rietveldt & Kiverstein, 2014). We wonder what clues artists and making offer as a context ripe for exploratory pedagogical practice.

Artists and making

Both QAGOMA and SLQ children’s spaces are designed and facilitated by artists, so Louise wondered if attention to the pedagogical practice of artists may offer insight as to how to attend to and utilise affordances of spaces and materials. The preschools of Reggio Emilia purposefully employ atelieristas (artists) to promote the aesthetic dimension, and “an intense relationship with things” (Vecchi, 2010, p. 9). Children, too, are understood to look at the world “with great intensity,” with a “greediness to understand it and to inhabit it” (Vecchi, 2010, p. 114). We suspect, as did Merleau-Ponty (1948/2004) and more recently Ingold (2000) and Stolz (2015), that clues to this deep connection of person, place, and pedagogy are particularly garnered by artists. Artists are often more sensorially aware and explore the myriad of affordances of materials and spaces beyond what they are intentionally designed for. Louise supervised Roxanne’s doctoral study on a parent initiated maker space in a

primary school where parents, volunteers and a resident artist worked with students to support open ended exploratory learning. We wondered if the ethnographic observations from this study may offer insights into how teaching and learning with environments may be pedagogically facilitated and communicated to preservice to teachers.

Some background to the Maker space

The Maker space was instigated in 2010 by parents in a small (n=65) public school (K-6) in a regional and creative community of New South Wales, Australia to support the school to provide open-ended creative learning opportunities for at least one hour per week. The space was originally called Studio but has recently been re-ascribed as a maker space because this seems to be a term with less ambiguity and much is now being written about making and maker spaces. Key ideas at the time were informed by parents own art practices and some familiarity with the ateliers (art studios) in the Reggio Emilia schools and a concern to offer some time and space for creativity and making that was learner driven thus aligning with more recent descriptions of maker spaces (see, Stevenson, Bower, Falloon, Forbes & Hatzigiann, 2018). Inspiration for creating the space came from the acquisition of disused classroom and parent concerns for supporting creativity, authentic learning, and applied conceptual skills, as well as seeking ways to make meaningful contributions in their own capacity as volunteers (see Finn, 2019a). The initiative was valued by the school principal and the NSW Department of Education provided some funding towards the program's establishment to engage community and support literacy and numeracy learning for low socio-economic status students.

The Maker space afforded children the sort of experiential learning where young children are free to forage with accessible arts, craft and recyclables and other materials inspired by children's interests and the community's resources, such as woodworking, sewing, and digital

technologies. Activity in the Maker Space is open-ended with the only proviso that children bring focus to their work. The Maker space was arranged into five smaller sections to provide a variety of benches, tables and floor spaces to work upon, with accessible materials and tools in open shelving that divides and frames each working space, although it often spilled out into the adjacent library space and outdoor environment. In the Maker space, children are supported to pursue their own interests facilitated by attentive relationships with volunteer parents and grandparents who assist and encourage children. The type of contributions made by parents varied from watching and chatting with children as they worked to sharing a skill such as sewing, sculpture, or woodworking. The parents also secured a small grant for a well-known local artist to bring more depth and quality to the children's work over two school terms (once a week for 20 weeks).



Figure 1: Maker space

Methodological and analytical approach to study of the Maker space Learning Program

The insights from the case study discussed here are drawn from a larger critical ethnography (see Finn, 2015) that examined the Maker space and its impact on the school site over a three-year period (approved through the Human Research Ethics Committee of the University

Southern Queensland). A dynamic account of the research site was garnered via multiple data sources (conversational and semi-formal interviews, photo elicitation, artefact analysis, and reflections from the field) and multiple voices of participants (children, parents, teachers, and the resident artist). The study examined transactions in the space through ecological psychology analysis, recognizing how support for relationality enhanced inclusivity in a mainstream school site (see Finn, 2019b). However, the findings discussed here are for the purposes of bringing attention to pedagogical practice in learning with environments. This has been achieved by distilling a smaller instrumental case (Stake, 1995) of the transactions between artist in residence, children, parents and the maker space across Roxanne's involvement over the three year duration of the study to identify patterns in the pedagogical practices. From an ethnographic position, we located principles of pedagogical practice of learning with environments through a dialogic reflexive process of analysis of exploring, uncovering, and making explicit the detailed nature of pedagogical transactions in learning with environments, through identification of recurrent patterns and relationships (O'Reilly, 2008). This involved a toing and froing process of Roxanne sharing descriptions of transactions between artist in residence, children and the maker space and Louise asking questions (such as what happened before, and then what happened? What did the artist do/say? How did the children respond?) of the data to gain a shared fuller picture. We both then searched for meaning and patterns, interpreting the data with concepts from the eco-behavioural paradigm including affordances, specificity, attunement and cycles of perception and action, as well as Ingold's (2000) pedagogies of showing and offering clues through an ongoing dialogic process. Identified principles were cross-checked across other observational data in the instrumental case and reflections of our own pedagogies of learning with environments.

Locating pedagogical principles for teaching and learning with environments

By examining the dynamic of person and environment transactions as mutually constituted, we attended to cycles of perception and action to locate pedagogical principles within the data. Four pedagogical principles for learning with environments were identified inspired from ecological psychology to describe activity in open classrooms and explain more thoroughly the role of the pedagogue (in this case an artist). What we see and describe is pedagogy is an emergent, relational and responsive practice, in contrast to many teachers' "existing understandings of pedagogy as a structured activity" (Saltmarsh, Chapman, Campbell & Drew, 2015, 317). The following provides an illustrative example of each of the four principles (provocative clues, showing-without-telling, offers to enhance, and attuning with perception-action cycles), accompanied with interpretation and inspired by ecological psychology's attention to perceiving to learn and learning to perceive.

Provocative Clues: Inviting exploratory behaviour

During her residency, Jana (a pseudonym for the artist) came bearing baskets of natural materials—native grasses, sticks, bark, and leaves from banana trees. She also brought a few of her own creations for inspiration: 3-D sculptures, cocoon like ornaments, baskets and handmade string, not unlike the physical stimulations that Vecchi (2010) describes the atelieristas at the preschools in Reggio Emilia providing to invite "an intense relationship with things" (p. 9). Jana, and her arts practice, was briefly introduced to the children at the start of their sessions, but the children were still able to do whatever they wanted in their Maker space time. Jana did not actively teach but rather engaged in her own arts practice alongside the children as they took up materials and enacted their own intentions in the space. Many children were enthralled with Jana's artefacts and the affordances she had found in natural materials as weave-able and sculpt-able objects. The novel objects Jana introduced to

the environment solicited inquiry, wonder, and for some children a desire to work alongside Jana, picking up materials for exploration and soaking up the information she had to share on subjects relating to the procurement, treatment and application of materials across cultures, for example. Others returned to their own projects but occasionally, or towards the end of their session, would take up pieces of lomandra grass or banana fibre and so begin exploration as if not wanting to miss out entirely on engaging with the affordances of transactions between self, fibres, techniques and Jana. Jana brought a specific presence that inherently aligned with the intent of the Maker space. Through engaging her own art practices, without a concern to ‘teach’, the artefacts and the materials she worked with inspired those around her to inquire, engage, explore, and wonder at her achievements, without a fear to embark on their own practice alongside Jana in a reciprocal relational space. Children initiated coming into relationship with the native grasses, sticks, knots and needles, and of course Jana and her twisting fingers of their own volition inspired by the provocative clues (See Figure 2).



Figure 2: Artist provided provocative curiosities: 3-D sculptures, cocoon like ornaments, baskets

We see in this pedagogical practice, Jana providing an offer, a clue of what to pay attention to. This is not unusual; teachers bring things into the classroom all the time, but Jana didn't explicitly teach with the offer, rather she was present in the space as a practicing artist, inviting exploration of the affordances of the materials. Jana provided provocative clues that invited exploratory behaviour rather than have children reproduce an activity. Jana did not offer explicit instructions nor did the children in the Maker space ask what to do, however their viewing of Jana's finished pieces and her work-in-progress (further clues) as she practiced proved extremely inspiring to others. This was also the way children's own work often inspired their peers, as one parent in the study describes:

Often the first thing they'll do is they'll come and they'll see something that has been made by another student between the time that they were in the Maker space last and they'll say "Who made that?" And often I don't know because they're not in my class so I'll go, "I don't know, but isn't it good" and we'll talk about what it is and then sometimes one or two of them will try and make something similar or build on the ideas, which is pretty impressive. (Bianca, Parent Volunteer, Interview, 7/10/2010)

Thus, provocative clues were provided not just by adults but by the children. This in turn inspired an online gallery of work for continued conversation and social engagement about the activity in the Maker Space (See Figure 3).

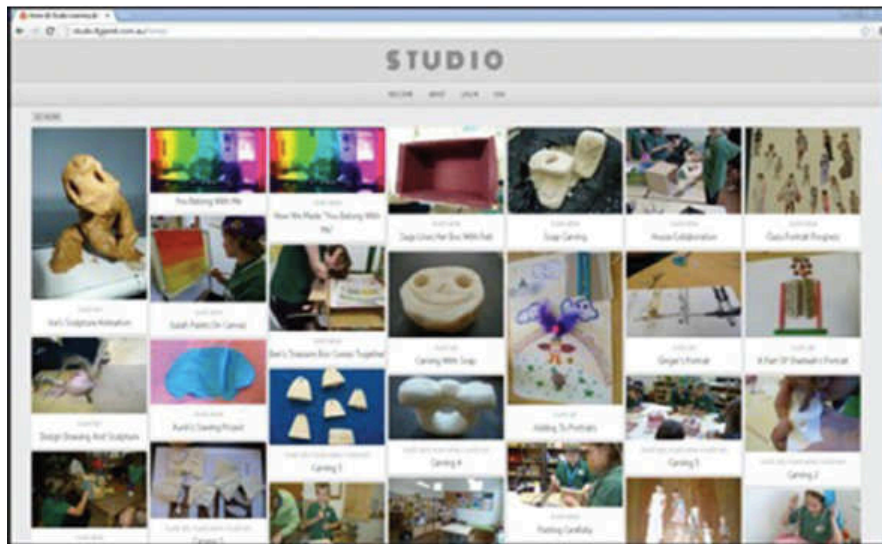


Figure 3: Maker space online gallery

Showing-without-telling: Inviting shared attention

To show something to another is inviting their perceptual attention. Through showing, “truths that are inherent in the world are, bit by bit, revealed or disclosed to the novice” (Ingold, 2000, p. 22). James Gibson (1979/1986/2015) referred to such as “education of attention” (p. 254). The following vignette illustrates a typical example of Jana’s invitation to share attention and therefore attune Roxanne to the affordances of grasses for weaving indicating this pedagogical approach is not specific to only adult-child transactions:

...Jana’s insights were revealed to me more through what she didn’t do, than what she did. The first week I sat next to her introducing myself, expressing appreciation of her work and a desire to talk about what she was doing. Jana cut me off instantly and beckoned with a huge smile, “Would you like to have a go?” She picked up two strands of the lomandra grass and exuberantly offered her hands out in front, as if they would speak for her with more clarity than words! My train of thought was stopped in its tracks, stopped long enough to notice my next breath drawing in. On the

out breath, I was with Jana, drawing in everything her hand had to show me...

(Reflective diary entries, Feb-March, 2013)

Jana's approach acknowledged the importance of communicating through actions, through showing-without-telling, a pedagogical approach most often aligned to learning outside of formal education (Lave & Wenger, 1991; Rogoff, 2003). We see Jana's practice as what Ingold (2000) advocates for in a practice of showing in learning with environments, so that place is experienced, smelt, touched, tasted, heard and seen.

Jana understood the significance of this pedagogical practice of showing-without-telling as an invitation to share attention, what Heft (2013) contends is the foundation of all pedagogy.

Discussing the Maker space one afternoon, Jana explained that she believed that "*Kids don't want you to do it for them!*" And in a meeting of parents and teachers she attended, she also advocated for learning in this relational way as children participate in guided practice: *...I can just see how, in the short time I've been here, how they can learn so much more than just the weaving and the twine making, biology, history,...* (Maker space Meeting, 17/6/13, 8.15am-9.15am). The approach of showing rippled on with others, as the following vignette illustrates when one of the children and Roxanne exchange techniques:

"Lashing is so much fun" Harry said. I replied, "I haven't been shown how to lash yet, I've only been weaving." Seemingly enthusiastic about the potential for an exchange, he stated, "I don't know how to do that bit." So, I suggested, "Can you show me how to lash, and I can show you the weaving part?" He responded excitedly, "Lashing is awesome... It's so strong! Jana said in Indonesia they use it to make the roofs of the houses!" He proceeded to show me the lashing technique with an air of competence.

(Reflective diary entries, Feb-March, 2013)

Evidence from artefacts and conversations reflected how what Jana (see Figure 4) was showing the children was making connections to wider bodies of knowledge, for example, when Harry recalled the lashing technique's importance for roofing. Jana noticed the rich possibilities for learning in this context where children were in control of their activity. The Maker space's provision of opportunities for shared attention through showing, welcomed spontaneous activity and conversation, where attunement to affordances occurred in a readily flowing reciprocal way (Zukow-Goldring & Arbib, 2007). Exploration and discovery are critical to the perception of affordances, and attunement to affordances is part of our socialisation process from birth: "The knowledge that others have about object properties, and the actions they can employ to demonstrate these properties to us, vastly enlarge our knowledge" (Heft, 2001, p. 198). As Rogoff (2003) explains "children can learn by observing and pitching in to mature activities of the community. Children watch on-going events keenly and listen closely to narratives and nearby conversations and contribute as they are ready" (p.366). Showing-without-telling was most often exemplified by a sense of quiet within the busy creative hum of shared ideas and innovations in the room. Roxanne became attuned to perceiving the influence of this pedagogical practice when students adopted a passive or ready stance indicating their volition to be shown a required skill (See Figure 5).



Figures 4 & 5: Showing: hands making side by side and Passive stance showing volition

Attuning with perception-action cycles: Supporting interest and wonder

Jana determined how to enhance the children's exploratory engagement with the environment by aligning with children's detection of affordances (J. Gibson, 1979/1986/2015) and their perception action cycles (E. Gibson, 2003). This involved noticing the children's enthusiasm for self-instigated activity, along with rich and meaningful exchanges with a broader mix of people from the community. She attuned with the children's perception-action cycles by noticing and responding to what clues they picked up, and when and how possibilities existed for showing-without-telling, in this way aligning with children's interest and wonder. "Wonder is relational" (MacLure, 2013, p. 229). There is relationality with the source of wonder and those who notice what you wonder about. Jana noticed children wonder, and aligned with the children's rhythms of wonder, such as can be seen in this vignette:

When Colin picks up string to wrap around handle - his initial exploratory behaviour indicates his perception of an affordance in string like fibre as wrap-around-able and an intention perhaps to enhance grip/aesthetic of the stick. As he begins to wrap string, Jana attunes to his affordance detection and offers to enhance by showing basket stitch technique. The maker space provides a means to support exploratory behaviour and as Colin makes a more functional attempt to use the banana fibre, indicating action towards a goal, Jana supports this functional attempt at making a suitable handle, by offering to instruct as useful technique.

This action of adults to both support exploration and functional attempts has recently been described by Nonaka and Goldfield (2018) and is detailed as a key practice of parents in the maker-space to support child-initiated, adult supported creative projects (see Finn, 2019a). Possibilities for action are expanded as each attunes with the other. A child's doors of perception are open to both the helpfulness of the adult and the technique his volition to

instruction affords while the adult perceives opportunities in child affordance detection as instructable. This is why Jana sees the experiences as "more than making", but as "opportunities to learn about biology, history ..." thus, exemplifying what Szokolszky et al. (2018) meant when they proposed the analogy of learning in such cycles of perception and action, as "the finding is in the making".

Research of the Maker space demonstrated that attuning with children's perception action cycles was more challenging for teachers, that they have difficulty perceiving learning in everyday circumstances under the constraints of busy timetables and reporting requirements, and the conditioning of seeing learning as representational rather than transactional (Osberg, Biesta & Cilliers 2008). For example, Vera (pseudonym, teacher) with her mind occupied with curriculum, assessment and timetabling pressures noted in a Maker space planning meeting: "some of the boys were having trouble coming up with a project, they were just heading outside and hitting the clay and things like that" (Maker space Meeting, 17/6/13). The teacher was referring to a moment when children were working on recycling clay for the Maker space. The activity offered learning potential, to connect to children's developing specificity from the physics of changing matter, to reducing consumption, along with a necessary energy release on a rainy day to which specificity of managing personal energy and attention could be discussed. By attuning with children's perception-action cycles, children's intentionality can be noticed (E. Gibson, 2003), enhancing intense relationships with things to support interest and wonder (Vecchi, 2010). Furthermore, a pedagogy of listening (as described by Rinaldi, 2006) is likened to attuning to children's perception-action cycles in that it is about being open and listening with all our senses to others' communication codes and symbols, actions, emotions, questions, interpretations and differences. Both require

teachers to tune in to what engages their student's innate curiosity to continue to bring depth and focus to learning.

Deepening learning with offers to enhance

By noticing what is captivating children's interests, through attuning with their perception-action cycles, we become better informed on how to extend their learning. Exploratory behaviour in the Maker space provided parents with opportunities to tune into child interests and challenges to support learning (by expanding action possibilities for developing skilled action) and propose offers to enhance. For example, parents organised for Jana to undertake the artist in residence position for two terms to support the children's ongoing exploration of fibre for making. Children had used string to make jewellery and material for dolls but the opportunity to have an artist working alongside the children was engaged to enhance their skills and knowledge of materials and possibilities for creativity (among other things).

Parents would often seek to enhance the environment with further material or social resources in this way, thus facilitating engagement with affordances to support children's functional attempts following their more exploratory behaviour. For example, calling on the expertise of a grandparent who had expertise working with clay after children expressed dissatisfaction with their exploratory sculptures. As Gregory expressed: "I failed with Dimentue¹! But I'm going to make an awesome scale (model) of it, but, even better this time!" (Year 4 Student, Interview, 30/7/13)

¹ A personal name given to the sculptural figure.



Figure 6: Offers to enhance strengthened Gregory's confidence & expansion of learning with clay

The example above of Colin receiving instruction from Jana to improve his handle is also illustrative of the typical offers to enhance provided in the maker-space as adults and indeed children themselves shared ideas, experience, and expertise. Jana noticed Colin's intention and aligned with it by suggesting that basket stitch would be useful to making a more elaborate and robust handle for the tool. Colin eagerly received suggestions on how to enhance his creation from Jana, who also shared her knowledge of the uses of basket stitch across cultures whilst they worked together.



Figure 7: Jana and Colin working on handle of fire stick

In the Maker space learning environment, the actions of adults to make offers to enhance was informed by attuning to the children's perception-action cycles. Jana noticed Colin's attention to the coconut fibre and his action of making a firestick with it. From this insight, Jana could then suggest what would enhance this making task, informed by her mastery of making with these materials. In the Maker space learning environment, the actions of adults to make offers to enhance children's work through tips or suggestions, sharing knowledge and skills contributed to a wider set of affordances from which to support learning.

Jana, like the parents involved, worked pedagogically in the Maker space by *attuning with perception-action cycles* of children supporting their developing effectivities and connecting them to wider bodies of knowledge via *provocative clues*, *showing-without-telling*, and *making offers to enhance* their work towards their goals. We believe these pedagogical principles are crucial to supporting children's interest and wonder in learning in embodied relational ways with environments. If the organism-environment mutuality relations of ecological psychology are cultivated in the education project, as opposed to cognitive science and biological thinking of organism and environment as being distinctly separate passive

entities (Ingold, 2000; Szokolszky, Read, Palatinus, Z., & Palatinus, K., 2019), we see great potential in not only producing deep joyful learning, but that humans are nurtured with understandings of their entangled relations with all other entities. The dominance of such biological and cognitive science thinking has fuelled the Anthropocene, where all entities on earth are for human use. And as renowned ecofeminist scholar Donna Haraway (2016) argues we need to recognise and make kin, that is, relations with all other entities, to make *kind*: to care.

An ecological psychological inspired relational pedagogy for learning with environments

By reading artist pedagogy in a maker space inspired by ideas from ecological psychology, we have located pedagogical principles for transactional learning *with* environments. Though we have looked to the pedagogical practices of an artist and recognise that many artists are attuned to sensation, affordances and perception action cycles, that contribute to developing specificity of action and knowledge, we are not by any means claiming that all artists and only artists have this capacity, but rather how the arts foreground attention to perception, sensation, matter and space. From the vignettes shared above of Jana in practice, we recognise provocative clues, showing-without-telling, attuning with children's perception-action cycles, and offers to enhance as key pedagogical principles to bring into teacher education to elicit more embodied, emplaced, relational and integrated practices in learning *with* environments in schools. So, that we don't just attend to the design of the learning environment, but rather how children, adults and environment co-exist and co-learn through an ecological psychology inspired relational pedagogy. Effectively, we recognise that all four pedagogical principles operate as united practice. Provocative clues may be pedagogically utilised through showing-without-telling, whilst attuning with children's

perception-action cycles by having intense relationships with environments. From such intense relationships, others' exploration and intentionality (what they desire to inquire, to make and to contribute) can be noticed. By noticing a child's intent or desire, ideas for offers to enhance children's explorations beyond their imaginations emerge. Collectively, we see that these four principles offer a framework to explain to preservice teachers how to work more intensely with the affordances of learning environments to cultivate deep self-motivated and joyous learning and inspire wonder as a means to co-create curriculum with environments.

We recognise the limitations of drawing from a single case and the limitations we bring as educators examining through a psychological lens, so what we propose with these four pedagogical principles is a beginning that we see offers potential for guiding relational pedagogies in learning with environments. To take these pedagogical principles into teacher education, we advocate for more time and attention to working pedagogically *with* learning environments through observing children and adults co-existing and learning with environments. The art of teaching has greater potential to be understood through close observation to the influence of environments on learning. Looking beyond education sources, to examine children's public program facilities and artists as pedagogues, offers new ways of seeing, knowing, and doing education, to attend to the knowledge emergence from learner transactions with environments (Osberg, Biesta and Cilliers 2008). Since developing these four pedagogical principles we have conducted a post-qualitative inquiry of the pedagogy of artworkers at The Corner at the State Library, Queensland, to see what emerges through ecological psychology and post-humanist readings of processes and practices in child, interdisciplinary artist and family collaborations at play (see Phillips & Finn, in press; Phillips, in press). At The Corner we witnessed the artworkers apply these four principles in

subtle relaxed ways nurturing a rich relational culture. Agential realism offered a means, to see what emerges in being with entities in The Corner and ecological psychology provided explanations of the dynamism of transactions to define the responsive organic pedagogy at play. Both theories draw attention to being with matter and the intra-actions or transactions between. Both nurture relationships, attentiveness, liberty, expressiveness, and creativity of emplaced, embodied, learning with environments that support joy, agency, and inspiration. Ecological psychology helps to explain – we feel to broader audiences of undergraduate students, parents, and policy makers. And it is relational pedagogies of learning with environments that are required to mitigate environmental ecocide and support adaptation to localised sustainable practices. Such relational pedagogies, as we have proposed, provide a necessary antidote to humancentricism and neoliberalism’s heightened individualism that fuels excessive local, national and global performative competition, consumerism, anxiety, and depression, so that we instead foster relations to all entities with curiosity, care and wonder through attuned relational perceptions and actions.

Bios

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Louise is an Associate Professor of Education at James Cook University, Singapore, where she coordinates the early childhood education degree. She has more than 30 years of experience working with children across various settings, as an early childhood educator, storyteller, consultant, researcher and tertiary educator. Louise’s research interests include children’s rights and citizenship, arts and rights based pedagogies and methodologies, storytelling, and creative learning environments. See <http://louptales.education>

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References

- Barad, K. (2003). Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter. *Signs*, 28(3), 801-831. doi:10.1086/345321
- Barker, R.G. (1968). *Ecological psychology: Concepts and methods for studying the environment of human behaviour*. California: Stanford University Press.
- Billington, T. (2018). Psychological assessments of young people in family courts: Relationality, experience, representation and the principle of "do no harm". *Qualitative Research in Psychology*.
<https://doi.org/10.1080/14780887.2018.1456589>
- Blackmore, J., Bateman, D., Loughlin, J., O'Mara, J., & Aranda, G., (2011). *Research into the connection between built learning spaces and student outcomes*. Department of Education and Early Childhood Development, East Melbourne, Vic.
- Braidotti, R. (2013). *The posthuman*. Cambridge, UK: Polity Press.
- Curtis, D., & Carter, M. (2003). *Designs for living and learning*. St Paul: Redleaf Press.
- Dahlberg, G. (1999, 24-24 September). *Early childhood pedagogy in a changing world--A practice-oriented research project troubling Dominant discourses within the field of early childhood education*. Paper presented at the Unpacking observation and documentation: Experiences from Italy, Sweden and Australia, Institute of Early Childhood, Macquarie University, Ryde.
- Edwards, C. (2012). Teacher and learner, partner and guide: The role of the teacher. In C. Edwards, L. Gandini & G. Foreman (Eds.). *The hundred languages of children: The Reggio Emilia experience in transformation* (3rd ed., pp. 147-172). Santa Barbara, CA: Praeger.
- Finn, R. (2015). Affordances of place: Implications of ecological psychology for inclusion. Unpublished Doctoral Thesis, University of Southern Queensland.
- Finn, R. (2019a). Specifying the Contributions of Parents as Pedagogues: Insights For Parent-School Partnerships. *The Australian Educational Researcher*. 46 (5), pp 879-891 doi:10.1007/s13384-019-00318-2
- Finn, R. (2019b). How pedagogical diversity can afford parallaxes of competence: towards more inherently inclusive school. *International Journal of Inclusive Education*, DOI: 10.1080/13603116.2019.1642400
- Fraser, S. (2012). *Authentic childhood*. Toronto: Nelson Education.
- Foucault, M. (1977). *Discipline and punish*. London: Penguin.
- Gibson, E. J. (1963). Perceptual learning. *Annual Review of Psychology*, 14, 29-56.
- Gibson, E. J. (2003). The world is so full of a number of things: On specification and perceptual learning. *Ecological Psychology*, 15(4), 283-287.
doi:10.1207/s15326969eco1504_3
- Gibson, E.J., & Pick, A.D. (2000). *An ecological approach to perceptual learning and development*. Melbourne: Oxford University Press.
- Gibson, J. J. (1966). *The senses considered as perceptual systems*. Boston: Houghton Mifflin
- Gibson, J. (1979/1986/2015). *The ecological approach to visual perception*. New Jersey: Lawrence Erlbaum Associates, Inc.
- Gibson, J.J. (1982). *Reasons for realism: selected essays of James J. Gibson*, (Eds E. Reed and R. Jones). Hillsdale, New Jersey: Lawrence Erlbaum.
- Gruenewald, David. A. (2003a) Foundations of Place: A multidisciplinary framework for place-conscious education, *American Educational Research Journal*, 40:3, 619-654.
- Gruenewald, David. A. (2003b) The Best of Both Worlds: A critical pedagogy of place, *Educational Researcher*, 32:4, 3-12.
- Haraway, D. J. (2016). *Staying with the trouble: Making kin in the Chthulucene*. Durham,

- NC: Duke University Press.
- Heft, H. (2001). *Ecological psychology in context: James Gibson, Roger Barker, and the legacy of William James' radical empiricism*. London: Lawrence Erlbaum Associates.
- Heft, H. (2017). "Perceptual Information of "An Entirely Different Order": The "Cultural Environment" in The Senses Considered as Perceptual Systems." *Ecological Psychology*, 29 (2): 122–145. doi:10.1080/10407413.2017.1297187.
- Heft, H. (2018) Places: Widening the Scope of an Ecological Approach to Perception–Action with an Emphasis on Child Development, *Ecological Psychology*, 30:1, 99-123, DOI: 10.1080/10407413.2018.1410045
- Ingold, T. (2000). *The perception of the environment: Essays on livelihood, dwelling and skill*. London: Routledge.
- Jones, S., Thiel, J. J., Davila, D., Pittard, E., Woglom, J. F., Zhou, X., . . . Snow, M. (2016). Childhood geographies and spatial justice: Making sense of place and space-making as political acts in education. *American Educational Research Journal*, 53(4), 1126-1158. doi:10.3102/0002831216655221
- Kinney, L., & Wharton, P. (2006). *An encounter with Reggio Emilia: Children's early learning made visible*. Abingdon, OX: Routledge.
- Kiverstein, J. & Rietveld, E. (2015). The Primacy of Skilled Intentionality: on Hutto & Satne's the Natural Origins of Content, *Philosophia*, 43:701–721 DOI 10.1007/s11406-015-9645-z
- Lave, J., & Wenger, E. (1991). *Situated learning: legitimate peripheral participation*. Cambridge, UK: Cambridge University Press.
- MacLure, M. (2013). The wonder of data. *Cultural Studies* ← → *Critical Methodologies*, 13(4), 228-232.
- Massey, D. (2005). *For Space*. London: Sage.
- May, H., O'Donoghue, D., & Irwin, R. (2014). Performing an intervention in the space between art and education. *International Journal of Education through Art*, 10(2), 163-177. doi:10.1386/eta.10.2.163_1
- Merleau-Ponty, M. (1948/2004). *The world of perception* (O. Davis, Trans.). London and New York: Routledge.
- Mulcahy, D., Cleveland, B., & Aberton, H. (2015). "Learning Spaces and Pedagogic Change: Envisioned, Enacted and Experienced." *Pedagogy, Culture & Society* 23 (4): 575–595. doi:10.1080/14681366.2015.1055128.
- Nonaka, T., & Goldfield, E. C. (2018). Mother-infant interaction in the emergence of a tool-using skill at mealtime: A process of affordance selection. *Ecological Psychology*, 30(3), 278–298. https://doi.org/10.1080/10407413.2018.1438199.
- Olsson, L. M., Dahlberg, G., & Theorell, E. (2016). Displacing identity – placing aesthetics: early childhood literacy in a globalized world. *Discourse: Studies in cultural politics of education*, 37(5), 717-738. DOI: 10.1080/01596306.2015.1075711
- O'Reilly, K. (2008). *Key concepts in ethnography*. Thousand Oaks, CA: Sage.
- Osberg, D., Biesta, G., & Cilliers, P. (2008). From Representation to Emergence: Complexity's challenge to the epistemology of schooling. *Educational Philosophy and Theory*, 40(1), 213-227. doi: 10.1111/j.1469-5812.2007.00407.x
- Phillips, L.G., & Finn, R. (in press). What emerges in playing in The Corner of artist-curated and created matter. In Hackett, A., Holmes, R., & MacRae, C. (eds.). *Working with young children in museums*. Abingdon, OX: Routledge.
- Phillips, L. G. (in press). Aesthetic experiences of making with paper in The (artist-infused) Corner for under eight year olds. In P. L. Maarhuis, & A.G. Rud, (Eds.) *Imagining Dewey: Artful works and dialogue about Art as Experience*. Rotterdam. Brill/Sense.

- Power, K., & Green, M. (2014). Reframing primary curriculum through concepts of place. *Asia-Pacific Journal of Teacher Education*, 42(2), 105-118. doi:10.1080/1359866X.2014.896869
- Rietveld, E. & Kiverstein, J. (2014). A rich landscape of affordances. *Ecological Psychology*, 26:4, 325-352, DOI: 10.1080/10407413.2014.958035
- Rinaldi, C. (2006). *In dialogue with Reggio Emilia: Listening, researching and learning*. New York, NY: Routledge.
- Rogoff, B. (2003). *The cultural nature of human development*. New York: Oxford University Press.
- Saltmarsh, S., Chapman, A., Campbell, M., & Drew, C. (2015). "Putting "Structure within the Space": Spatially Un/responsive Pedagogic Practices in Open-plan Learning Environments." *Educational Review*. 67(3) 315-327 doi:10.1080/00131911.2014.924482.
- Simpson, L. B. (2014). Land as pedagogy: Nishnaabeg intelligence and rebellious transformation. *Decolonization: Indigeneity, Education & Society*, 3 (3), pp. 1-25
- Soja, E. W. (1989). *Postmodern Geographies: The Reassertion of Space in Critical Social Theory*. London: Veso.
- Somerville, M. (2010). A place pedagogy for "global contemporaneity". *Educational Philosophy and Theory*, 42(3), 326–344. doi:10.1111/j.1469-5812.2008.00423.x
- Stake, R. E. (1995). *The art of case study research*. Thousand Oaks, CA: Sage.
- State Library of Queensland (2019). *The Corner*. Retrieved from <https://www.slq.qld.gov.au/discover/children-families/corner>
- Szokolszky, A., Read, C., Palatinus, Z., & Palatinus, K. (2019). Ecological approaches to perceptual learning: learning to perceive and perceiving as learning. *Adaptive Behavior*, <https://doi.org/10.1177/1059712319854687>
- Stevenson, M., Bower, M., Falloon, G., Forbes, A., & Hatzigianni, M. (2019). By design: Professional learning ecologies to develop primary school teachers' makerspaces pedagogical capabilities. *British Journal of Educational Technology*, Vol 50 No 3 2019 1260–1274, doi:10.1111/bjet.12743
- Stolz, S. A. (2015). Embodied learning. *Educational Philosophy and Theory*, 47(5), 474-487. doi: 10.1080/00131857.2013.879694
- Stonehouse, A. (2011). The 'third teacher' - creating child friendly learning spaces. *Putting children first*, (38), 12-14. Retrieved from http://www.imagineeducation.com.au/files/GapTraining/NCAC_20_20The_20third_20teacher_ChildFriendlySpaces.pdf
- Terreni, L. (2006). *If the environment is the third teacher what language does she speak?* . Paper presented at the 6th Annual Professional Development Symposium: The politics of early childhood education, Auckland.
- Thrift, N. (2008). *Non-representational Theory: Space, Politics, Affect*. London: Routledge.
- Vecchi, V. (2010). *Art and creativity in Reggio Emilia: Explore the role and potential of ateliers*. New York: Routledge.
- Wattchow, B., & Brown, M., (2011). *A Pedagogy of Place: Outdoor Education for a Changing World*. Melbourne: Monash University Publishing.
- Young, F., Cleveland, B., & Imms, W. (2019). The affordances of innovative learning environments for deep learning: educators' and architects' perceptions. *The Australian Educational Researcher*, <https://doi.org/10.1007/s13384-019-00354-y>
- Zukow-Goldring, P., & Arbib, M. (2007). Affordances, effectivities, and assisted imitation: Caregivers and the directing of attention. *Neurocomputing*, 70(13 -15), 2181-2193. <http://dx.doi.org/10.1016/j.neucom.2006.02.029> doi:10.1016/j.neucom.2006.02.029